ATSDR Studies on Chemical Releases in the Great Lakes Region

Agency for Toxic Substances and Disease Registry

December 2008

Thank you to the staff of the National Center for Environmental Health/Agency for Toxic Substances and Disease Registry (NCEH/ATSDR) for their efforts in compiling ATSDR Studies on Chemical Releases in the Great Lakes Region.

NCEH/ATSDR also extends thanks to the many partners and reviewers who contributed to the development of the report.

Howard Frumkin, MD, DrPH, Director

National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry

Thomas Sinks, PhD, Deputy Director

National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry

And a Special Thanks to the International Joint Commission:

United States Commissioners	**Canadian Commissioners**
Dennis L. Schornack, Former Chair	Herb Gray, Chair
Irene B. Brooks, Chair	Pierre Trepanier, Commissioner
Allen I. Olson, Commissioner	Jack P. Blaney, Commissioner
Sam Speck, Commissioner	

United States Section Staff	**Canadian Section Staff**
Charles A. Lawson, Secretary	Murray Clamen, Secretary
Dr. H. Kay Austin, Ecomanagement Advisor	Jim Houston, Senior Environmental Adviser
Frank Bevacqua, Public Information Officer	Bernard Beckhoff, Public Affairs Adviser

also:

Syracuse Research Corporation

Under Contract Number 205-1999-00024, and

The U.S. EPA Great Lakes National Program Office (GLNPO)

Director's Preface

Howard Frumkin, MD, DrPH

Director, National Center for Environmental Health and Agency for Toxic Substances and Disease Registry

The Great Lakes form one of the world's principal freshwater seas and one of North America's most spectacular and beautiful natural features. For the millions of people who live near the Great Lakes and the millions more who visit them, the lakes, the watersheds that feed them, and the surrounding land are a source of inspiration and sustenance.

But careless practices over many years have resulted in contamination of the Great Lakes ecosystem. Countless chemical products and byproducts of modern life—solvents, metals, pesticides, persistent organic pollutants, and more—have found their way into the air, water, land, and biota, and even into people's bodies. Substantial cleanup has already been accomplished, and more is underway. We are, however, only beginning to understand the consequences of this contamination.

For almost a century, since the 1909 enactment of the Boundary Waters Treaty, the International Joint Commission (IJC) has helped the U.S. and Canadian governments manage the lake and river systems along the border. An important expression of that commitment was the Great Lakes Water Quality Agreement (GLWQA), first signed in 1972. The GLWQA commits the United States and Canada to restoring and maintaining the chemical, physical, and biological integrity of the Great Lakes region ecosystem, and explicitly recognizes the importance of protecting human health as part of this task.

Since its formation more than 20 years ago, the Agency for Toxic Substances and Disease Registry (ATSDR) has been committed to protecting public health from chemical contamination. In 2001, the IJC asked ATSDR for "assistance in evaluating the public health implications of environmental contamination in Great Lakes Areas of Concern (AOCs) by providing information on ATSDR's public health assessments of hazardous waste sites within these AOCs." Areas of Concern are ecologically degraded places in the region. This report is the response to that request, which specifically stated

> In its 11th Biennial report, the IJC intends to comment on the hazards posed by the continuing presence of hazardous materials in the AOC's. To this end, the Commission would request that ATSDR provide to the Commission information on public health assessments that it has conducted on hazardous waste sites located within any of the 33 [*sic*] United States AOC's. It would be most helpful if ATSDR could identify evaluated sites with each AOC, the Hazard Category assigned to each site, any relevant demographic information available to ATSDR concerning populations at risk, completed exposure pathways identified, and the priority substances following these pathways.

This request was more complex than it appeared. AOCs did not correlate well geographically with waste sites that ATSDR had evaluated; some waste sites occupied small parts of an AOC while others were only partly contained within the AOC. Sources of contamination might be

outside an AOC but could still contribute to environmental pollution within that AOC. Many sources of contamination were not within ATSDR-evaluated sites.

In addition, many sites that ATSDR evaluated had since been remediated and did not provide current information regarding environmental contamination in the AOCs. Therefore, in assembling this report, ATSDR scientists considered whether additional data sources might be useful in answering the request. We surveyed many sources of data on environmental exposures and human health (see Appendix 3 for the environmental and health data that were considered).

Ultimately, four kinds of environmental data were included. At the core of the final report were the ATSDR site assessment/public health assessment data that addressed the specific IJC request quoted above. We have updated those assessments with additional information from the U.S. Environmental Protection Agency (U.S. EPA) and other sources to reflect remediation efforts since the time of the initial assessment. In addition, to provide a more complete picture of ongoing chemical inputs into the Great Lakes AOCs and to add value to the final report, ATSDR provided examples of data from three other major U.S. EPA data sources, including the Toxic Release Inventory (TRI), the National Pollutant Discharge Elimination System (NPDES) and the Impairments of Beneficial Use database. While each of these drew on a large, sophisticated database, important limitations remain: even these environmental databases taken together provide only a partial picture of the burden of chemical exposures people in the region face.

We also considered whether available health data would let us link environmental contamination in the region to human health concerns. For reasons further explicated in Chapter 1, we concluded that current data do not allow us to draw firm conclusions about the threat to human health from critical pollutants across the Great Lakes region. Further multi-agency research must address this essential public health concern. Although we were limited by available time and resources in the number of databases we could summarize in this document, we believe that the compilation of environmental data included here provides useful information to scientists, policy makers, and the public.

Limitations aside, a principal value of this report is that it compiles for the first time in one place information on 146 ATSDR site assessments conducted between 1982 and 2007 in the Great Lakes region and also provides updated information on their status. In addition, we provide some information on other chemical inputs into the Great Lakes region from publicly available datasets. A major conclusion of this report is that we need better and more integrated scientific data to allow us to assess threats that these chemicals may pose to human health. Even as we work to prevent pollution and to clean up the residua of past emissions—much-needed efforts that are well underway—we need to advance our understanding of the health consequences of chemical exposures. Better data are an essential first step.

The preparation of this report

An early draft of this report became public in 2007, before ATSDR had finished reviewing and finalizing it. That draft had unacceptable scientific limitations, described at http://www.atsdr.cdc.gov/grtlakes/pdfs/Scientific_Concerns.pdf. To assure the scientific quality of the final report, ATSDR obtained substantial internal and external scientific review of the penultimate draft of the report (including a review by the U.S. Institute of Medicine available at http://www.nap.edu/catalog.php?record_id=12476) and also invited public comment. After considering all of the comments, ATSDR carefully revised the report. Responses to the Institute of Medicine and to the public comments will be available on the ATSDR Web site.

In the course of that review and revision, several important points became clear.

First, good science matters. Earlier drafts did not clearly assemble and analyze the available data; as a consequence, the data as presented could have led to incorrect conclusions. ATSDR corrected the deficiencies and submitted the document to what we considered to be an appropriate review and clearance process for a document of this high level of importance and interest. The result is this December 2008 final document.

Second, good communication matters. Methods, data, and conclusions must be made clear to all report readers.

Third, people care passionately about the environment, about health, and about the links between the two. All of us—at our agency, across the Great Lakes region, across the nation—believe in wholesome, healthy, environments, and believe that accurate, timely information will help us get there. That shared concern is a precious resource.

This report aims to be accurate, informative, and useful to health professionals, decision-makers, and the public. It confirms that the Great Lakes region is contaminated with toxic chemicals, that we lack sufficient information about human exposure to these chemicals, that we are therefore limited in our ability to draw solid conclusions about their health impact across the region, and that we need better information. I am proud that our agency—together with many partners in government, academia, civil society, and the private sector—is taking steps to fill data gaps and improve our understanding, from our Great Lakes Human Health Effects Research Program (http://www.atsdr.cdc.gov/grtlakes/program-overview.html) to our Biomonitoring program (http://www.cdc.gov/biomonitoring/).

This report is an important step on the journey toward understanding the public health implications of environmental contamination in the Great Lakes region. We need to work hard to build that understanding. More importantly, we need to apply that understanding, by taking effective action to protect people now and in the future, and to sustain a healthy ecosystem.

Executive Summary

Background

This report responds to and extends a 2001 request from the International Joint Commission (IJC), the binational organization that works to implement the Great Lakes Water Quality Agreement (GLWQA) between the United States and Canada. The GLWQA calls for the two nations to define "the threat to human health from critical pollutants" found in the Great Lakes region. This final report supersedes all previous drafts and contains responses to public comments and to those comments in a review of the penultimate draft of this report from the Institute of Medicine (IOM) of the National Academies.

Among other things, the GLWQA calls on the two nations to define "the threat to human health from critical pollutants" found in the Great Lakes region. In its December 2001 request, the IJC asked ATSDR to review those health assessments it had conducted on hazardous waste sites within "Areas of Concern" on the United States side of the Great Lakes region. The IJC stated further that

> It would be most helpful if ATSDR could identify evaluated sites within each AOC, the Hazard Category assigned to each site, any relevant demographic information available to ATSDR concerning the populations at risk, completed exposure pathways identified, and the priority substances following these pathways.

This report

The GLWQA defines "Areas of Concern" (AOC) as ecologically degraded geographic regions that require remediation. This report summarizes ATSDR, U.S. Environmental Protection Agency (U.S. EPA), and state agency activities in 26 AOCs along Great Lakes streams, rivers, and lakes in the United States. In addition, because waste sites and other sources of environmental data frequently do not correlate well geographically with AOCs, we have also provided information on 54 counties in close geographic proximity to the included AOCs.

The pollutants

The GLWQA defines "critical pollutants" as substances that persist in the environment, bioaccumulate in fish and wildlife, and are toxic to humans and animals. The GLWQA lists 11 critical pollutants. This report emphasizes the critical pollutants within the constraints imposed by available data and also provides information on other pollutants. Where information on other pollutants is available from included sources and thought to be of interest to some readers of this report, we have included it as well.

Environmental data

At the core of the final report are the ATSDR site assessment/public health assessment data from hazardous waste sites in the AOCs or in counties that are in close proximity to AOCs. We have updated those assessments with additional information from the U.S. EPA and other sources to reflect remediation efforts since the time of the initial assessment.

In addition, to provide a more complete picture of ongoing chemical inputs into the Great Lakes AOCs and add value to the final report, ATSDR provided examples of data from three other major U.S. EPA data sources, including U.S. EPA 2001 chemical release data from its Toxic Release Inventory (TRI), U.S. EPA 2004 data on pollutant discharges into water, from its

National Pollutant Discharge Elimination System (NPDES), and data on "beneficial use impairments," such as wildlife and drinking water advisories, from each of the Great Lakes states.

The data in the report are presented in three ways: in text, in tables, and in Geographic Information System-based (GIS) maps created by ATSDR for each of the 26 U.S. AOCs and the 54 AOC counties that lie within or in close proximity to the AOCs. We have provided information that was current as this document was prepared. These datasets are, however, updated on an ongoing basis, and the most current information is found on the U.S. EPA and ATSDR Web sites.

Health Data

To assess potential health effects related to AOCs, health data should be

- biologically associated with relevant exposures, and
- well-matched to the environmental data in space and time.

Except as noted in the context of ATSDR health assessment documents, no currently available health data meet these needs; thus, the body of the report does not include other health data. The bibliography and Appendices 3 and 4 summarize additional environmental health data and research relevant to the region (though not specific to AOCs) and ATSDR remains committed to improving the availability and relevance of data linking health and environment.

Conclusions

This report yields six principal conclusions.

1. As a result of both past and ongoing releases, environmental pollution in the Great Lakes region is widespread. Of 146 hazardous waste sites located in AOC counties and evaluated by ATSDR, many have been remediated; but others are still undergoing long-term remediation. In addition, recent data from EPA databases demonstrate ongoing chemical releases in the region.
2. Throughout the region, fish tissue monitoring detects contaminant levels at or above levels thought to pose a risk to human health as determined by state and federal regulatory agencies. These monitoring efforts have led to the issuance of advisories to limit fish or wildlife consumption in all but one of the 26 AOCs—Presque Isle Bay in Pennsylvania. Fish advisories that result from chemical releases into an AOC are in some cases specific to locations within that AOC, and in other instances are regional.
3. The data reported here do not reflect the totality of chemical pollution in the region. Many sources of contamination exist that are not ATSDR-evaluated sites. TRI data did not reflect the totality of toxic releases: reporting exemptions included small firms, firms from certain industry sectors, and other categories of emitters. The NPDES data did not include information on nonpoint-source water pollutants. Thus, available data even taken together do not include exposures from pesticide applications, from mobile sources, or from indoor sources. Hence the data provide only a partial picture of contaminants in the environment.
4. The available information on environmental pollution provides little insight on the *exposure* of people to pollutants. TRI data on chemicals used and emitted, and NPDES

data on chemicals discharged into water, do not indicate whether these chemicals reach people and enter their bodies. ATSDR assessments of hazardous waste sites do, however, include analysis of exposure pathways, and, when available, include data on how much exposure actually occurs.

5. Current data do not allow us to draw firm conclusions about relationships between critical pollutants in the Great Lakes region and potential health effects.
    - Data that are routinely collected (such as information on cancer and birth defects) are not well matched to exposure data in time or by location and therefore cannot help to assess whether the identified environmental exposures have adverse health consequences.
    - In addition, data are not routinely collected on some important health effects that might be associated with toxic exposures such as neurobehavioral, endocrine, reproductive, and immune effects.
6. Although much research on environmental contamination and related health issues has been done in the Great Lakes region, more is needed. From 1992 to 2008, the ATSDR Great Lakes Human Health Research Program has provided approximately $32 million in extramural research funding to the Great Lakes region. For ATSDR, this represents a tangible commitment to public health in the region. Data from these studies have provided useful information to important public health issues and are vital to improving and safeguarding human health in the Great Lakes region. For more information on the Great Lakes Human Health Effects Research Program, see Appendix 4.

Recommendations

Additional work is needed to permit scientists, decision makers, and members of the public to define and take action to reduce the threat to human health from pollutants in the Great Lakes region. Needs include

1. Original data on environmental contaminants, including characterization of air, water, soil, foods, consumer goods, and pathways of exposure.
2. Modeling of exposure pathways using appropriate information about historical environmental exposure especially to provide information about potential causes of health conditions with long latencies.
3. Increased biomonitoring to characterize amounts of chemicals in the bodies of people living in the Great Lakes region.
4. Development of health data linkages to permit joint analyses of the various environmental data sets and linkage between health and environmental data.
5. Collection of data on a broader range of outcomes that may be associated with chemical exposure such as neurobehavioral, endocrine, reproductive, and immune functions.
6. Performance of analytical epidemiology studies to investigate specific hypotheses arising from the foregoing data sets, including advanced techniques for measuring exposure and outcomes, careful consideration of individual variability in susceptibility including genetic analyses, careful control of confounders, and sophisticated data analysis.

7. Appropriate public health action based on the foregoing information, such as developing standardized criteria for restrictions on human consumption of Great Lakes region fish.

Given the magnitude of needed actions, additional work will require a coordinated, collaborative effort by the relevant state and federal agencies and partners.

Table of Contents

Chapter 1. Background and Methods

Chapter 1. Background and Methods

The Great Lakes Water Quality Agreement (GLWQA) was first signed by the United States and Canada in 1972 and renewed in 1978 and 1983. It commits the two nations to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem. The entire GLWQA, which includes general and specific objectives to achieve these goals, is available at http://www.epa.gov/glnpo/glwqa/1978/annex.html#ANNEX%2012.

The GLWQA objectives emphasize human health protection. For example, Annex 12, "Persistent Toxic Substances," calls for the two countries to "establish action levels to protect human health based on multimedia exposure and on the interactive effects of toxic substances." That same section suggests research on the "pathways, fate and effects of toxic substances aimed at the protection of human health . . ," and in particular on research to determine "the significance of effects of persistent toxic substances on human health and aquatic life." Similarly, Annex 2, Remedial Action Plans and Lake-wide Management Plans, proposes Lake-wide Management Plans for Critical Pollutants, including "a definition of the threat to human health or aquatic life posed by Critical Pollutants, singly or in synergistic or additive combinations with another substance. . ."

1.1. Geographic Focus

The geographic focus of this report is on "Areas of Concern" (AOC) defined by Annex 2 of the GLWQA as

> a geographic area that fails to meet the General or Specific Objectives of the Agreement where such failure has caused, or is likely to cause impairment of beneficial use or of the area's ability to support aquatic life.

The "impairment of beneficial use," in turn, is defined as any of 14 possible changes in "the chemical, physical or biological integrity of the Great Lakes System." These changes are

- Restrictions on fish and wildlife consumption,
- Tainting of fish and wildlife flavor,
- Degradation of fish and wildlife populations,
- Fish tumors or other deformities,
- Bird or animal deformities or reproduction problems,
- Degradation of benthos,
- Restrictions on dredging activities,
- Eutrophication or undesirable algae,
- Restrictions on drinking water, consumption, or taste and odor problems,
- Beach closings,
- Degradation of aesthetics,
- Added costs to agriculture or industry,
- Degradation of phytoplankton and zooplankton populations, and
- Loss of fish and wildlife habitat.

Figure 1. 1. United States and Binational Great Lakes Areas of Concern

The U. S. and Canadian governments have identified a total of 43 Great Lakes AOCs: 26 in the United States, 12 in Canada, and 5 shared on connecting river systems (binational AOCs). See http://www.epa.gov/glnpo/aoc/. This report provides data on the 26 U.S. AOCs defined by the U.S. EPA, organized geographically by lake from east to west, around the lake shorelines. Lake Ontario AOCs are discussed in Chapter 2, Lake Erie AOCs in Chapter 3, Lake Huron AOCs in Chapter 4, Lake Michigan AOCs in Chapter 5, and Lake Superior AOCs in Chapter 6. The map (Figure 1.1) shows the locations of the U.S. (and binational) AOCs. The binational AOCs are addressed in the Canadian report.[1]

The locations and approximate boundaries of the AOCs are based on information provided by U.S. EPA at http://www.epa.gov/glnpo/aoc/.

[1] Elliot, SJ, Eyles J, DeLuca P. 2001. Mapping health in the Great Lakes Areas of Concern : a user-friendly tool for policy and decision makers. Environ Health Perspect 109(6):817–19.

1.2. Contaminant Focus

As defined by IJC, critical pollutants are chemicals that persist in the environment, bioaccumulate in fish and wildlife, and poison humans and animals. The IJC has identified critical pollutants as the focus for efforts to reduce pollutants in the Great Lakes. Because of their toxicity, the Great Lakes Binational Toxics Strategy identifies them as requiring immediate priority and targets them for virtual elimination (http://www.epa.gov/bns/). Table 1.2 lists these pollutants. This report includes relevant information on critical pollutants where that information is available from the existing data sources included in this report. We recognize that the IJC's interest is primarily focused on the 11 critical pollutants listed below. However, because this report will have a number of audiences in addition to the IJC, we have also provided information on other pollutants if it was available in the sources we have included.

Table 1.2. International Joint Commission (IJC) Great Lakes 11 Critical Pollutants

*IJC Tracking Number**	*Critical Pollutant, Synonyms, Relevant Contaminants in TRI and NPDES*
1	PCBs (polychlorinated biphenyls), Aroclors
2	Dioxins, PCDDs (polychlorinated dibenzo-p-dioxins), TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), other polychlorinated dioxin congeners
3	Furans, PCDFs (polychlorinated dibenzofurans), TCDF (2,3,7,8-tetrachlorodibenzofuran), other polychlorinated dibenzofuran congeners
2 & 3	Dioxins and dioxin-like compounds
4	B(a)P [benzo(a)pyrene]; carcinogenic PAHs (polyaromatic hydrocarbons)
5	DDT (dichlorodiphenyltrichloroethane) and metabolites, p,p'- and o,p'-DDT, DDE
6	Aldrin/dieldrin
7	Mirex
8	Alkyl-lead, alkylated lead, tetraethyl lead, lead, lead compounds
9	Mercury, methyl mercury, mercury compounds
10	Toxaphene
11	Hexachlorobenzene

* ATSDR assigned these numbers to the pollutants to enable tracking of those TRI and NPDES records that provide data relevant to each pollutant. The number does not reflect priority.

1.3. Methods and Data

Among other things, the GLWQA calls on the two nations to define "the threat to human health from critical pollutants" found in the Great Lakes region. In its December 2001 request, the IJC asked ATSDR to review those health assessments it conducted on hazardous waste sites within AOCs on the United States side of the Great Lakes region. The IJC stated further that

> It would be most helpful if ATSDR could identify evaluated sites within each AOC, the Hazard Category assigned to each site, any relevant demographic information available to ATSDR concerning the populations at risk, completed exposure pathways identified, and the priority substances following these pathways.

This request was more complex than it appeared. AOCs do not correlate well geographically with waste sites that ATSDR has evaluated. Some waste sites occupy small parts of an AOC while others may be only partly contained within the AOC. Sources of contamination may lie close to but not within an AOC while still contributing to environmental pollution within the AOC. Many sources of contamination exist that are not ATSDR-evaluated sites. Finally, many sites that have been evaluated by ATSDR have since been remediated and thus do not provide current information environmental contamination in the AOCs. Therefore, in assembling this report, ATSDR scientists considered whether additional data sources might be useful in answering the request. We surveyed many sources of data on environmental exposures and human health (see Appendix 3 for the environmental and health data that were considered).

At the core of the final report are the ATSDR site assessment/public health assessment data from hazardous waste sites in the AOCs or in counties that are in close proximity to AOCs. This report compiles previously published public health assessment documents for the 26 U.S. AOCs and for 54 counties in geographic proximity to those AOCs. We have updated those assessments with additional information from the U.S. EPA and other sources to reflect remediation efforts since the time of the initial assessment.

In addition, to provide a more complete and holistic picture of ongoing chemical inputs into the Great Lakes AOCs and add value to the final report, ATSDR provided examples of data from three other major U.S. EPA data sources, including U.S. EPA 2001 chemical release data from its Toxic Release Inventory (TRI), U.S. EPA 2004 data on pollutant discharges into water, from its National Pollutant Discharge Elimination System (NPDES), and data on "beneficial use impairments," such as wildlife and drinking water advisories, from each of the Great Lakes states.

These data are presented in three ways: text, tables, and Geographic Information System-based (GIS) maps created by ATSDR for each of the 26 U.S. AOCs and the 54 AOC counties that lie within or in close proximity to the AOCs (the specific included counties are shown on the individual AOC maps).

We selected datasets to include in the report that we believed were responsive to the request, for which we were able to assure scientific quality, and which we could assess and summarize with the time and resources that were available for this project. The list is not all-inclusive. It does not include all datasets that we could conceivably have included (Appendix 3 provides a list of those that were considered) and also does not include recognized but less well-defined contamination sources such as atmospheric deposition and urban/agricultural runoff that are not well represented in currently available data sources. The datasets do, however, provide a somewhat more inclusive picture of chemical inputs into the Great Lakes region than would a report limited only to ATDSR-evaluated sites.

ATSDR site assessment data are complete as of this report's release date. The specific year(s) in the databases are discussed in the description of each dataset. The specific databases included are discussed further in the sections that follow.

1.3.1. ATSDR Hazardous Waste Site Assessment Data

In 1980, Congress created ATSDR to implement the health-related sections of federal laws that protect the public from hazardous wastes and from releases of hazardous substances into the environment. The Comprehensive Environmental Response, Compensation, and Liability Act of

1980 (CERCLA), commonly known as the "Superfund" Act, includes a Congressional mandate to remove or to clean up abandoned and inactive hazardous waste sites and to provide federal assistance in responding to toxic releases (http://www.atsdr.cdc.gov/congress.html). As the lead agency for implementing CERCLA's health-related provisions, ATSDR's responsibilities include assessing the presence and nature of health hazards at Superfund sites; sometimes directly and sometimes by providing funds to states. ATSDR's reports on hazardous waste sites therefore represent a valuable data source for potential exposure to pollutants.

Sites investigated by ATSDR include CERCLA (Superfund) sites, National Priorities List (NPL) sites (EPA's list of the most serious CERCLA sites), and petitioned sites, where assessment activity begins as a result of a citizen or public official contacting ATSDR in writing to investigate a site or a sudden occurrence such as an explosion or spill. Specific and more complete definitions for CERCLA and NPL sites are provided in the Glossary of Terms in Appendix 1 of this report.

ATSDR investigations draw on available information from U.S. EPA and local governments. Such information can include physical features of the site, environmental sampling data, biota sampling data, health data, and community health concerns. ATSDR health assessors use comparison values such as ATSDR minimal risk levels (MRLs) and U.S. EPA reference doses (RfDs) to identify chemicals that might require further evaluation for their effect on human health under site-specific conditions. As part of their investigation, ATSDR health assessors identify points of exposure, concentrations of contaminants at exposure points, and potentially exposed populations. A completed exposure pathway must include all five of the following elements:

1. Contaminant source or release—examples include drums and landfills.
2. Environmental media and transport—this involves the movement of the contaminant through various media (i.e., air, soil, and water) and includes the degradation of the contaminant.
3. Exposure point. The specific location(s) where the population might come into contact with the contaminated media.
4. Exposure route. This includes the means by which contact is made by the population at the exposure point (e.g., inhalation, ingestion, or dermal contact).
5. Population potentially or actually exposed.

The confirmation of a completed exposure pathway does not necessarily mean the presence of a public health hazard. Specific conditions require examination (i.e., route of exposure and the magnitude, frequency, and duration of exposure) to evaluate the possible health implications resulting from exposures. ATSDR uses standard language to describe the level of hazard at sites (ATSDR public health assessment guidance manual 2005). These Hazard Categories are shown in Table 1. 3.

Table 1. 3. ATSDR Public Health Hazard Categories

Hazard Category	*Definition*
1. Urgent Public Health Hazard	Sites where short-term exposures (<1 year) to hazardous substances or conditions could result in adverse health effects requiring immediate action or intervention.
2. Public Health Hazard	Sites where long-term exposures (>1 year) to hazardous substances or conditions could result in adverse health effects requiring one or more public health interventions.
3. Indeterminate Public Health Hazard	Sites where a professional judgment on the level of health hazard cannot be made due to the lack of critical information about the extent of exposure or toxicologic properties at estimated exposure levels.
4. No Apparent Public Health Hazard	Sites where human exposure to contaminated media may be occurring, may have occurred in the past, or may occur in the future, but the exposure is not expected to cause adverse health effects.
5. No Public Health Hazard	Sites that because of the absence of exposure do not pose a public health hazard.

ATSDR investigations can produce several public health documents, including but not limited to public health assessments, health consultations, exposure investigations, site reviews, and updates. The three principal public health documents are

- A public health assessment (PHA) is a complete evaluation of hazardous substances, health outcomes, and community concerns at a site. A PHA is intended to determine whether people could be harmed by coming into contact with hazardous substances, and contains recommendations to protect public health.
- A health consultation (HC) is a more limited, specific-exposure, issue review of available or, in rare instances, newly collected data to respond to a particular health question or to a request for information about a potential environmental hazard.
- An exposure investigation (EI) collects and analyzes site-specific information and, when appropriate, tests on biologic samples to determine whether people have in fact been exposed to hazardous substances.

This report includes summaries of ATSDR's assessment of site-related exposures and, where available, associated health effects from 146 site narratives written between 1982 and 2007. Because the site narratives included here were based on health and environmental information provided by a variety of federal, state, and local environmental and health agencies; and because they were collected over a long time period during which ATSDR's processes and procedures were evolving, the included data and the descriptions can vary considerably from site to site.

Site narratives were abstracted from all three of the ATSDR public health document types. Results are summarized for sites categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard, which represent approximately 60 per cent of ATSDR public health assessment investigations conducted at the AOC sites. A list of all the included sites is shown in Appendix 5. Most of the sites are not located within an AOC but are found elsewhere in within counties that include part of an AOC.

For NPL sites remediated subsequent to ATSDR's evaluation, current site status was obtained from U.S. EPA NPL Fact Sheets (http://www.epa.gov/epahome/whereyoulive.htm) from written

comments from U.S. EPA's or other partners, from more recent ATSDR follow-up reports, if available, from relevant state agency updates, and occasionally from other Web sources. In some instances, updated health assessments have resulted in a revised hazard category. Due to ongoing remediation activities, current conditions at a site may differ from those described in the most recent ATSDR site assessment included here. Thus, the last available ATSDR hazard category listed in that assessment may not reflect present conditions.

1.3.2. Toxics Release Inventory 2001 Data

The Emergency Planning and Community Right to Know Act (EPCRA) of 1986 facilitates emergency planning, minimizes the effects of potential toxic chemical accidents, and provides the public with information on releases of toxic chemicals in their communities. Under this authority, the Toxic Release Inventory (TRI) Program collects data on a number of different types of disposal or other releases as reported by certain industries and federal facilities, and on certain waste management and recycling practices.

Facilities must report release information to the TRI if any of approximately 650 chemicals that they manufacture, use, or store at levels above specified thresholds. The list includes 25,000 pounds per year for chemicals manufactured or processed, 10,000 pounds per year for chemicals otherwise used, and far lower levels for a small number of persistent, bioaccumulative, and toxic chemicals. The TRI database is publicly available (http://www.epa.gov/tri) and contains information on specified toxic chemical releases to soil, water, and air from the reporting facilities.

What information is included: Information in TRI includes the location of each reporting facility, the specific chemicals manufactured, processed, and used at that facility, and estimated amounts of these chemicals released each year. Facility releases include discharges to air, water, and land. TRI data also include disposal of waste materials into landfills and Class I underground injection wells. Although landfill disposal is recorded as "releases onto land," the amount of chemicals in this category may not represent conditions for human exposure. In fact, disposal in Resource Recovery and Conservation Act (RCRA)-approved landfills equipped with liners, covers, leak-detection systems, and groundwater monitoring systems may reduce potential human exposure compared with the pre-RCRA condition of those same landfills.

What is not included: EPCRA exempts such items as chemicals used in routine janitorial or facility maintenance, chemicals used in foods, drugs, or cosmetics, and chemicals used in motor vehicle maintenance. Facilities with fewer than 10 employees are not required to report, nor are facilities in certain industrial sectors. TRI data do not therefore reflect the totality of chemical releases into a specified environment.

This dataset only lists the amounts, in pounds, of toxic substance released to air, surface water, to soil surface on site, and injected underground. The data also list toxic substances transferred off-site for disposal. Because onsite releases for counties within an AOC are most relevant to exposures in the U.S. Great Lakes AOCs, we report only those data.

This report provides 2001 TRI data as an example because these data were available to us throughout the preparation of this report. They are not a complete representation of TRI data over time. Additional and more recent TRI data are available electronically at http://www.epa.gov/tri/tridata/tri01/data/index.htm.

1.3.3. National Pollutant Discharge Elimination System (NPDES) 2004 Data

The Federal Water Pollution Control Act (33 U.S.C. §1251 et seq.), commonly known as the Clean Water Act, created the National Pollutant Discharge Elimination System (NPDES) permit program. NPDES controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Individual homes connected to a municipal system, connected to a septic system, or that have no surface discharge do not need an NPDES permit. Industrial, municipal, and other facilities, however, must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.

In addition to issuing permits, the program requires permit holders to monitor discharges to ensure compliance with their permits. U.S. EPA collects this information and, together with information about permitted discharges, makes it available to the public through the Permit Compliance System (PCS). Available NPDES reports are available at: http://www.epa.gov/enviro/html/pcs/pcs_query.html. The NPDES program only records permitted releases; thus the database does not include information about nonpoint sources of chemical releases (e.g., pesticide and fertilizer run-off from agricultural lands, animal feedlots, urban runoff, failing septic systems, illegal dump sites) and unpermitted point sources. The NPDES database does not therefore represent the totality of chemical releases into bodies of water.

1.3.4. Data on Impairments of Beneficial Use

Because of the volume of available information for NPDES-permitted facilities that discharged industrial and municipal effluent within the AOC counties, ATSDR requested that U.S. EPA query the database to identify only those facilities within the 54 U.S. AOC counties that released IJC-critical pollutants. If those facilities also released noncritical pollutants, they are included in this report. Data presented in this report are from 2004. They are presented here because they were available to us through most of the preparation of this report. More recent data for specific facilities are available from http://www.epa.gov/enviro/html/pcs/pcs_query.html.

Of the 14 Impairments of Beneficial Use discussed above, two were considered to represent a potential impact of critical pollutants on human health: restrictions on fish and wildlife consumption and restrictions on water consumption. Accordingly, these findings are summarized for each of the AOCs based on information from the U.S. EPA Web site at http://www.epa.gov/glnpo/aoc/. We included information that was current as of the date of this report.

1.3.5. Restrictions on Fish and Wildlife Consumption

Fish-tissue monitoring can determine whether contaminant concentrations exceed state-based human consumption advisories for specific fish species. Each Great Lakes state sets guidelines and advisories for consumption of sport- and subsistence-caught fish. The states may base recommendations on existing U.S. EPA or FDA guidance or develop their own, state-specific recommendations. Fish caught for commercial sale, however, must comply with U.S. FDA contaminant-concentration standards. In 1993, the Great Lakes Sport Fish Advisory Task Force[2]

[2] Critical review of a proposed uniform Great Lakes fish advisory protocol (A science report to the Council of Great Lakes Governors). 1995. Prepared by Michigan Environmental Science Board, Council of Great Lakes Governors

created a Great Lakes area-wide standard for fish contaminated with polychlorinated biphenyls (PCBs), and in 2005 created a similar standard for mercury. For PCBs, the Task Force developed a health protection value (HPV) of 0.05 µg/kg/day for PCB residue ingested from fish tissue, with associated recommendations ranging from unrestricted consumption (i.e., fish containing fewer than 0.05 ppm PCB) to "Do-Not-Eat" (i.e., fish containing more than 1.89 ppm PCBs). Every Great Lakes state except New York uses these recommendations for establishing PCB-related fish consumption advisories. The recommendations for mercury established an average dietary ingestion level below 0.1 µg/kg/day for mercury (equating to 7 µg/day for a 70-kg person). All Great Lakes states, with the exception of New York and Pennsylvania, have adopted this recommendation.

1.3.6. Restrictions on Drinking Water Consumption and Standards for Drinking Water Odor and Taste

The Safe Drinking Water Act requires monitoring for contaminants in drinking water supplied by large and intermediate drinking water utilities. This is to determine whether drinking water contains concentrations of contaminants that exceed U.S. EPA's standards for human consumption. The U.S. EPA's National Primary Drinking Water Regulations are legally enforceable standards for maximum contaminant levels (MCLs) in drinking water for such contaminants as organic and inorganic chemicals and radionuclides (http://www.epa.gov/safewater/contaminants/). If levels of contaminants exceed the MCL, the public water facility must take remedial action to lower the contaminant levels to the MCL. Nonenforceable standards are applicable for odor and taste criteria. The Safe Drinking Water Act does not, however, require small utilities and private well owners to monitor drinking water for contaminants.

1.3.7. Map Data

Using ArcGIS software (ESRI, Redlands, CA), ATSDR produced maps for each of the 26 Areas of Concern (AOC). The same maps are in both Appendix 2 and in the report. Each map shows a single AOC and its associated county or counties (referred to as an AOC county).

The maps in Appendix 2 of the report are 11 by 17 inches, but those same maps in the report itself have been reduced in size; they appear in landscape format after the Beneficial Use Impairment discussion for each AOC. The maps depict the potential sources of contamination in the AOCs, and include

- ATSDR hazardous waste sites—if the site county of record was an AOC county.
- TRI facilities—if the county of record was an AOC county.
- NPDES discharge locations—if the county of record was an AOC county.

In March 2008, we downloaded as digital Global Information System (GIS) files the AOC boundaries for both of these map types from the U.S. EPA Web site (http://www.epa.gov/greatlakes/aoc/). In addition to AOC boundaries, some of the maps contain data regarding areas of particular interest to the U.S. EPA: watersheds, source areas of concern, or expanded study areas. Each map also includes basic information such as counties, place

---

Special Fish Advisory Science Panel. Michigan Environmental Science Board. Lewis Cass Building P.O. Box 30026 Lansing, Michigan 48909; September.

names, primary roads, Interstate highways, and bodies of water. Any errors in the spatial coordinates in the databases are also reflected in the maps.

1.3.8. Health Data

To assess accurately the potential health effects related to AOCs, health data

- should be biologically associated with relevant exposures, and
- should match the environmental data in space and time.

Except as noted in the context of ATSDR health assessment products, ATSDR did not consider currently available health data to meet these needs. As a result, this report does not include other health data. Chapter 7, the bibliography, and Appendices 3 and 4 of this report, however, contain additional health data discussion, as does http://www.atsdr.cdc.gov/grtlakes/. ATSDR is committed to improving the availability and relevance of data linking health and environment over time.

1.3.9. Demographic Information

Consistent with the original IJC request, we included—when such information was available—relevant demographic data about populations (e.g., children, women of childbearing age, the elderly) that, if exposed to toxic substances, may experience higher than usual exposures or greater than usual health consequences. We did not provide general demographic data for AOC counties because those data did not allow us to determine which populations might have some risk of exposure to the toxic substances discussed in this report. But for some sites in Chapters 2–6, data are provided regarding numbers of children, women of child bearing age, and elderly persons living in close proximity (i.e., within 1 mile) of that site. Wherever possible, ATSDR has updated demographic information relevant to the specific site health assessments.

1.4. Report Revisions

This report differs in several important ways from earlier working drafts and supersedes all previous versions. Detailed information regarding the changes and the reasons for those changes is available at http://www.atsdr.cdc.gov/grtlakes/improving-science.html, and http://www.atsdr.cdc.gov/grtlakes/.

Chapter 2. Lake Ontario

Chapter 2. Lake Ontario

2.1. Oswego River AOC, Oswego County, NY

The Oswego River Area of Concern (AOC) is in Oswego County, NY, on the southeastern shore of Lake Ontario. The AOC includes the harbor areas and lower segment of the Oswego River from the harbor to the Varick power dam and is centered in the City of Oswego. On June 19, 2006, the U.S. EPA delisted Oswego River AOC as an AOC. See the AOC map at end of this chapter and in Appendix 2.

2.1.1. Hazardous Waste Sites Relevant to the Oswego River AOC

ATSDR identified three hazardous waste sites in Oswego County that it determined posed either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Information on these three sites is summarized in Table 2.1-A, together with information regarding the date and type of assessment and the type and location of the site:

Table 2.1-A. Hazardous Waste Sites in Oswego County, NY

Site Name, City, and CERLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Fulton Terminals, Fulton NYD980593099	PHA	1988	3	NPL	Completed
Pollution Abatement Services, Oswego NYD000511659	PHA PHA	1988 1997	2 4	NPL	Completed
Volney Landfill, Volney NYD980509376	PHA SRU	1987 1993	3 3	NPL	Ongoing

2 = Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard

PHA=Public Health Assessment, SRU=Site Review and Update

ATSDR conducted further evaluation of the data for these sites, summarized in the following section.

2.1.1.1 Fulton Terminals Site

This site covers less than 1 acre and is near the northern corporate limits of Fulton (Oswego County) NY. From 1936 to 1960, the primary site activity was the manufacture of roofing materials. Asphalt was stored in aboveground tanks and fuel oil was stored in underground tanks. From 1972 to 1977, the site was used for the staging and storage of materials scheduled for incineration at the Pollution Abatement Services Site in Oswego, NY. Information on this site is from the ATSDR's 1988 public health assessment and the 2004 U.S. EPA 5-year site review.

ATSDR Conclusions: Because of possible exposures to site-related arsenic, benzene, lead, and PCBs, and because of xylene in soil, in sediments, and in groundwater, ATSDR's 1988 public health assessment classified this site as an *Indeterminate Public Health Hazard* (Category 3). At that time no completed exposure pathways had been identified; the site was nonetheless fenced and the municipal water system extended drinking water to nearby residences. Still, through direct contact with contaminated soils, groundwater, and sediments, potential future pathways for exposure remained. Other identified potential

exposures included the inhalation of site-related VOCs and ingestion of plants, game animals, and fish, all of which were capable of site-contaminant bioaccumulation.

U.S. EPA Update: In 1997, U.S. EPA reported that through the joint efforts of local, county, and state government, this site had been successfully remediated. In September of 2004, U.S. EPA completed a 5-year review of the Fulton Terminals site. U.S. EPA concluded that

- site soils have been cleaned to protective levels;
- human health, ecological, and environmental risks estimated for the site are within or below acceptable levels;
- the fence around the site is intact and in good condition;
- the two groundwater monitoring wells are functional;
- there is no evidence of trespassing, vandalism or damage (to the monitoring wells or the fence); and
- there are no drinking water wells within the plume of contamination and none are expected to be drilled because of existing local and state requirements.

Available at: http://www.epa.gov/superfund/sites/fiveyear/f04-02022.pdf. 2004 Sep [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B[a]P, B[b]F, lead, and PCBs were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

2.1.1.2 Pollution Abatement Services

This 15.6-acre site is in an industrial and commercial area near the northeastern edge of Oswego, (Oswego County) NY. During the late 1950s, demolition debris was disposed of at the site. Later, from 1970 to 1977, a chemical waste incineration facility operated there. Onsite drums, three waste lagoons containing over a million gallons of wastes, and aboveground tanks all held liquid wastes awaiting incineration. From 1973 to 1976, the lagoons overflowed and liquid wastes released into White and Wine Creeks. Because of onsite wastes and contamination of groundwater, surface water, soil, sediment, and air, the site posed a public health threat. Several clean-up actions ensued.

Multiple remedial activities addressed waste materials stored onsite and contaminated groundwater, surface water, soil, and sediment offsite. Contaminants in groundwater, soil, and sediments included arsenic, benzene, cyanide, 1, 2-dichloroethane, ethylbenzene, lead, methylene chloride, nickel, phenol, selenium, toluene, trichloroethylene, xylene, and PCBs. Information on this site is from ATSDR's 1988 and 1997 public health assessments.

Public Health Outcome Data: When compared with either Westside Sewage Treatment Plant Workers or with the general population, the New York State Department of Health (NYSDOH) 1986 cancer incidence investigation did not detect a statistically significant excess in cancer incidence among workers at the Eastside Sewage Treatment Plant. Four different types of cancer were observed, two of which are quite common among men in the age group examined. The remaining two cancer types have no known risk factors in common. Furthermore, the occurrence of all four cancers arose in relatively short intervals—all fewer than 10 years from the beginning of employment at the Eastside Sewage Treatment Plant to the time of cancer diagnosis. Given the long (10–20 year) latency period for most adult cancers,

this interval is shorter than would be expected, assuming that these occupational exposures had in fact contributed to the development of cancer.

ATSDR Conclusions: In 1988, because of onsite wastes and contamination of groundwater, surface water, soil, sediment, and air with arsenic, benzene, cyanide, 1,2-dichloroethane, ethylbenzene, lead, methylene chloride, nickel, phenol, selenium, toluene, trichloroethylene, xylene, and PCBs, ATSDR concluded that this site posed a *Public Health Hazard* (Category 2). A subsequent evaluation of the site in 1997 determined that the site posed *No Apparent Public Health Hazard* (Category 4); remedial activities completed in that same year eliminated the potential for current and future exposures to site contaminants in onsite soils, soil-gas, air, surface water, and groundwater. Moreover, past exposures to residents near the site may have occurred, but the data to assess these exposures were insufficient. In 1997, U.S. EPA reported that through the joint efforts of local, county, and state government, this site had been successfully remediated.

U.S. EPA Update: U.S. EPA completed its latest 5-year plan for Pollution Abatement Services in December of 2003. At that time, U.S EPA concluded that

- The leachate monitoring/collection system is operating properly;
- The cap and vegetative cover are intact and in good condition;
- The fence around the site is intact and in good repair;
- The groundwater long-term monitoring wells are functional;
- There is no evidence of trespassing, vandalism or damage (to the cap and vegetative cover, long-term monitoring wells, or fence);
- VOC concentrations in the long-term monitoring wells located north of Mitchell Street (M-25 and M-26) (see Figure 1) are below MCLs;
- VOC concentrations in long-term monitoring wells located south of Mitchell Street (M-21 and LR-8) have attenuated over the past five years, but remain above MCLs;
- VOC concentrations in long-term monitoring well LR-6, also located south of -12-Mitchell Street, are below MCLs;
- PCB levels in creek and wetland sediments and biota are steadily declining, and are typically undetectable in the sediments at many sampling locations;
- There are no drinking water wells within the plume of contamination and none are expected to be drilled because of existing local requirements; and
- Wetlands and surface waters are not degraded by site contaminants and site remedies are expected to be in place so as to prevent contaminants from reaching and contaminating wetlands and surface waters.
- The next 5-year review is scheduled for completion sometime after December 2008.

Available at: http://www.epa.gov/superfund/sites/fiveyear/f04-02005.pdf. 2003 Dec [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, dieldrin, B[a]A, B[b]F, B[k]F, B[a]P, and chrysene were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

2.1.1.3 Volney Municipal Landfill

This site covers about 85 acres, including a former sand and gravel pit in a rural section of Volney (Oswego County) NY. From 1969 to 1983, the unlined landfill operated primarily as a municipal waste disposal facility for residential, commercial, and light industrial operations. In the mid- to late 1970s the landfill accepted wastes from several companies, some of which were designated as hazardous. About this same time, the landfill was expanded in size and included the installation of a leachate collection and drainage system in its central and northern portions. In the fall of 1985, the landfill closed and systems were put in place to control surface water drainage, landfill gas, and leachate.

ATSDR Conclusions: In 1987, ATSDR concluded that because of the undetermined nature and extent of buried waste in the landfill and because of the lack of sufficient environmental monitoring data to rule out exposures to contaminated groundwater, surface water, and creek sediments, this site presented an *Indeterminate Public Health Hazard* (Category 3). A 1993 reevaluation of site issues supported ATSDR's earlier conclusions that onsite groundwater contamination of arsenic, selenium, and vinyl chloride could affect nearby drinking water wells, thus posing an *Indeterminate Public Health Hazard* (Category 3). In 2001, U.S. EPA reported that through the joint efforts of local, county, and state governments, this site had been successfully remediated.

U.S. EPA Update: The U.S. EPA 5-year plan for the Volney Municipal Landfill site states that as of August of 2005:

- The cap and vegetative cover are intact and in good condition;
- The landfill gas system is operating properly;
- The monitoring wells are securely locked and functional;
- The extraction well is functional;
- There is no evidence of trespassing or vandalism;
- The remedy has prevented residents from drinking contaminated groundwater; and
- No additional measures are needed to protect public health.

U.S. EPA will conduct the next 5-year review on or about August 2010.

Available at: http://www.epa.gov/superfund/sites/fiveyear/f05-02028.pdf. 2005 Aug [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutant lead was identified at this site during ATSDR's assessment of exposure-related issues. For a more complete listing of hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

2.1.2. Summary and Conclusions for the Oswego River AOC

2.1.2.1 Hazardous Waste Sites

ATSDR categorized three sites in Oswego County, NY, as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some time in their assessment history. A review of the documents for these sites shows no clear evidence of current human exposure to waste site-related IJC-critical pollutants. Remediation has been completed at two of the sites, and is ongoing at the Volney Landfill site.

2.1.2.2 TRI Data

The TRI onsite chemical releases for Oswego County, NY in 2001 totaled 204,417 pounds, primarily to air, as listed in Table 2.1-B.

Only 171.3 pounds (0.08%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to air), lead and lead compounds (to air), and mercury (to land). The facilities that released these pollutants are listed in Table 2.1-C. No releases occurred of non-IJC chemicals ≥ 100,000 pounds.

2.1.2.3 NPDES Data

The NPDES permitted discharges for Oswego County, NY are summarized in Table 2.1-D. The average annual permitted discharges in 2004 totaled 147,377 pounds, primarily consisting of ammonia nitrogen and aluminum. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

2.1.2.4 Beneficial Use Impairments (BUIs)

Delisting of this site resolved the AOC-specific BUIs. Improved water quality addressed a fish consumption advisory within the AOC, and Lake Ontario-wide fish advisories addressed that lake's fish consumption restrictions. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

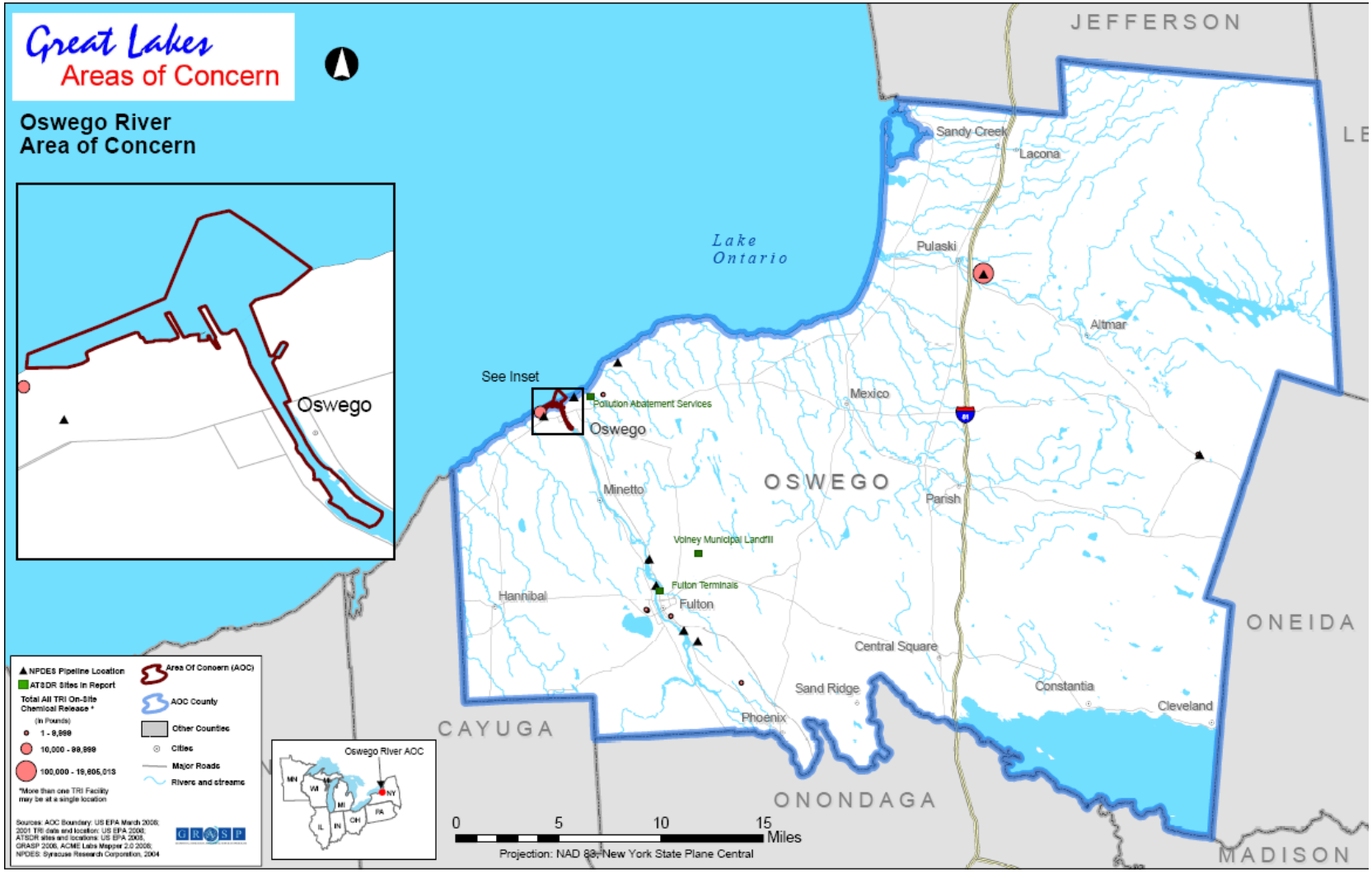

Great Lakes
Areas of Concern
Oswego River
Area of Concern
Oswego
See Inset
Pollution Abatement Services
Oswego
Lake
Ontario
JEFFERSON
Sandy Creek
Lacona
Pulaski
Altmar
Mexico
Minetto
OSWEGO
Parish
Volney Municipal Landfill
Fulton Terminals
Fulton
Hannibal
Central Square
Sand Ridge
Constantia
Cleveland
Phoenix
ONEIDA
CAYUGA
ONONDAGA
MADISON
NPDES Pipeline Location
AST&DR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,805,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Oswego River AOC
0 5 10 15 Miles
Projection: NAD 83, New York State Plane Central

Table 2.1-B. TRI Releases (in pounds, 2001) for the Oswego River AOC

Chemical	*IJC Tracking number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00624015	4.41E-06	0	0	0.00624456	1.30095E-04	0.006374655
(PCDDs and PCDFs)	3							
LEAD	8	14	No data	0	0	14	586.3	600.3
LEAD COMPOUNDS	8	132.3	No data	0	0	132.3	5507.8	5640.1
MERCURY	9	0	No data	0	25	25	0	25
	Total IJC	**146.3062402**	**4.41E-06**	**0**	**25**	**171.3062446**	**6094.10013**	**6265.406375**
ALUMINUM (FUME OR DUST)		1654	No data	0	0	1654	41805	43459
AMMONIA		8898	No data	0	0	8898	0	8898
BARIUM COMPOUNDS		10	11	0	0	21	216	237
BENZO(G,H,I) PERYLENE		0.09	No data	0	0	0.09	0	0.09
CHLORINE		1651	72	0	0	1723	0	1723
CHROMIUM		152	No data	0	0	152	105	257
COPPER		74	No data	0	0	74	70215	70289
COPPER COMPOUNDS		250	No data	0	0	250	755	1005
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		36691	No data	0	0	36691	0	36691
MANGANESE		96	No data	0	0	96	967	1063

Chemical	*IJC Tracking number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
N-BUTYL ALCOHOL		42288	2527	0	0	44815	0	44815
N-HEXANE		341	No data	0	0	341	7619	7960
OZONE		89900	No data	0	0	89900	0	89900
POLYCYCLIC AROMATIC COMPOUNDS		0.64	No data	0	0	0.64	0	0.64
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		19000	No data	0	0	19000	0	19000
TOLUENE		170	No data	0	0	170	4685	4855
ZINC COMPOUNDS		0	460	0	0	460	2440	2900
	Total Non-IJC	**201175.73**	**3070**	**0**	**0**	**204245.73**	**128807**	**333052.73**
	Total	**201322.0362**	**3070.000004**	**0**	**25**	**204417.0362**	**134901.1001**	**339318.1364**

Table 2.1-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Oswego River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Oswego County, NY	2	ALCAN ALUMINUM CORP.	13126LCNRLLAKER	OSWEGO
		OSWEGO HARBOR POWER	13126NGRMH261WA	OSWEGO
Lead and lead compounds	3			
Oswego County, NY	3	ALCAN ALUMINUM CORP.	13126LCNRLLAKER	OSWEGO
		OSWEGO HARBOR POWER	13126NGRMH261WA	OSWEGO
		OWENS-BROCKWAY GLASS CONTAINER INC. PLANT 25	13069WNSLLRD5GR	FULTON
Mercury and mercury compounds	1			
Oswego County, NY	1	NESTLE CONFECTIONS & SNACKS	13069NSTLF555SO	FULTON

Table 2.1-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Oswego River AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	0
ALUMINUM, TOTAL (AS AL)	**Total Non-IJC**	13310.33
CHROMIUM, TOTAL (AS CR)		192.36
CYANIDE, TOTAL (AS CN)		19.71
NITROGEN, AMMONIA, TOTAL (AS NH3)		131400.00
PHENOLS		268.28
ZINC, TOTAL (AS ZN)		2186.35
		147377.03
	Total	**147377.03**

2.2. Rochester Embayment AOC, Monroe County, NY

The Rochester Embayment AOC encompasses the Rochester Embayment; this is an area of Lake Ontario formed by the indentation of the Monroe County, NY shoreline. The AOC also includes approximately 6 miles of the Genesee River influenced by lake levels; that is, from the river's mouth to the Lower Falls. The drainage area consists of the entire Genesee River Basin and parts of two other drainage basins (see AOC map at end of chapter and in Appendix 2).

2.2.1. Hazardous Waste Sites Relevant to the Rochester Embayment AOC

ATSDR has identified one hazardous waste site in Monroe County that posed a public health hazard. Information on this site, including the public health threat posed by this site at the time of ATSDR activities, is summarized in Table 2.2-A, together with information regarding the date and type of assessment, and the type and location of the site:

Table 2.2-A. Hazardous Waste Sites in Monroe County, NY

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Rochester City of APCO, Rochester NYXCRZ#NY00	HC	2000	2	Non-NPL	Completed

2 = Public Health Hazard, HC = Health Consultation

ATSDR conducted a further evaluation of the data for this site, summarized in the following section.

2.2.1.1 Rochester City of APCO Site (Former APCO Property Brownfields Site)

This site covers about 5 acres in the City of Rochester (Monroe County) NY. General contracting firms used it since at least the 1930s until 1996 when the city foreclosed on the property. The site includes a construction and demolition debris disposal area and underground storage tank areas with VOC-contaminated soil and groundwater. The tanks were used for gasoline and diesel fuel, and some of them leaked. Stained surface soils with elevated PAHs were thought to be associated with dumping/spillage of used motor oil. Site information is from the 2000 ATSDR health consultation and the State of New York 2008 site update.

Demographic Data: NYSDOH's estimate from the 1990 U.S. Census data was that 24,060 persons lived within 1 mile of this site. Subpopulations considered sensitive included

Children 6 years and younger	2,334
Females aged 15–44	6,229
Adults 65 and older	not reported

ATSDR Conclusions: Because of potential for future exposures to site-related PAHs, lead, mercury, and VOCs in soil and groundwater, in 2000 ATSDR concluded that this site presented a *Public Health Hazard* (Category 2). At that time no completed exposure pathways were known, the site was fenced, and groundwater was not used for water supply wells. Still, if the

site were developed, potential future pathways for exposure through direct contact with contaminated soils remained a possibility. Migration of soil gas vapors from contaminated groundwater or contaminated groundwater itself could migrate into the basements of adjacent residences, causing inhalation exposure. That said, through the joint efforts of local, county, and state governments, in 2004 U.S. EPA reported the successful remediation of the APCO site.

U.S. EPA Update: The Rochester City of APCO site is a state Environmental Restoration Project (ERP) site and is not included in the CERCLIS database.

New York State Department of Health Update: Rochester City/APCO site remediation was completed in 2004, and the site is now a residential housing subdivision (Mark S. Sergott, New York State Department of Health, 2008 Aug 20 email). See also: RGBN field trip visits brownfields redevelopment site. Available at: http://www.ceinfo.org/resources/NL04_Summer.pdf [cited 2008 Oct 8].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B[a]P, lead, and mercury were identified at this site.

2.2.2. Summary and Conclusions for the Rochester Embayment AOC

2.2.2.1 Hazardous Waste Sites

In 2000, ATSDR concluded that due to the potential for future exposures to site-related PAHs, lead, mercury, and VOCs in soil and groundwater, the Rochester City APCO site posed a *Public Health Hazard* (Category 2). Remediation at this site was, however, completed in 2004, and this site was no longer expected to contribute to human or environmental exposure.

2.2.2.2 TRI Data

The TRI onsite chemical releases for Niagara County are summarized in Table 2.2-B. Because they are for the entire county, and because industrial activity is concentrated in or near the Niagara River AOC, these data are more relevant to the binational Niagara River AOC than to the Eighteen Mile Creek AOC. That said, total onsite releases in 2001 were 3,174,559 pounds, the majority of which were released to air, followed by releases to soil, and then to surface water.

Of the total onsite releases, 63,282 pounds were IJC-critical pollutants. The IJC-critical pollutants released were PCBs (to air), PCDDs and PCDFs (primarily to air), lead compounds and mercury compounds (primarily to land), and hexachlorobenzene (to surface water). The facilities that released these pollutants are listed in Table 3.3-C. Most of these facilities are located in the City of Niagara Falls, and, as stated, are relevant to the binational Niagara River AOC rather than to the Eighteen Mile Creek AOC.

Releases of IJC-critical pollutants relevant to the Eighteen Mile Creek AOC are PCDDs and PCDFs from a facility in Barker, lead compounds from a facility in Barker and one in Lockport, and mercury compounds from a facility in Barker.

The major releases (≥ 500,000 pounds) of non-IJC chemicals were manganese compounds and barium compounds (primarily to land).

2.2.2.3 NPDES Data

The NPDES permitted discharges for Monroe County, NY are summarized in Table 2.2-D. The average annual permitted discharges in 2004 totaled 3,597,331 pounds, primarily of nitrogen (as ammonia or nitrogen, each >1,000,000 pounds), and also ethylene glycol (474,500 pounds) and manganese (113,150 pounds). No IJC-critical pollutants were the subject of permitted (i.e., quantity average limit) discharge amounts.

2.2.2.4 Beneficial Use Impairments (BUIs)

U.S. EPA lists as AOC impairments restrictions on fish and wildlife consumption, restrictions on drinking water consumption, or drinking water taste and odor concerns.

Consumption restrictions for Lake Ontario fish are reportedly due to chemical contaminants including PCBs, Mirex, and dioxin. This advisory seems to reflect a lake-wide restriction. Wild waterfowl consumption restrictions have also been imposed based on chemical contamination. But left unclear is the restriction's scope: AOC only, or region-wide.

Treated drinking water is under no consumption restrictions. Occasional taste and odor problems with treated drinking water, however, have been reported. Those problems appear to relate to water that is drawn from Lake Ontario (in the embayment) and treated.

Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

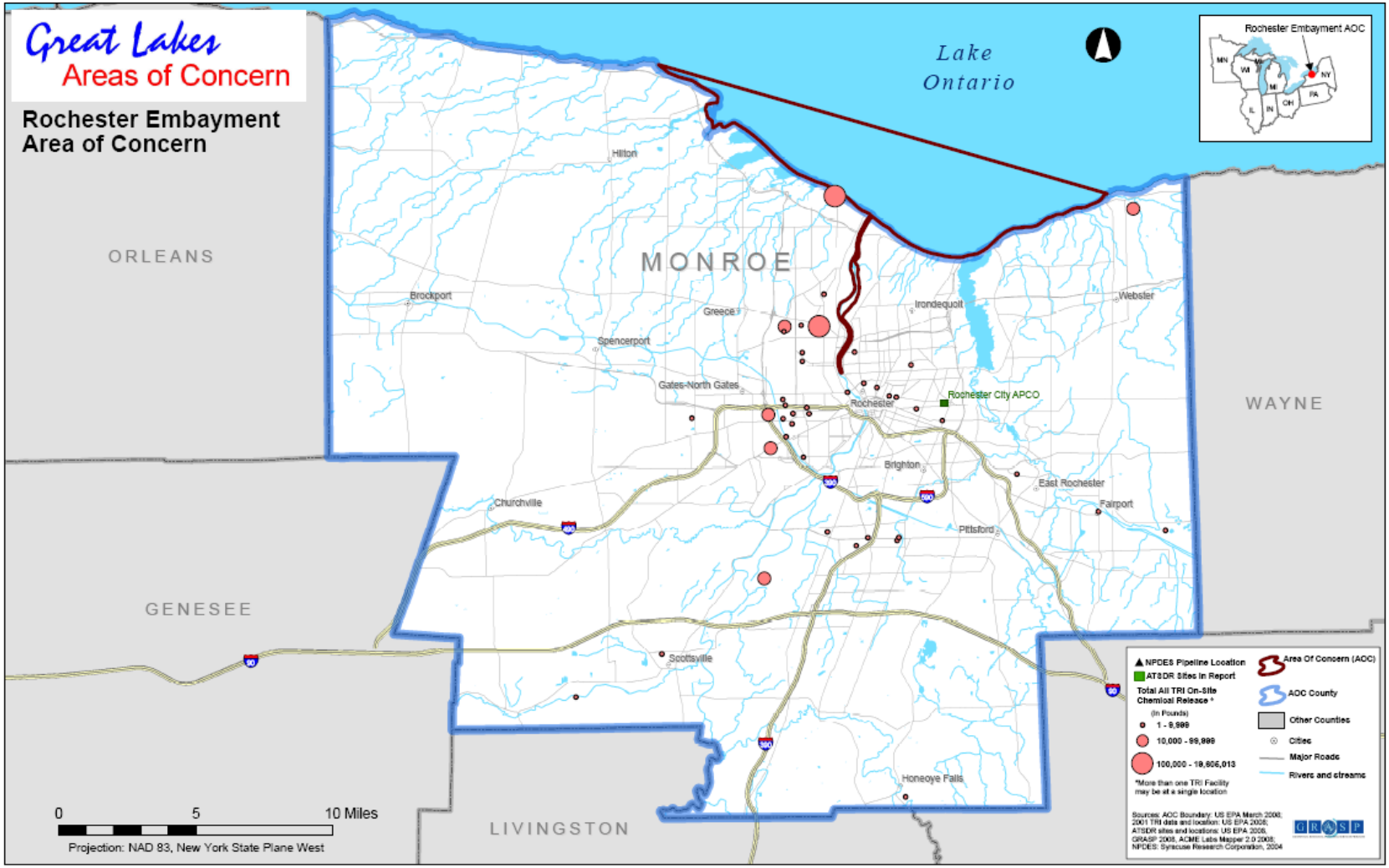

Great Lakes
Areas of Concern
Rochester Embayment
Area of Concern
Lake
Ontario
Rochester Embayment AOC
MN
WI
MI
NY
PA
OH
IN
IL
ORLEANS
MONROE
WAYNE
GENESEE
LIVINGSTON
Hilton
Brockport
Greece
Spencerport
Gates-North Gates
Rochester
Rochester City APCO
Irondequoit
Webster
Brighton
East Rochester
Fairport
Pittsford
Churchville
Scottsville
Honeoye Falls
0
5
10 Miles
Projection: NAD 83, New York State Plane West
NPDES Pipeline Location
AT&DR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,806,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
GRASP

Table 2.2-B. TRI Releases (in pounds, 2001) for the Rochester Embayment AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.0078057	0.007056	0	3.31E-06	0.014865008	0.004313004	0.019178012
(PCDDs and PCDFs)	3							
LEAD	8	108.34	18	0	218	344.34	2572.44	2916.78
LEAD COMPOUNDS	8	477.04	1032	0	8	1517.04	6278.48	7795.52
MERCURY	9	0.9	0	0	0	0.9	0	0.9
MERCURY COMPOUNDS	9	151	4	0	0.049	155.049	23.27	178.319
	Total IJC	**737.2878057**	**1054.007056**	**0**	**226.0490033**	**2017.343865**	**8874.194313**	**10891.53818**
1,1,1-TRICHLOROETHANE		0	No data	0	0	0	5	5
1,2,4-TRIMETHYLBENZENE		725	0	0	0	725	254	979
1,2-DICHLOROPROPANE		16350	82	0	0	16432	0	16432
1,4-DIOXANE		1194	1800	0	0	2994	2	2996
2-METHOXYETHANOL		969	0	0	0	969	0	969
4,4'-ISOPROPYLIDENE-DIPHENOL		0	0	0	0	0	1	1
ACETALDEHYDE		9520	0	0	0	9520	2	9522
ACETONITRILE		9381	1800	0	0	11181	47	11228
ACRYLAMIDE		0	4	0	0	4	0	4
AMMONIA		24905	20680	0	0	45585	0	45585
ANILINE		172	4	0	0	176	46	222

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
ANTIMONY COMPOUNDS		390	5200	0	4	5594	343	5937
BARIUM		10	No data	0	0	10	22005	22015
BARIUM COMPOUNDS		1635	5046	0	120	6801	67863	74664
BENZENE		1834	0	0	0	1834	253	2087
BENZO(G,H,I)PERYLENE		0.183	0	0	0	0.183	0	0.183
BUTYL ACRYLATE		195	37	0	0	232	350	582
CARBON TETRACHLORIDE		1928	No data	0	0	1928	0	1928
CERTAIN GLYCOL ETHERS		31329	3300	0	0	34629	1110	35739
CHLORINE		42223	1	0	0	42224	0	42224
CHLORODIFLUORO-METHANE		11000	0	0	0	11000	0	11000
CHLOROFORM		280	No data	0	0	280	0	280
CHLOROMETHANE		480	0	0	0	480	0	480
CHLOROPHENOLS		87	1	0	0	88	28	116
CHROMIUM		765	No data	0	0	765	264	1029
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		370	625	0	13	1008	16371	17379
COPPER		2031	40	0	0	2071	2306	4377
COPPER COMPOUNDS		0	No data	0	0	0	250	250
CRESOL (MIXED ISOMERS)		150	150	0	0	300	69	369
CUMENE		500	No data	0	0	500	250	750

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On and Offsite Releases
CYCLOHEXANE		37000	0	0	0	37000	270	37270
DIBUTYL PHTHALATE		12	43	0	0	55	19	74
DICHLOROMETHANE		900112	3010	0	0	903122	920	904042
DIETHANOLAMINE		3	2	0	0	5	0	5
ETHYLBENZENE		731	0	0	0	731	253	984
ETHYLENE GLYCOL		3927	9600	0	6800	20327	46	20373
FORMALDEHYDE		1240	0	0	0	1240	3	1243
FORMIC ACID		0	0	0	0	0	16	16
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		3104151	No data	0	0	3104151	0	3104151
HYDROGEN FLUORIDE		244013	0	0	0	244013	0	244013
HYDROQUINONE		451	290	0	0	741	0	741
MANGANESE		253	No data	0	0	253	16024	16277
METHANOL		406619	15000	0	0	421619	367	421986
METHYL ACRYLATE		63	0	0	0	63	0	63
METHYL ETHYL KETONE		48154	6210	0	0	54364	291	54655
METHYL ISOBUTYL KETONE		7515	1610	0	0	9125	420	9545
METHYL METHACRYLATE		81	4	0	0	85	0	85
METHYL TERT-BUTYL ETHER		3725	No data	0	0	3725	250	3975
M-XYLENE		820	No data	0	0	820	0	820

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On and Offsite Releases
N,N-DIMETHYLFORMAMIDE		2009	82	0	0	2091	15	2106
NAPHTHALENE		500	No data	0	0	500	250	750
N-BUTYL ALCOHOL		17310	130	0	0	17440	11	17451
N-HEXANE		4482	0	0	0	4482	255	4737
NICKEL		783	No data	0	0	783	476	1259
NITRATE COMPOUNDS		27	980000	0	0	980027	76913	1056940
NITRIC ACID		3992	0	0	0	3992	0	3992
N-METHYL-2-PYRROLIDONE		75000	880	0	0	75880	0	75880
O-XYLENE		900	No data	0	0	900	0	900
OZONE		31031	0	0	0	31031	0	31031
PERCHLOROMETHYL MERCAPTAN		5	No data	0	0	5	0	5
PHENOL		51	0	0	0	51	6	57
POLYCYCLIC AROMATIC COMPOUNDS		2.961	2	0	0	4.961	7.81	12.771
PROPYLENE OXIDE		2032	0	0	0	2032	0	2032
PYRIDINE		12672	160	0	0	12832	79	12911
SILVER COMPOUNDS		781	3919	0	0	4700	96	4796
SODIUM NITRITE		0	0	0	0	0	11240	11240
STYRENE		224	9	0	0	233	110	343
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		740050	No data	0	0	740050	0	740050

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
TERT-BUTYL ALCOHOL		1550	No data	0	0	1550	250	1800
TOLUENE		60653	58	0	0	60711	352	61063
TOLUENE DIISOCYANATE (MIXED ISOMERS)		500	No data	0	0	500	0	500
TRICHLOROETHYLENE		3074	No data	0	0	3074	0	3074
TRIETHYLAMINE		1514	0	0	0	1514	0	1514
VANADIUM COMPOUNDS		195	No data	0	0	195	170	365
VINYLIDENE CHLORIDE		94	0	0	0	94	18	112
XYLENE (MIXED ISOMERS)		9414	56	0	0	9470	310	9780
ZINC COMPOUNDS		2670	10110	0	20	12800	300003	312803
	Total Non-IJC	**5888809.144**	**1069945**	**0**	**6957**	**6965711.144**	**521259.81**	**7486970.954**
	Total	**5889546.432**	**1070999.007**	**0**	**7183.049003**	**6967728.488**	**530134.0043**	**7497862.492**

Table 2.2-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Rochester Embayment AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Monroe County, NY	2	EASTMAN KODAK CO. KODAK PARK	14652STMNK1669L	ROCHESTER
		RUSSELL STATION	14612RSSLL1101B	ROCHESTER
Lead and lead compounds	8			
Monroe County, NY	8	AMETEK POWER INSTRUMENTS	14605MTKPW255NU	ROCHESTER
		EASTMAN KODAK CO. KODAK PARK	14652STMNK1669L	ROCHESTER
		FISHER SCIENTIFIC CO. L.L.C. PFEIFFER GLASS CO.	14616FSHRS140BE	ROCHESTER
		HARRIS CORP. RF COMMUNICATIONS DIV.	14609RFCMM570CU	ROCHESTER
		PJC TECHS. INC. METRO CIRCUITS DIV.	14613PJCTC205LA	ROCHESTER
		RUSSELL STATION	14612RSSLL1101B	ROCHESTER
		SABIN METAL CORP.	14546SBNMT1647W	SCOTTSVILLE
		SEN DEC CORP.	14450SNDCC151PE	FAIRPORT
Mercury and mercury compounds	3			
Monroe County, NY	3	EASTMAN KODAK CO. KODAK PARK	14652STMNK1669L	ROCHESTER
		FISHER SCIENTIFIC CO. L.L.C. PFEIFFER GLASS CO.	14616FSHRS140BE	ROCHESTER
		RUSSELL STATION	14612RSSLL1101B	ROCHESTER

Table 2.2-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Rochester Embayment AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
1,1,1-TRICHLOROETHANE		1825
1,1,2-TRICHLOROETHANE		2299.50
1,2-DICHLOROETHANE		5840
1,2-DICHLOROPROPANE		4745
1,4-DIOXANE		74460
2,6-DINITROTOLUENE		693.50
2-METHYL-1,3-DIOXOLANE		21535
2-PHENOXYETHANOL		31755
ALUMINUM, TOTAL (AS AL)		51100
ANTIMONY, TOTAL (AS SB)		18615
ARSENIC, TOTAL (AS AS)		3650
BARIUM, TOTAL (AS BA)		20075
BIS (2-CHLOROETHYL) ETHER		292
CHLOROFORM		1971
CHROMIUM, TOTAL (AS CR)		4380
COPPER, TOTAL (AS CU)		6570
CYANIDE, TOTAL (AS CN)		6935
DICHLOROMETHANE		9855
ETHYLENE GLYCOL		474500
MANGANESE, TOTAL (AS MN)		113150
N,N-DIMETHYLANILINE		9855
NICKEL, TOTAL (AS NI)		6205
NITROGEN, AMMONIA, TOTAL (AS NH3)		1460000
NITROGEN, KJELDAHL TOTAL (AS N)		1131500
PHENOLS		4745
PHENOLS, CHLORINATED		985.50

Chemical	*IJC Tracking Number*	*Discharge*
SILVER, TOTAL (AS AG)		12775
TETRAHYDROFURAN		36865
TIN, TOTAL (AS SN)		40150
VANADIUM, TOTAL (AS V)		3504
ZINC, TOTAL (AS ZN)		36500
	Total Non-IJC	**3597330.50**
	Total	**3597330.50**

2.3. Eighteen Mile Creek AOC, Niagara County, NY

The Eighteen Mile Creek AOC is in the town of Newfane (Niagara County) NY. The creek flows from south to north and discharges into Lake Ontario through Olcott Harbor, approximately 18 miles east of the mouth of the Niagara River. The AOC includes Olcott Harbor and extends almost 2 miles upstream, to just below the Burt Dam—the farthest point at which backwater conditions exist during Lake Ontario's highest monthly average lake level.

2.3.1. Hazardous Waste Sites Relevant to the Eighteen Mile Creek AOC

Two AOCs occupy parts of Niagara County: the Niagara River AOC (in Niagara and Erie Counties, NY) and the Eighteen Mile Creek AOC. The Niagara River AOC is a binational (U.S.-Canada) AOC outside the scope of this report. See the AOC map at end of this section and in Appendix 2.

Over a period of years ATSDR conducted health assessment activities for seven Niagara County hazardous waste sites. Six of these are on or very close to the Niagara River, mostly in the City of Niagara Falls. As such they are relevant to the Niagara River AOC. These six sites are Forest Glen Mobile Home Subdivision, Hooker (102nd Street), Hooker (Hyde Park), Hooker (S Area), Love Canal, and Niagara County Refuse. At some point in their assessment five were classified as Indeterminate Public Health Hazards (Category 3). In 1985 Love Canal was classified as an Urgent Public Health Hazard. The remaining site, Barker Chemical, is relevant to the Eighteen Mile Creek AOC and is discussed below.

Table 2.3-A. Hazardous Waste Site in Niagara County, NY

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Barker Chemical, Somerset, NYN000204285	HC	2000	2	Non-NPL	Completed

2 = Public Health Hazard, HC = Health Consultation

2.3.1.1 Barker Chemical

Barker Chemical is a former Somerset, NY, agricultural chemical manufacturer that produced fungicides and herbicides from the 1930s through the 1960s. But during the manufacturing process, Barker also produced waste sludges and discharged them into the onsite settling lagoons. Barker Chemical has been inactive since the early 1970s. In 2000, the 10-acre site encompassed several abandoned buildings, three settling lagoons, an aboveground tank, and an area of shallow, standing water near the buildings. Some private homes were as close as 500 feet from the site boundary. The site was only partially fenced; consequently, trespassers in the winter months played ice hockey, skated, and drove ATVs on the frozen lagoons. While the site was under consideration for brownfields remediation, monitoring revealed pH readings as low as 1.71. In the surface soil, lagoon sediments, and waste composites, arsenic and lead levels were

above typical New York State background. In 2000, the Niagara County Health Department notified the Town of Somerset of the health hazards from contact with acidic surface water. The county then asked the NYS Department of Environmental Conservation (DEC) for assistance to provide remedial measures such as fencing, posting hazard signs, and neutralizing of acid conditions. NYS Department of Health requested the NYSDEC to discourage public access to the site. Information on this site is from the 2000 ATSDR health consultation.

ATSDR Conclusions: In 2000, ATSDR concluded that because of the low pH levels of water in the waste lagoons and tributaries and the levels of arsenic and lead detected in soil and sediment throughout the site, the site posed a *Public Health Hazard* (Category 2) for children and adults who might access it. In addition, as no record of pesticide analysis was found for the site, other possible hazards might lurk there. In 2001, a U.S. EPA emergency removal action demolished buildings, disposed of offsite contaminated soil from selected areas, stabilized lagoon sludges *in-situ*, and restored sites. Since completion of the remediation, DEC conducted follow-up investigations and determined that low-pH conditions had returned to areas of previous remediation, with potential offsite consequences. U.S. EPA reported in 2006 that the site had been fully remediated.

U.S. EPA Update: Barker Chemical is a now a non-NPL site for which no further remedial action is planned**.** Available at: http://oaspub.epa.gov/enviro/cerclis_web.report?pgm_sys_id=NYD981484447 [cited 2008 Oct 29]**.**

2.3.2. IJC-critical Pollutants Identified within ATSDR Documents

The IJC-critical pollutant lead was identified at this site during ATSDR's assessment of exposure-related issues.

2.3.3. Summary and Conclusions for the Niagara Eighteen Mile Creek AOC

2.3.3.1 Hazardous Waste Sites

The Environmental Protection Agency (U.S. EPA) Region II requested that ATSDR determine whether Barker Chemical, a former agricultural chemical manufacturing facility, represented a public health threat, and whether remedial activities were necessary. The NYSDEC provided to ATSDR preliminary onsite environmental sampling results. After assessing the samples, ATSDR concluded that because of the low pH levels in the waste lagoons and possible site-wide exposure to arsenic and lead, the site represented a potential public health risk for children and adults who accessed it.

U.S. EPA's 2001 emergency site remediation included building demolition, offsite disposal of contaminated soil from selected areas, *in-situ* stabilization of lagoon sludges, and site restoration. A follow-up investigation by state authorities determined that low-pH conditions had returned to areas of previous remediation, with potential offsite consequences. As of 2006, however, the site was deemed fully remediated.

2.3.3.2 TRI Data for the Eighteen Mile Creek AOC.

The TRI onsite chemical releases for Niagara County are summarized in Table 3.3-B. Because they are for the entire county, and because industrial activity is concentrated in or near the Niagara River AOC, these data are more relevant to the binational Niagara River AOC than to the Eighteen Mile Creek AOC. Total onsite releases in 2001 were 3,174,559 pounds, the majority of which were released to air, followed by releases to soil, and then surface water.

Of the total onsite releases, 63,282 pounds were IJC-critical pollutants. The IJC-critical pollutants released were PCBs (to air), PCDDs and PCDFs (primarily to air), lead compounds and mercury compounds (primarily to land), and hexachlorobenzene (to surface water). The facilities that released these pollutants are listed in Table 3.3-C. Most of these facilities are in the City of Niagara Falls and are therefore more relevant to the binational Niagara River AOC than to the Eighteen Mile Creek AOC.

Releases of IJC-critical pollutants relevant to the Eighteen Mile Creek AOC are PCDDs and PCDFs from a facility in Barker, lead compounds from a facility in Barker and one in Lockport, and mercury compounds from a facility in Barker.

The major releases ($\geq$ 500,000 pounds) of non-IJC chemicals were manganese compounds and barium compounds (primarily to land).

2.3.3.3 NPDES Data for the Eighteen Mile Creek AOC

The NPDES permitted discharges for Niagara County, NY are summarized in Table 3.3-D. The average annual permitted discharges in 2004 totaled 211,184 pounds. The only chemical accounting for >100,000 pounds was fluoride, at 136,875 pounds.

The IJC-critical pollutants DDT and metabolites, Mirex, lead, and mercury accounted for a total of 867 pounds (primarily lead). The facilities permitted to discharge these pollutants are listed in Table 3.3-E. All are located in the City of Niagara Falls, and are therefore not relevant to the Eighteen Mile Creek AOC, but rather to the Binational Niagara River AOC. As explained in Chapter 1 of this document, the binational AOCs are not included in this document.

2.3.3.4 Beneficial Use Impairments (BUIs)

Some Do-Not-Eat restrictions on fish and wildlife are in effect for this AOC.

Fish consumption restrictions specific to Eighteen Mile Creek are due to PCB contamination. No human consumption of any fish species or American eel of any size is recommended. No consumption of snapping turtle meat is recommended for women of childbearing age and children younger than 15 years of age.

Restrictions on consumption are also in effect for Lake Ontario fish. But no consumption advisories extend to American eel, channel catfish, carp, or lake trout over 25 inches long. For more information go to: (http://www.epa.gov/glnpo/aoc/).

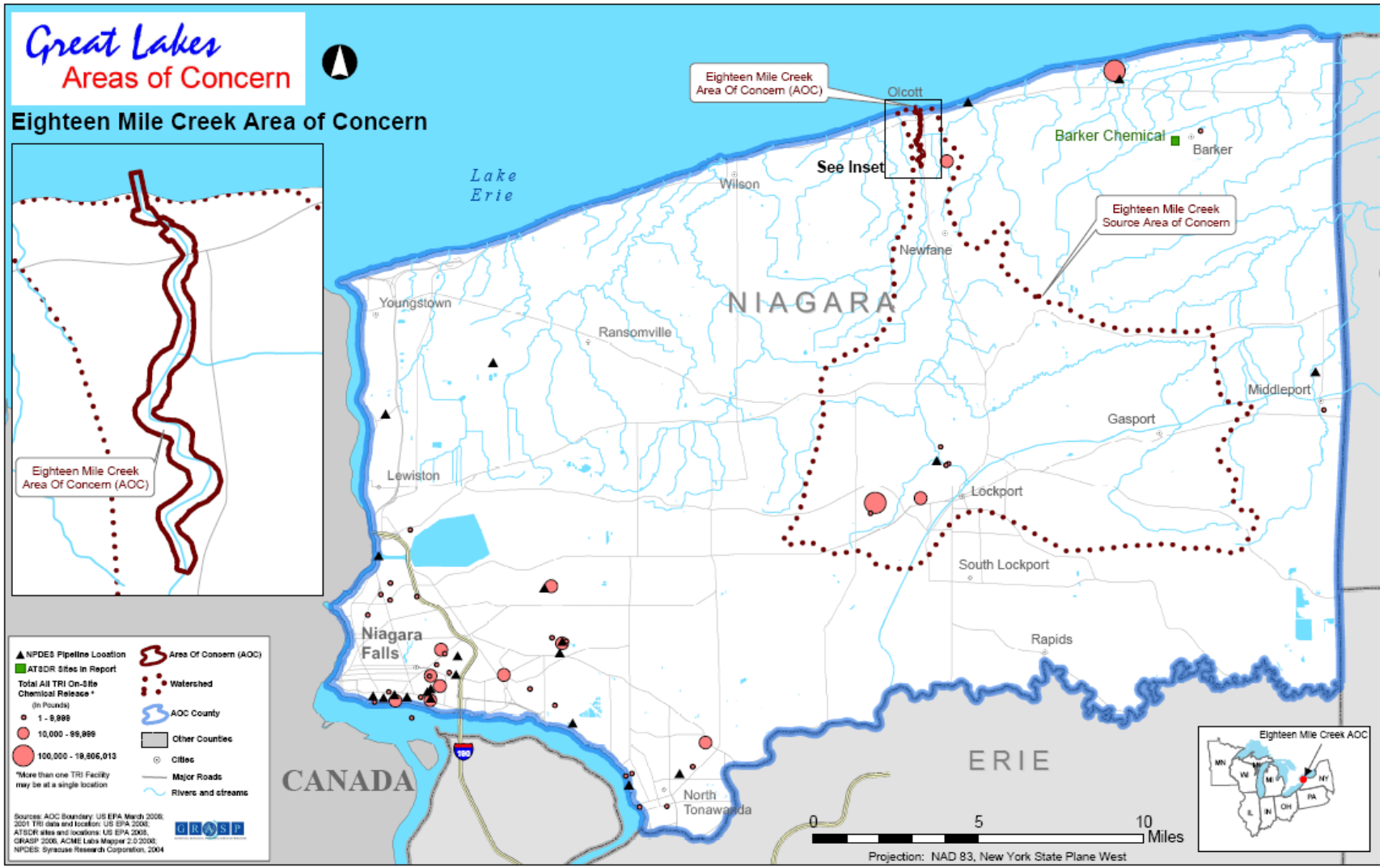

Great Lakes
Areas of Concern
Eighteen Mile Creek Area of Concern
Eighteen Mile Creek Area Of Concern (AOC)
Olcott
See Inset
Barker Chemical
Barker
Lake Erie
Wilson
Eighteen Mile Creek Source Area of Concern
Newfane
NIAGARA
Youngstown
Ransomville
Middleport
Gasport
Lewiston
Lockport
South Lockport
Niagara Falls
Rapids
CANADA
North Tonawanda
ERIE
0
5
10
Miles
Projection: NAD 83, New York State Plane West
Eighteen Mile Creek AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 18,606,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Watershed
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008; 2001 TRI data and location: US EPA 2008; ATSDR sites and locations: US EPA 2008; GRASP 2006, ACME Labs Mapper 2.0 2008; NPDES: Syracuse Research Corporation, 2004
GRASP

Table 2.3-B. TRI Releases (in pounds, 2001) for the Eighteen Mile Creek AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
POLYCHLORINATED BIPHENYLS	1	226	0	0	0	226	0.82632	226.82632
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.007063938	0.00024255	0	0	0.007306488	9.50796E-04	0.008257284
(PCDDs and PCDFs)	3							
LEAD	8	26	190	0	7366	7582	8276.681	15858.681
LEAD COMPOUNDS	8	1547.9	0.8	0	53356	54904.7	13332.3	68237
MERCURY COMPOUNDS	9	77.1	0.04	0	492	569.14	61.8	630.94
HEXACHLOROBENZENE	11	0	0.3	0	0	0.3	0.1	0.4
	Total IJC	**1877.007064**	**191.1402426**	**0**	**61214**	**63282.14731**	**21671.70827**	**84953.85558**
4,4'-ISOPROPYLIDENE-DIPHENOL		500	No data	0	0	500	0	500
ALLYL CHLORIDE		35	No data	0	0	35	0	35
ALUMINUM OXIDE (FIBROUS FORMS)		0	No data	0	0	0	250	250
AMMONIA		3289	878	0	533	4700	0	4700
ANILINE		5388	No data	0	0	5388	0	5388
ARSENIC COMPOUNDS		23	10	0	37921	37954	0	37954
BARIUM COMPOUNDS		4720	1768	0	619346	625834	271022	896856
BENZO(G,H,I)PERYLENE		114	No data	0	0	114	0.1	114.1
BENZOIC TRICHLORIDE		541	0	0	0	541	371	912
BENZOYL CHLORIDE		4520	0	0	0	4520	0	4520

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
BENZOYL PEROXIDE		1453	0	0	0	1453	0	1453
BIFENTHRIN		500	No data	0	0	500	0	500
CARBOFURAN		500	No data	0	0	500	0	500
CERTAIN GLYCOL ETHERS		44952	2600	0	0	47552	3800	51352
CHLORINE		16044	0	0	0	16044	0	16044
CHLOROACETIC ACID		1500	No data	0	0	1500	0	1500
CHLOROBENZENE		631	No data	0	0	631	0	631
CHROMIUM		1	No data	0	0	1	1058	1059
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		217	110	0	50553	50880	11155	62035
COPPER		1010	35	0	0	1045	60	1105
COPPER COMPOUNDS		69	10	0	50367	50446	333	50779
CRESOL (MIXED ISOMERS)		405	No data	0	0	405	0	405
DIPHENYLAMINE		1434	No data	0	0	1434	0	1434
ETHYLBENZENE		46	No data	0	0	46	0	46
FORMALDEHYDE		3911	2	0	0	3913	0	3913
HEXACHLOROCYCLO-PENTADIENE		584	0	0	0	584	29	613
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		154675	No data	0	0	154675	0	154675
HYDROGEN FLUORIDE		20795	0	0	0	20795	0	20795

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On and Offsite Releases
HYDROQUINONE		75	No data	0	0	75	0	75
LITHIUM CARBONATE		0	No data	0	0	0	250	250
MANGANESE		5	70	0	0	75	400	475
MANGANESE COMPOUNDS		6953	1169	0	1000441	1008563	44376	1052939
METHANOL		18797	No data	0	0	18797	0	18797
METHYL ETHYL KETONE		22735	0	0	0	22735	0	22735
METHYL ISOBUTYL KETONE		500	No data	0	0	500	0	500
N,N-DIMETHYLFORMAMIDE		1198	No data	0	0	1198	0	1198
N-BUTYL ALCOHOL		478	No data	0	0	478	0	478
N-HEXANE		14199	No data	0	0	14199	0	14199
NICKEL		255	3	0	0	258	721	979
NICKEL COMPOUNDS		227	10	0	90480	90717	78	90795
NITRATE COMPOUNDS		0	163100	0	315710	478810	135	478945
NITRIC ACID		54765	0	0	0	54765	4813	59578
O-CRESOL		500	No data	0	0	500	0	500
O-TOLUIDINE		2987	No data	0	0	2987	0	2987
O-XYLENE		38134	No data	0	0	38134	0	38134
PHENOL		7501	9	0	0	7510	45158	52668
PHOSGENE		78	No data	0	0	78	0	78
PHOSPHORUS (YELLOW OR WHITE)		46	No data	0	0	46	0	46

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
POLYCYCLIC AROMATIC COMPOUNDS		1003.809325	No data	0	0	1003.809325	900.52	1904.329325
PROPARGYL ALCOHOL		79	No data	0	0	79	0	79
SEC-BUTYL ALCOHOL		56100	3100	0	0	59200	5200	64400
SILVER		5	No data	0	0	5	0	5
STYRENE		12680	No data	0	0	12680	0	12680
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		76429	No data	0	0	76429	0	76429
TETRACHLORO-ETHYLENE		11200	180	0	0	11380	649	12029
TOLUENE		3778	No data	0	0	3778	0	3778
TRIETHYLAMINE		10	No data	0	0	10	0	10
VANADIUM COMPOUNDS		4263	No data	0	84318	88581	45010	133591
XYLENE (MIXED ISOMERS)		5117	No data	0	0	5117	0	5117
ZINC (FUME OR DUST)		250	No data	0	0	250	No data	250
ZINC COMPOUNDS		1405	1015	0	77929	80349	29906	110255
	Total Non-IJC	**609609.8093**	**174069**	**0**	**2327598**	**3111276.809**	**465674.62**	**3576951.429**
	Total	**611486.8164**	**174260.1402**	**0**	**2388812**	**3174558.957**	**487346.3283**	**3661905.285**

Table 2.3-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Eighteen Mile Creek AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Polychlorinated biphenyls	1			
Niagara County, NY	1	SAINT-GOBAIN ABRASIVES INC.	14304CRBRN6600W	NIAGARA FALLS
Dioxin and dioxin-like compounds (PCDDs and PCDFs)				
Niagara County, NY		AES SOMERSET L.L.C.	14012SSMRS7725L	BARKER
		NIAGARA FALLS GENERATING STATION	14304CHRSR5300F	NIAGARA FALLS
		OCCIDENTAL CHEMICAL CORP. NIAGARA PLANT	14302CCDNT4700B	NIAGARA FALLS
Lead and lead compounds	10			
Niagara County, NY	10	AES SOMERSET L.L.C.	14012SSMRS7725L	BARKER
		DELPHI HARRISON THERMAL SYS. LOCKPORT	14094GNRLM200UP	LOCKPORT
		DU PONT NIAGARA FALLS PLANT	14302DPNTNBUFFA	NIAGARA FALLS
		FERRO ELECTRONIC MATERIAL SYS.	14305TMCRM4511H	NIAGARA FALLS
		NIAGARA FALLS GENERATING STATION	14304CHRSR5300F	NIAGARA FALLS
		NORTH AMERICAN HOGANAS	14304PYRNC5950P	NIAGARA FALLS
		OCCIDENTAL CHEMICAL CORP. NIAGARA PLANT	14302CCDNT4700B	NIAGARA FALLS
		PRECIOUS PLATE INC.	14304PRCSP2124L	NIAGARA FALLS
		TULIP CORP. NIAGARA FALLS PLANT	14305TLPCR3125H	NIAGARA FALLS
		U.S. VANADIUM CORP.	14303SVNDM13747	NIAGARA FALLS
Mercury and mercury compounds	2			

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Niagara County, NY	2	AES SOMERSET L.L.C.	14012SSMRS7725L	BARKER
		NIAGARA FALLS GENERATING STATION	14304CHRSR5300F	NIAGARA FALLS
Hexachlorobenzene	1			
Niagara County, NY	1	OCCIDENTAL CHEMICAL CORP. NIAGARA PLANT	14302CCDNT4700B	NIAGARA FALLS

Table 2.3-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Eighteen Mile Creek AOC

Chemical	*IJC Tracking Number*	*Discharge*
DDT/DDD/DDE, SUM OF P,P' & O,P' ISOMERS	5	7.3
MIREX	7	58.4
LEAD, TOTAL (AS PB)	8	790.83
MERCURY, TOTAL (AS HG)	9	10.95
	Total IJC	**867.48**
ALUMINUM, TOTAL (AS AL)		1297.58
ARSENIC, TOTAL (AS AS)		1460
BARIUM, TOTAL (AS BA)		18250
BORON, TOTAL (AS B)		1332.25
CARBON TETRACHLORIDE		73
CHLOROFORM		3525.90
CHROMIUM, TOTAL (AS CR)		584
COPPER, TOTAL (AS CU)		1228.83
FLUORIDE, TOTAL (AS F)		136875
METHYLENE CHLORIDE		18.25
NICKEL, TOTAL (AS NI)		912.50
PHENOLICS, TOTAL RECOVERABLE		39675.50
PHENOLS		91.25
SELENIUM, TOTAL (AS SE)		2555
TETRACHLOROETHYLENE		65.70
ZINC, TOTAL (AS ZN)		2372.50
	Total Non-IJC	**210317.26**
	Total	**211184.74**

Table 2.3-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Eighteen Mile Creek AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
DDT and Metabolites	1			
Niagara County, NY	1	NIAGARA FALLS (C) WWTP	NY0026336	NIAGARA FALLS
Mirex	1			
Niagara County, NY	1	NIAGARA FALLS (C) WWTP	NY0026336	NIAGARA FALLS
Lead	1			
Niagara County, NY	1	OCCIDENTAL CHEMICAL CORP	NY0003336	NIAGARA FALLS
Mercury	1			
Niagara County, NY	1	OLIN CORP - NIAGARA FALLS PLT	NY0001635	NIAGARA FALLS

Chapter 3. Lake Erie

Chapter 3. Lake Erie

3.1. Buffalo River AOC, Erie County, NY

The Buffalo River AOC is within the City of Buffalo, in western New York State. The AOC extends from the mouth of the Buffalo River approximately 6 miles to the east and includes the adjoining land. The Buffalo River flows west into Lake Erie, near the head of the Niagara River. See the AOC map at the end of this section and in Appendix 2.

3.1.1. Hazardous Waste Sites Relevant to the Buffalo River AOC

ATSDR evaluated six hazardous waste sites in Erie County, NY that were identified during the public health assessment process as posing either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Table 3.1-A summarizes ATSDR's site activities, including information regarding the type and location of the site, and the date and type of assessment document.

Table 3.1-A. Hazardous waste sites in Erie County, NY

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Abby Street Hickory Wood Subdivision, Buffalo NYSFN0204229	HC HC HC HC	1999 2001 2004 2004	2 2 N.S. N.S.	Non NPL	Ongoing
Diarsenol Company, Buffalo NYD981187040	HA	1994	2	Non NPL	Completed
Ernst Steel, Buffalo NYD980508246	HC	1990	2	Non NPL	Completed
Newstead Site, Newstead NYD986883387	HV LISR	1989 1992	1 N.S.	Non NPL	Completed
NL Industries, Depew NYD980531636	HC HC	2003 2004	2 4	Non NPL	Ongoing
Pfohl Brothers Landfill, Cheektowaga NYD980507495	HA	1995	3	NPL	Ongoing

1=Urgent Public Health Hazard, 2=Public Health hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard

HA=Public Health Assessment, HC=Health Consultation, HV=Health Advisory, SRU=Site Review and Update, LISR=Lead Initiative Summary Report, N.S.=Not stated

ATSDR provides further evaluation of these data in the public health assessments and other health-related documents listed in Table 3.1-A. Evaluations for the five sites categorized as

either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard are discussed in the following subsections.

3.1.1.1 Abby Street/Hickory Woods Subdivision

This subdivision is within the AOC. It is near a former steel and coke manufacturing property and within ½ mile of the river, which is to the north and west of the subdivision. The area includes about 80 homes, three vacant lots, and a playground. Most of the homes were built on fill. Information on this site is taken from the 1999, 2001, and 2004 ATSDR health consultations for this site and from the State of New York 2008 site update.

Public Health Outcome Data: To investigate potential exposures and health conditions, NYSDOH conducted a self-reported survey of the residents. Among the 201 residents who participated,

- all had lived in the subdivision for at least 5 years (average 10 years), and 10 (or 5%) reported thyroid disease (primarily hypothyroid); and
- six of the affected residents were under age 45. Among the general U.S. population of all ages, the rate of thyroid disease was 1.7%.

Because in comparison with the general population the prevalence of thyroid conditions among Hickory Woods residents was elevated, ATSDR recommended follow follow-up. A subsequent ATSDR health consultation (April 2004) conducted with the NYSDOH focused primarily on medical records. The health consultation showed that most of those who were initially found to have had a thyroid condition also had predisposing factors for that condition. The assessor therefore concluded that further investigation of the apparent elevated prevalence of thyroid disease was not warranted. Indeed, the rates and types of cancer reported among the participants did not reveal an unusual pattern of cancer incidence.

In its analysis of childhood blood lead levels, NYSDOH analyzed data from the universal screening of children under the age of 6. Of the 49 children in the subdivision screened between 1994 and 2000, 31 had values lower than 5µg/dL, 12 had values of 5–9.9µg/dL, and 6 had values more than or equal to 10µg/dL. Further analyses revealed a significant correlation between blood lead levels for children in older homes and soil lead levels at their homes; the age of housing was highly predictive of soil lead levels.

ATSDR Conclusions: In 1999, ATSDR concluded that several unfenced vacant lots in the subdivision posed a *Public Health Hazard* (Category 2). Apparently due to a concern for elevated B(a)P equivalents in soil, the lots were covered with crushed stone over geo-textile mats. Three residential lots and one undeveloped lot were excavated to remove PAH-contaminated soil, assessed as B(a)P equivalents. Subdivision soil and of sump water received additional monitoring. In 2001, ATSDR also concluded that the levels of arsenic contamination in surface soil at a playground posed a public health hazard.

Although not explicitly discussed, soil ingestion and soil contact in yards, in vacant lots, and in a playground were considered completed exposure pathways. The contaminants in soil were PAHs, arsenic, cadmium, and lead. Aldrin and dieldrin were detected in single samples and thus required further investigation. Lead sources were thought to be lead paint, possible past contributions from leaded gasoline, and emissions from industry. Although lead levels and PAHs were comparable to or lower than those of two other Buffalo area neighborhoods, arsenic levels

in soil at the playground were sufficiently high to constitute a public health hazard. In coordination with local, county, and state governments, U.S. EPA conducted several removal activities.

Because of an elevated thyroid prevalence in comparison with the general population, ATSDR recommended follow-up on the thyroid conditions among Hickory Woods residents. A subsequent ATSDR health consultation of medical records conducted with the NYSDOH (April 2004) showed predisposing factors for the thyroid condition in most of the residents initially surveyed at this site.

U.S. EPA Update: The Abby Road/Hickory Woods Subdivision site is now a Removal Action site only—no site assessment work or remedial action is necessary. Available at: http://oaspub.epa.gov/enviro/multisys2.get_list?facility_uin=110022431386 [cited 2008 Oct 8].

The New York State Department of Health Update: At the Abby Street/Hickory Woods site, the City of Buffalo has agreed to compensate homeowners for the loss in value of their homes. The money given to the homeowners was for the loss in value of their homes—not a straight out buyout. Many of the homeowners were happy with the settlement, but it seemed that the money given to the homeowners could be taxable. Also, the three covered and fenced parcels the City of Buffalo was supposed to have remediated several years ago are still not remediated (Cameron H. O'Connor, New York State Department of Health, 2008 Aug 21 email). See also NYSDOH Hickory Woods Fact Sheet. Available at: http://www.health.state.ny.us/environmental/investigations/hickory_woods/fact_sheet.htm. [cited 2008 Oct 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs, aldrin, dieldrin, and lead were identified at this site.

3.1.1.2 Diarsenol Company (Kingsley Park)

This site is approximately 2½ miles north of the AOC. It is the former Diarsenol Company pharmaceutical manufacturing plant. From 1930 to 1948, the pharmaceutical plant produced an arsenic-based medication and reportedly stored waste materials and unused product on open ground adjacent to the facility. The City of Buffalo purchased the property in 1968 and until 1988 used it as a public recreation area (Kingsley Park), when the park was closed because of concerns regarding contamination. Information for this site is from ATSDR's 1994 public health assessment.

Demographic Data: Kingsley Park is in census tract 33.02 and borders 32.02. The combined total population for these tracts is 9,517, of whom 16% was under 10 years of age and another 16% was 65 or older.

Public Health Outcome Data:

Although the Erie County Health Department offered a blood lead and urinary arsenic screening program for all community residents of all ages, participation was limited:

- 2 of the 305 samples showed blood lead levels ≥ 25µg/dL.
- Testing of 304 community residents for urinary arsenic revealed that all had levels below 10 µg/L—the health-based screening value was 50µg/L.

ATSDR Conclusions: In 1994, ATSDR concluded that because prior to 1991 nearby residents and park users may have been exposed to levels of arsenic, lead, and PAHs that exceed health-based values, this site posed a *Public Health Hazard* (Category 2). Completed exposure pathways were ingestion, skin contact and, possibly, inhalation of contaminants in surface soil and ingestion of leafy vegetables grown on contaminated soil. Arsenic was also considered site-related. The source of lead—levels were higher offsite than onsite—was thought to be lead paint on older buildings and leaded gasoline. PAHs were found at levels typical of urban soils and were thought to be related to urban air quality and combustion of fossil fuels. In 1991, remediation by excavation to a minimum 1-foot depth, removal of soil from the site and from the bordering yards, and replacement with clean soil and seeding with grass appeared to have restored the site. ATSDR concluded that because of the remediation, present or future exposure to site-related contaminants was unlikely.

U.S. EPA Update: Diarsenol/Kingsley Park is a non-NPL site for which no further remedial action is planned. Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs and lead were identified at this site.

3.1.1.3 Ernst Steel Site

This site is approximately 2 miles north of the AOC. The western portion of the 10-acre site reportedly contained paint sludge, metal shavings, machine cutting oil, and other waste dumped there until 1980. At the time of ATSDR's site evaluation, access to this area was not restricted. Information regarding this site is from a 1990 ATSDR health consultation.

Because nearby residents—including children who may have frequently traversed the site or may have played onsite—could have ingested lead and chromium and could have inhaled dust, the lead and chromium contamination was considered site-related. But insufficient data were available to determine whether runoff, air dispersion, or groundwater contamination resulted in offsite migration. In 1992, additional sampling revealed 11,000 tons of lead-contaminated paint waste material.

ATSDR Conclusions: ATSDR concluded that because of levels of lead and chromium found onsite and the potential for onsite trespassing, this site posed a *Public Health Hazard* (Category 2). Insufficient data were available to determine whether contaminants had migrated from the site. In 1998, U.S. EPA reported that the Ernst Steel site was successfully remediated by removing contaminated soil, constructing buildings, and installing an asphalt parking lot, all of which reduced the potential for future, direct-contact exposure.

U.S. EPA Update: Ernst Steel is a non-NPL site for which no further remedial action is planned. Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues the IJC-critical pollutant lead was identified at this site.

3.1.1.4 Newstead Site

The Newstead housing site is a 6-acre parcel of land on Fletcher Road in Newstead (Erie County) NY, several miles northeast of the AOC. It consists of a residence, and associated play

area and barn, plus a fallow field, a garden, and an area that had reportedly been used for disposal of old chemicals and paint from a Buffalo paint manufacturing firm. In 1985, a site inspection revealed protruding 55 gallon drums and, on surface soil, waste material of tar-like and resinous consistency. Information regarding this site is from the 1989 health advisory and the 1992 ATSDR lead initiative summary report. Although a further assessment in 1992 did not provide a health hazard category, it did recommend that further actions await the results of a Remedial Investigation/Feasibility Study.

Demographic Data: Two adults and two children under 5 years of age formerly resided on the site. The area is relatively rural, but some families do live nearby.

Public Health Outcome Data: In 1991, the NYSDOH tested former site residents—who had been relocated sometime after 1985 and before 1989—for blood lead and cadmium levels and for urinary cadmium levels. The levels of contaminants were reported to be within the range of the general population.

ATSDR Conclusions: In 1989, because of high levels of lead, cadmium, barium, and chromium in soil, and physical hazards, ATSDR issued a public health advisory (Category 1, *Urgent Public Health Hazard*). In the past, when people were living at the site, exposure to soil contaminated with high concentrations of lead, an IJC-critical pollutant, and high concentrations of cadmium, barium, and chromium, probably occurred during routine domestic activities (e.g., playing, lawn care, and gardening). Although the site has been fenced, a concern for exposure to trespassers remained. In 2007, with the assistance of local, county, and state governments, U.S. EPA completed excavation and off-site disposal of contaminated soils.

U.S. EPA Update: Newstead is now a non-NPL Superfund Alternative Site. Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

3.1.1.5 NL Industries

The former NL Industries site is an inactive lead processing facility. According to state and local records, lead processing began at this location in 1872 and ceased in 1972. Past onsite activities included brass foundry operations, smelting, and processing of metal alloys used for ball bearing surfaces. The 7.5-acre site included a lagoon for the disposal of lead-contaminated sludges. At this site, lead was the one contaminant of concern.

Demographic Data: 2000 U. S. Census Bureau data showed that approximately 16,500 persons lived in the Village of Depew. Of those, 16,500, 98.7% were Caucasian, with fewer than 1 percent each African-American, Native American, Asian, multi-racial, Hispanic, and classified as other.

ATSDR Conclusions: In 2003, ATSDR concluded that because of the potential for incidental ingestion exposure to lead-contaminated soils in nearby residential yards, this site posed a *Public Health Hazard* (Category 2).

U.S. EPA Update: NL Industries is a non-NPL site that does not appear in the CERCLIS database.

New York State Department of Health Update: In 2007, U.S. EPA reported the site had been fenced. In 2005, U.S. EPA excavated and disposed of off-site the contaminated soils from the residential yards immediately downwind of the facility. Site remediation started in 2007 and is continuing, with final capping anticipated in 2008. Starting in 2008, U.S. EPA will remediate a second residential area farther downwind of the facility. (Matthew J. Forcucci, New York State Department of Health, 2008 Aug 13 email)

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

3.1.1.6 Pfohl Brothers Landfill

The Pfohl Brothers Landfill is a 120-acre site in the northeastern portion of Erie County, NY, several miles northeast of the Buffalo River AOC. It is near Ellicott Creek, which drains into the Niagara River rather than into the Buffalo River. Pfohl Brothers was in operation from 1932 to 1971, and accepted both municipal and industrial wastes. The industrial wastes included pine tar pitch, waste paints and thinners, waste cutting oils, phenolic tar, and PCB-laden oil and capacitors. Information regarding this site was taken from the 1995 ATSDR public health assessment and the U.S. EPA 2005 five-year site review.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations who lived within 1 mile of this site:

Children 6 years and younger	389
Females aged 15-44	942
Adults 65 and older	1,157

Public Health Outcome Data: NYSDOH surveys conducted in 1990 included 60 residents of 20 nearby households, 35% of whom were children age 17 or younger, and a few former area residents and former and current employees of the town of Cheektowaga who may have come into contact with site contaminants. The NYSDOH concluded the survey did not reveal any unusual illness patterns.

In 1991, NYSDOH blood lead screenings of 20 children living near the site found a maximum blood lead level of 8 μg/dL, below the CDC action level of 10 μg/dL.

NYSDOH conducted initial and follow-up studies of cancer incidence for 1978–1987 in three census tracts that comprise both the site and the Ellicott Creek area. For all cancers in women, for breast cancer in women, and for prostate cancer in men, observed rates were significantly greater than expected, based on other New York areas with similar population densities. Most of the excess cancer in women was accounted for by breast cancer (130 versus 105 expected), and that the breast cancer excess occurred in the landfill census tract (100.01). Yet geographic analysis revealed no clustering around the landfill. ATSDR therefore concluded that the cancer occurrence was in all likelihood not site-related.

ATSDR Conclusions: In 1995, ATSDR concluded that because data for groundwater, including onsite and offsite monitoring wells and private drinking water wells, were not adequate to determine whether contaminants—and particularly PCBs and metals—have migrated offsite, this site is an *Indeterminate Public Health Hazard* (Category 3).

U.S. EPA Update: In 2002, U.S. EPA reported that through the joint efforts of local, county, and state governments drum removal was complete and landfill wastes were contained. Removal and remedial activities have substantially reduced the likelihood of exposure to site-related contamination. In its latest (March 2006) 5-year review of the Pfohl Brothers Landfill site, U.S. EPA concluded that

- The caps and vegetative covers are intact and in good condition;
- The landfill gas system is operating properly;
- The monitoring wells are securely locked and functional;
- The leachate collection system is functional;
- There is no evidence of trespassing or vandalism; and
- No additional measures are needed to protect public health.

U.S. EPA will conduct its next 5-year review sometime after March 2011.

Available at: http://www.epa.gov/superfund/sites/fiveyear/f06-02016.pdf. 2006 Mar [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants dibenzofuran, aldrin, dieldrin, PAHs, PCB, lead, and mercury were identified at this site. For a more complete list of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.1.2. Summary and Conclusions for the Buffalo River AOC, Erie County, NY

3.1.2.1 Hazardous Waste Sites

ATSDR categorized six sites in Erie County, NY, as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some time in their assessment history. Three of these sites have either been remediated by removal of contaminated soil and waste-containing barrels, or by institutional controls (e.g., fencing, covering contaminated soil) thus preventing exposure to site contaminants. Three other sites are undergoing remediation.

In the past, these hazardous waste sites may have contributed to the environmental burden of the IJC-critical pollutants PCBs, B[a]P, lead, and mercury.

3.1.2.2 TRI Data

Onsite TRI releases in Erie County, NY, totaled 5,269,495 pounds, the majority of which were released to air, followed by releases to water; considerably less was released to soil. See Table 4.1-B.

The IJC-critical pollutants accounted for 9,387 pounds, or 0.2% of the total onsite releases. The released IJC-critical pollutants were PCDDs and PCDFs (to air), lead and lead compounds (to air and water), and mercury and mercury compounds (to air).

Major releases (≥ 500,000 pounds total onsite) of non-IJC critical chemicals were hydrochloric acid aerosols, ammonia, and carbon disulfide (primarily to air). Facilities releasing these pollutants are listed in Table 3.1-C.

3.1.2.3 NPDES Data

The NPDES permitted discharges for Erie County, NY are summarized in Table 4.1-D. The average annual permitted discharges in 2004 totaled 691,036 pounds, the majority of which was nitrogen (as ammonia).

The one IJC-critical pollutant was lead, accounting for 124 pounds. The facility permitted to discharge this pollutant is listed in Table 4.1-E.

3.1.2.4 Beneficial Use Impairments (BUIs)

Of the three health-related BUIs, restrictions on fish consumption were the single impairment at this AOC site. According to the U.S. EPA, restrictions on fish consumption were based on lake-wide advisories due to PCB and chlordane contamination. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

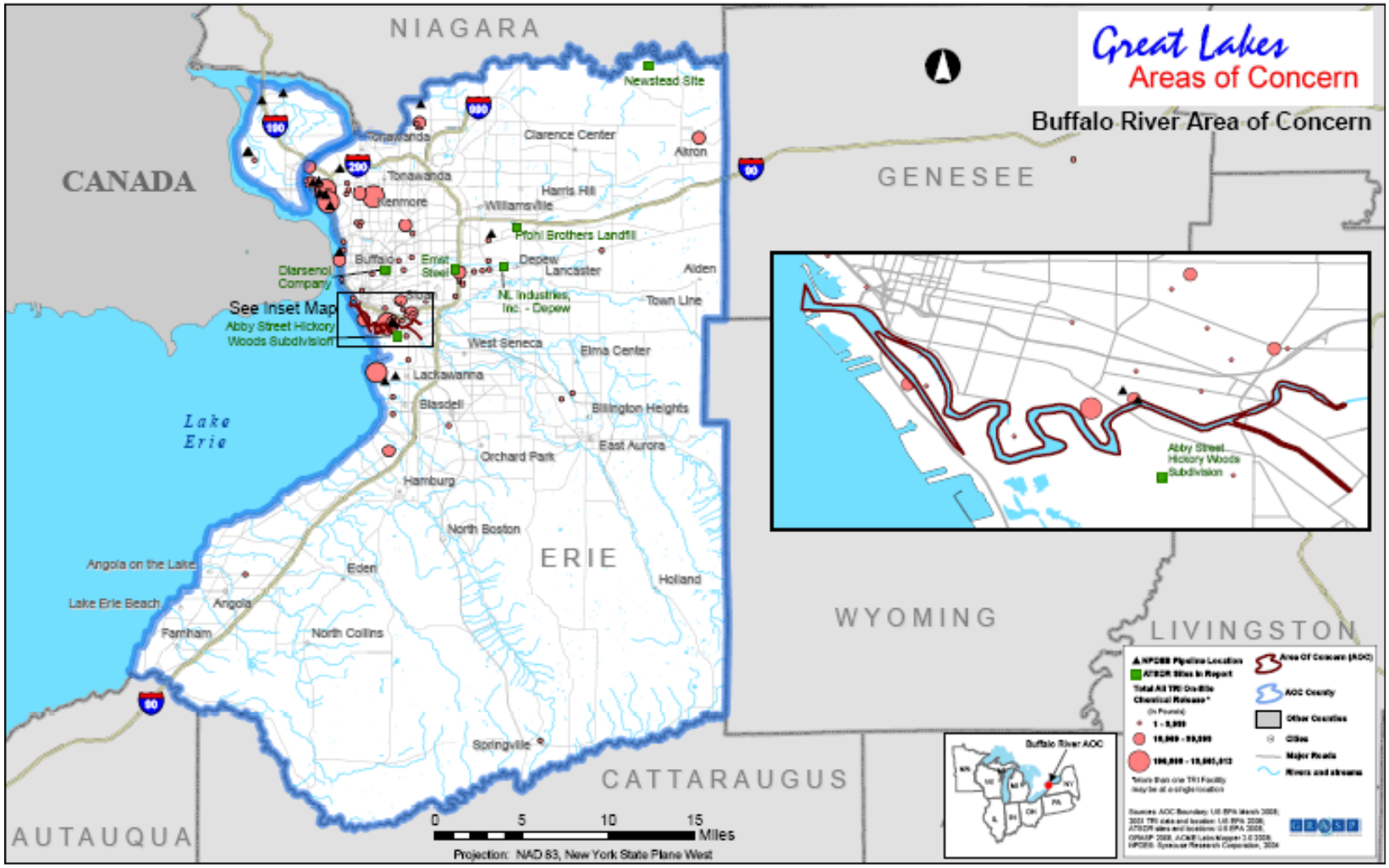

Great Lakes
Areas of Concern
Buffalo River Area of Concern
NIAGARA
CANADA
GENESEE
WYOMING
LIVINGSTON
ERIE
CATTARAUGUS
AUTAUQUA
Lake Erie
See Inset Map
Abby Street Hickory Woods Subdivision
Newstead Site
Clarence Center
Akron
Tonawanda
Kenmore
Harris Hill
Williamsville
Pfohl Brothers Landfill
Buffalo
Ernst Steel
Depew
Lancaster
Alden
Town Line
Diamond Company
NL Industries, Inc. - Depew
West Seneca
Elma Center
Lackawanna
Blasdell
Billington Heights
Orchard Park
East Aurora
Hamburg
North Boston
Eden
Holland
Angola on the Lake
Lake Erie Beach
Angola
Farnham
North Collins
Springville
0 5 10 15 Miles
Projection: NAD 83, New York State Plane West
Abby Street Hickory Woods Subdivision
Buffalo River AOC

Table 3.1-B. TRI Releases (in pounds, 2001) for the Buffalo River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
POLYCHLORINATED BIPHENYLS	1	0	0	0	0	0	0.43	0.43
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00059535	No data	0	0	0.000595	0	0.00059535
(PCDDs and PCDFs)	3							
LEAD	8	758.37	0	0	0	758.37	1676.6	2434.97
LEAD COMPOUNDS	8	3947.3164	4311.41	0	48	8306.726	48134.46	56441.1864
MERCURY	9	0.01	0	0	0	0.01	0	0.01
MERCURY COMPOUNDS	9	322	0	0	0	322	18	340
	Total IJC	**5027.696995**	**4311.41**	**0**	**48**	**9387.106**	**49829.49**	**59216.597**
1,1-DICHLORO-1-FLUOROETHANE		13756	No data	0	0	13756	0	13756
1,2,4-TRIMETHYLBENZENE		704	1	0	0	705	50	755
1,3-BUTADIENE		13	0	0	0	13	0	13
ACETONITRILE		383	No data	0	0	383	0	383
AMMONIA		707047	13158	0	0	720205	250	720455
ANILINE		6247	193	0	0	6440	0	6440
ANTHRACENE		2	No data	0	0	2	0	2
ANTIMONY COMPOUNDS		0	No data	0	0	0	4556	4556
ARSENIC COMPOUNDS		585	8	0	0	593	14000	14593

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
BARIUM COMPOUNDS		895	74000	0	0	74895	19000	93895
BENZENE		17948	751	0	0	18699	39	18738
BENZO(G,H,I)PERYLENE		21.7414289	0	0	0	21.74142	1.64	23.3814289
BROMOMETHANE		10898	No data	0	0	10898	0	10898
BUTYL ACRYLATE		34	No data	0	0	34	0	34
CARBON DISULFIDE		671000	No data	0	0	671000	1800	672800
CERTAIN GLYCOL ETHERS		25803	0	0	0	25803	0	25803
CHLORINE		252	No data	0	0	252	0	252
CHROMIUM		1277	0	0	0	1277	313	1590
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		1086	24000	0	1026	26112	10300	36412
COBALT COMPOUNDS		3	2	0	0	5	110	115
COPPER		1270	3	0	0	1273	11604	12877
COPPER COMPOUNDS		0	No data	0	0	0	107	107
CREOSOTE		83	No data	0	0	83	0	83
CUMENE		15	0	0	0	15	0	15
CYANIDE COMPOUNDS		29763	777	0	0	30540	0	30540
CYCLOHEXANE		84	0	0	0	84	0	84
DI(2-ETHYLHEXYL) PHTHALATE		117	No data	0	0	117	0	117

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
DIBUTYL PHTHALATE		4	No data	0	0	4	0	4
DICHLOROMETHANE		29255	No data	0	0	29255	8700	37955
DIISOCYANATES		11	No data	0	0	11	2	13
ETHYLBENZENE		1265	1	0	0	1266	35	1301
ETHYLENE		1993	0	0	0	1993	0	1993
ETHYLENE GLYCOL		1	5	0	0	6	0	6
FORMALDEHYDE		1009	0	0	0	1009	0	1009
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		2224000	No data	0	0	2224000	0	2224000
HYDROGEN FLUORIDE		170005	No data	0	0	170005	0	170005
MALEIC ANHYDRIDE		23	0	0	0	23	0	23
MANGANESE		1401	250	0	0	1651	3791	5442
MANGANESE COMPOUNDS		1483	32000	0	2048	35531	11100	46631
METHANOL		7990	0	0	0	7990	0	7990
METHYL ETHYL KETONE		66492	0	0	0	66492	0	66492
METHYL ISOBUTYL KETONE		518	No data	0	0	518	0	518
METHYL METHACRYLATE		111160	No data	0	0	111160	250	111410
METHYL TERT-BUTYL ETHER		6014	5	0	0	6019	0	6019
N,N-DIMETHYLANILINE		19	11	0	0	30	750	780

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
N,N-DIMETHYLFORMAMIDE		170	No data	0	0	170	0	170
NAPHTHALENE		7331	750	0	0	8081	0	8081
N-BUTYL ALCOHOL		169	No data	0	0	169	0	169
N-HEXANE		15284	5	0	0	15289	56	15345
NICKEL		1191	0	0	0	1191	1987	3178
NICKEL COMPOUNDS		1163	17000	0	9488	27651	6634	34285
NITRATE COMPOUNDS		0	27160	0	0	27160	1430	28590
NITRIC ACID		1179	No data	0	0	1179	0	1179
PERACETIC ACID		4000	0	0	0	4000	0	4000
PHENANTHRENE		1397	No data	0	0	1397	0	1397
PHENOL		24000	1200	0	0	25200	0	25200
POLYCYCLIC AROMATIC COMPOUNDS	1399.279526	14.75	0		0	1414.029	32.8	1446.82952
PROPYLENE		587	No data	0	0	587	0	587
SODIUM NITRITE		584	No data	0	0	584	6960	7544
STYRENE		24556	5	0	0	24561	6850	31411
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	430393	0	0		0	430393	0	430393
TOLUENE		395405	2	0	0	395407	5232	400639
TRICHLOROETHYLENE		8400	No data	0	0	8400	No data	8400

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
URETHANE		0	No data	0	0	0	195	195
VANADIUM COMPOUNDS		475	0	0	0	475	39000	39475
VINYL ACETATE		64	No data	0	0	64	0	64
XYLENE (MIXED ISOMERS)		9679	3	0	0	9682	139	9821
ZINC COMPOUNDS		4597	12288	0	0	16885	400863	417748
	Total Non-IJC	**5043953.021**	**203592.75**	**0**	**12562**	**5260107.7**	**556137.4**	**5816245.21**
	Total	**5048980.718**	**207904.16**	**0**	**12610**	**5269494.8**	**605966.9**	**5875461.80**

Table 3.1-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Buffalo River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	None			
Erie County				
Lead and lead compounds	12			
Erie County, NY	12	BETHLEHEM STEEL CORP. GALVANIZED PRODS. DIV.	14218BTHLHGALVA	BLASDELL
		BUFFALO CHINA INC.	14210BFFLCHAYES	BUFFALO
		DERRICK CORP.	14225DRRCK590DU	CHEEKTOWAGA
		FEDCO AUTOMOTIVE COMPONENTS CO.	14207FDCTM57TON	BUFFALO
		FRONTIER HOT DIP GALVANIZING INC.	14207FRNTR1740E	BUFFALO
		GIBRALTAR STEEL CORP.	14225GBRLT2555W	BUFFALO
		GMC POWERTRAIN DIV. TONAWANDA NY	14240CHVRLRIVER	BUFFALO
		ITT STANDARD	14227TTSTN175ST	CHEEKTOWAGA
		L.D. MCCAULEY INC.	14127LDMCC3875C	ORCHARD PARK
		POHLMAN FNDY. CO. INC.	14206PHLMN205BA	BUFFALO
		REPUBLIC TECHS. INTL. L.L.C.	14218BTHLHBARRO	BLASDELL
		WILLIAMS ADVANCED MATERIALS INC.	14214WLLMS2978M	BUFFALO
Mercury and mercury compounds	1			
Erie County, NY	1	BETHLEHEM STEEL CORP. LACKAWANNA COKE DIV.	14218BTHLHPOBOX	LACKAWANNA

Table 3.1-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Buffalo River AOC

Chemical	*IJC Tracking Number*	*Discharge*
LEAD, TOTAL (AS PB)	8	124.10
	Total IJC	**124.10**
BENZENE		277.40
CHLOROBENZENE		474.50
CHLOROFORM		270.10
CHROMIUM, HEXAVALENT (AS CR)		10.95
CYANIDE, TOTAL (AS CN)		7957
DI-N-BUTYL PHTHALATE		277.40
IRON, TOTAL (AS FE)		38325
METHYLENE CHLORIDE		930.75
NITROGEN, AMMONIA TOTAL (AS N)		10110.50
NITROGEN, AMMONIA, TOTAL (AS NH3)		610280
PHENOLICS, TOTAL RECOVERABLE		2263
PHENOLS		16571
TETRACHLOROETHYLENE		2445.50
TOLUENE		277.40
XYLENE		277.40
ZINC, TOTAL (AS ZN)		164.25
	Total Non-IJC	**690912.15**
	Total	**691036.25**

Table 3.1-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Buffalo River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead	**1**			
Erie County, NY	1	IVACO STEEL PROCESSING (NY)LLC	NY0083623	TONAWANDA

3.2. Presque Isle Bay AOC, Erie County, PA

The Presque Isle Bay AOC is in northwest Pennsylvania, on the southern shore of Lake Erie. The watershed primarily includes urban and industrial areas within the City of Erie and Millcreek Township. The principal tributaries are Millcreek (including Garrison Run) and Cascade Creek, which account for about two-thirds of the water flowing into the bay (see AOC map at end of chapter and in Appendix 2).

3.2.1. Hazardous Waste Sites Relevant to the Presque Isle Bay AOC

ATSDR identified three hazardous waste sites and one industrial facility in Erie County, PA that during the public health assessment process were found to pose either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. These conclusions, together with information regarding the type and location of the site and the date and type of assessment document, are summarized in Table 3.2-A.

Table 3.2-A. Hazardous Waste Sites in Erie County, PA

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Foamex Products Site (Corry Area Middle-High School) PAD005029517	HC HC	2001 2004	3 4	Non NPL	Active site; RCRA supervised
Hammermill – Scott Run Site, Harborcreek Township PAD981114648	HC	1998	2	Non NPL	Completed
Lord-Shope Landfill, Girard Township PAD980508931	HA LISR SRU	1989 1992 1995	2 4 4	NPL	Ongoing
Millcreek Dump, Erie PAD980231690	HA SRU	1989 1993	3 2	NPL	Ongoing

2=Public Health hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard

HA=Public Health Assessment, HC=Health Consultation, LISR = Lead Initiative Summary Report, SRU=Site Review and Update

3.2.1.1 Foamex Products Site (Corry Area Middle-High School)

The Foamex Products Site is an active manufacturing facility in Corry (Erie County) PA. It is near a school and near residential areas. ATSDR was asked to evaluate whether air emissions from this facility presented a public health hazard to nearby residents and students of Corry Area Middle-High School, located approximately 2,000 feet west of the plant, and to nearby residents. Information regarding this site is from the relevant 2001 and the 2004 ATSDR health consultations and a Pennsylvania Department of Environmental Protection update.

ATSDR Conclusions: In 2001, ATSDR concluded that the air sampling and monitoring data from 4 consecutive days in April 2000 were not adequately representative of long-term or peak exposure patterns. Consequently, ATSDR classified the site as an *Indeterminate Public Health*

Hazard (Category 3). Although the data indicated a completed exposure pathway (inhalation) to methylene chloride for residents near the plant and possibly for high school students, time-integrated concentrations were below ATSDR's intermediate and chronic exposure MRLs. In addition, for residents near the plant, peak air concentrations of methylene chloride exceeded ATSDR's acute MRL, and toluene diisocyanate isomers in air were not above detection limits. In 2004, ATSDR again examined methylene chloride levels in the air, determined they were below levels of health concern, and classified this specific issue as *No Apparent Public Health Hazard.* (Category 4). ATSDR also reported that in 2004, Foamex Products voluntarily eliminated methylene chloride from its manufacturing process.

U.S. EPA Update: Foamex Products does not appear in the CERCLIS database. It is an operating facility with discharge permits overseen by the Pennsylvania Department of Environmental Protection.

Pennsylvania Department of Environmental Protection Update. The Department of Environmental Protection's Air Quality program inspected the facility in December 2007 and found no violations. As mentioned in the report, in 2003 Foamex stopped using methylene chloride, a known carcinogen, as the blowing agent used to create the bubbles in the foam. Foamex completed a 100% substitution of the methylene chloride with carbon dioxide. This represented a reduction in air pollution of over 600 tons per year from previous years. Erie County went from being near the top of the list of releases of known carcinogens to the air to not "making the list" because of this one change by Foamex (Lori Boughton, Chief, Office of Great Lakes, PDEP, 2008 June 26 letter).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site. Because the Foamex Products Site is an active manufacturing facility rather than a hazardous waste site, its releases are included in the TRI section of this report.

3.2.1.2 Hammermill – Scott Run Site

This site is approximately 10 miles east of the City of Erie, in Harborcreek Township (Erie County) PA. In the 1960s, the Hammermill Paper Company used this 5-acre, heavily wooded site for disposal of pulp and paper waste. Wood mulch was stored/piled on the site, and various wastes, including drummed waste, were dumped into two lagoons. In 1988, the number of drums was estimated at 50; in 2001, they were estimated at 27. Some were partially buried and in various stages of decay. Others, due to thick vegetation or sediment deposition, may not have been visible. The site is currently part of a recreational park. Information regarding this site was taken from the 1998 ATSDR health consultation and the 2008 Pennsylvania Department of Environmental Protection update.

ATSDR Conclusions: Because the lagoons posed a drowning risk for visitors who could fall off a foot bridge that spanned the lagoons, in 1998 ATSDR concluded that the site posed a *Public Health Hazard* (Category 2). Although the contaminants in the discarded drums had not been adequately characterized, the contaminants did not appear to have migrated offsite. But the deteriorating drums might have released additional, as-yet-unknown chemicals, and the monitoring data were both old (1988) and incomplete. Remedial activities at this site included the removal of 79 drums. The state committed to conduct additional clean-up activities when resources allowed.

U.S. EPA Update: Hammermill Scott Run has been deleted from the NPL.

Pennsylvania Department of Environmental Protection Update: The site has been clean-closed. The owner of the site, International Paper, removed all of the drums and impacted soils, identified a mercury issue in the wetlands at the site, removed the mercury-contaminated media, and restored the site. Monitoring is ongoing to ensure the wetlands are established and maintained. This site is no longer releasing any contaminants (Lori Boughton, Chief, Office of Great Lakes, PDEP, 2008 June 26 letter).

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutant lead was detected onsite.

3.2.1.3 Lord Shope Landfill

Located some 17 miles west of Erie, PA, the 4-acre Lord Shope Landfill is an NPL site situated on an approximate 30-acre parcel, which consists of a landfill and adjacent areas of contaminated surface soil and groundwater. From about 1954 to 1979, Lord Corporation dumped wastes into the landfill. Although primarily debris, these wastes also included rubber scrap, organic and inorganic chemicals, solvents, cooling oils, acids, and caustics. Remedial actions in 1982–1983 included removal of exposed drums, containment and removal of 20,000 gallons of leachate, regrading and capping of the landfill, construction of an upgradient subsurface groundwater diversion wall, and site fencing.

Additional remediation initiated after the 1989 public health assessment included removal of VOCs from the landfill, and surrounding soils, and groundwater through vapor stripping and extraction, removal of VOCs from groundwater by vapor stripping, and through discharge of treated groundwater to a tributary of Elk Creek. Information regarding this site was taken from the 1989 ATSDR public health assessment, the 1992 lead initiative summary report, the 1995 site review and update, U.S. EPA's 2004 five-year review, and a 2008 Pennsylvania Department of Environmental Protection update.

Demographic Data: The demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	26
Females aged 15–44	75
Adults 65 and older	35

ATSDR Conclusions: In 1989, ATSDR concluded that because of incomplete on- and offsite contamination characterization, the site posed a *Public Health Hazard* (Category 2). The available data indicated that 1) long-term oral exposure to lead from private well water, and 2) dermal exposure to arsenic from offsite surface water, were of public health concern. The 1992 lead initiative summary report and the 1995 ATSDR's site review and update concluded that the site posed *No Apparent Public Health Hazard* (Category 4). Remedial actions, including a groundwater pump and treat system, were determined effective in controlling the off-site migration of groundwater contaminants.

U.S. EPA Update: In its September 2004 five-year review, U.S. EPA concluded that

> The constructed remedy is functioning as intended by the ROD [Record of Decision]. The landfill cap and Site fencing provide two lines of defense to prevent any potential for direct contact with contaminated soil. The ground water extraction system is functioning as designed and the discharge of treated effluent to the unnamed tributary of Elk Creek

> consistently meets or exceeds NPDES standards. There are no exposures to Site-related ground water contaminants. The vapor extraction system is also functioning as designed. The institutional controls are in place and are being maintained on the deed to the property thereby providing an effective warning to any potential future owners of the property regarding the contamination. Because there are no current exposures and because the potential for future exposures is minimal, the remedy at the Site remains protective of human health and the environment.

The next 5-year review of the Lord Shope Landfill site will occur on or after September 2009. Available at: http://www.epa.gov/superfund/sites/fiveyear/f04-03019.pdf. 2004 Sep [cited 2008 Jul 10].

Pennsylvania Department of Environmental Protection Update. This landfill site is in Girard Township, which is not in the Presque Isle Bay watershed. In 1982, Lord Corporation (a site responsible party), removed 81 exposed drums of waste, installed a composite cap over the landfill, and installed a low permeability groundwater cutoff wall upgradient of the landfill. Lord then selected a remedy consisting of a groundwater pump-and-treat system in conjunction with an *in-situ* vapor stripping system. Remedial activities were completed in August 1996. The site is currently in the Operation and Maintenance (O&M) phase (Lori Boughton, Chief, Office of Great Lakes, PDEP, 2008 June 26 letter).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.2.1.4 Millcreek Dump

Millcreek Dump covers some 124.3 acres. It is 2 miles west of the City of Erie and fewer than 2 miles from Presque Isle Bay. Originally a wetland, between 1941 and 1981 the site was an unpermitted landfill and was mostly filled with foundry sand and other industrial and municipal wastes containing VOCs, PCBs, PAHs, and heavy metals. In 1983, drums filled with hazardous liquids were removed from the site, and some fences were added. Access to most of the site, however, remained unrestricted. Information regarding this site was taken from the 1989 ATSDR public health assessment, the 1993 ATSDR site review and update, the U.S. EPA 2006 five-year site review, and the 2008 Pennsylvania Department of Environmental Protection update.

Demographic Data: The demographic profile from the 2000 U.S. Census identified the following vulnerable populations living within 1 mile of this site:

Children 6 years and younger	90
Females aged 15-44	2,289
Adults 65 and older	2,055

ATSDR Conclusions: ATSDR concluded in the 1989 public health assessment that because of potential migration of contaminated groundwater to an upgradient public water supply well field during extended droughts, the site was an *Indeterminate Public Health Hazard* (Category 3). In the 1993 Site Review and Update, because of exposure to contaminated soil, sediment, and surface water, airborne dust from operation of recreational vehicles, and contaminated groundwater during flooding of basements, ATSDR reclassified the site as a *Public Health*

Hazard (Category 2) for area residents, workers, and site intruders. In that same site review and update ATSDR concluded, however, that not all of the contaminated groundwater was site-related.

During the last 9 years, Responsible Parties (RP) operated the treatment plant, and during this time the clean-up standards were met. In December, 2006 the State of Pennsylvania discussed with the PRP (Principal Responsible Party) how to replace the RPs by October 2007 and continue plant operations. In September of 2007, the state assumed responsibility for the operation and maintenance of the Groundwater Extraction and Treatment System.

U.S. EPA Update: In its latest 5-year review of the Mill Creek Dump site, dated September, 2006, U.S. EPA concluded

> The remedy is functioning as designed and is considered protective of human health and the environment in the short term as the groundwater is extracted from the Site and treated. Groundwater leaving the Site meets the discharge limitations imposed by the National Pollution Discharge Elimination System (NPDES) permit for discharge to Marshalls Run, which borders the eastern edge of the Site. The cap is functioning as intended and is protective of human and ecological receptors. The plans for expansion of the EIA onto the Site have been evaluated, and it has been determined that it will not have a significant impact on the remedy. Short-term protectiveness will be maintained during construction of the airport expansion through controls placed during construction that will not allow excavation through the cap. Construction will occur on top of the cap.
>
> To ensure long-term protectiveness, EPA will confirm that air emissions from the treatment plant are within EPA's acceptable risk range. In addition, the potential for vapor intrusion will be assessed, and 1,4-dioxane will be added to the list of sampled contaminants. The ROD did not require institutional controls to be implemented to prevent use of groundwater or disturbance of soil. However, ICs in the form of deeds conveying interest in real property are in place. Long-term protectiveness of the remedy is expected to be achieved through the continued operation of the treatment system until cleanup goals are met and compliance with the institutional controls (ICs). Sampling and monitoring of groundwater is expected to continue until cleanup standards are met.

The next 5-year review will occur on or after September 2011. Available at: http://www.epa.gov/superfund/sites/fiveyear/f2006030001083.pdf. 2006 Sep [cited 2008 Jul 10].

Pennsylvania Department of Environmental Protection Update. This site is located in Millcreek Township, discharging to Marshall Run, which is also not in the AOC watershed. U.S. EPA completed construction of a groundwater treatment system at the site in 1992. Construction of a cap, a golf course, wetlands and a flood retention basin was completed in September 2001. A nine-hole golf course was built over the former industrial and municipal waste dump. The final inspection and grand opening of the golf course was in June 2002. A five-year review was conducted in July 2007. The Department of Environmental Protection assumed operation and maintenance of the treatment plant in October 2007 and continues to monitor (Lori Boughton, Chief, Office of Great Lakes, PDEP, 2008 June 26 letter).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, PCBs, and PAHs were identified at this site. For a more complete listing of hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.2.2. Summary and Conclusions for the Presque Isle Bay AOC, Erie County, PA

3.2.2.1 Hazardous Waste Sites

During the entirety of its health assessment activities in Erie County, PA, ATSDR categorized four sites as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. One such site, Foamex, is an active manufacturing facility (Foamex Products site) that as of the date of this report did not release IJC-critical pollutants.

One of the sites has been remediated and is not expected to contribute to human or environmental exposure. Remediation is ongoing at two sites.

3.2.2.2 Public Health Outcome Data

No health outcome data has been reported for any of the four sites. As reported by U.S. EPA (June 2004), Presque Isle Bay is the first AOC designated in the post-remediation Recovery Stage.

3.2.2.3 TRI Data

In 2001, the TRI total onsite chemical releases for Erie County, PA were 3,688,175 pounds. See Table 3.2-B. IJC-critical pollutants accounted for 0.2% of this total. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to air), lead and lead compounds (to air and land), and mercury (to air and land). The major onsite releases (≥ 500,000 pounds) of non-IJC chemicals were dichloromethane, methanol, and hydrochloric acid aerosols (primarily to air). Facilities releasing these pollutants are listed in Table 3.2-C.

3.2.2.4 NPDES Data

The NPDES permitted discharges for Erie County, PA are summarized in Table 3.2-D. The average annual permitted discharges in 2004 totaled 388,803 pounds, the majority of which was phosphorus and ammonia nitrogen. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

3.2.2.5 Beneficial Use Impairments (BUIs)

Of the three health-related BUIs, no BUI was listed as impaired at this AOC site. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

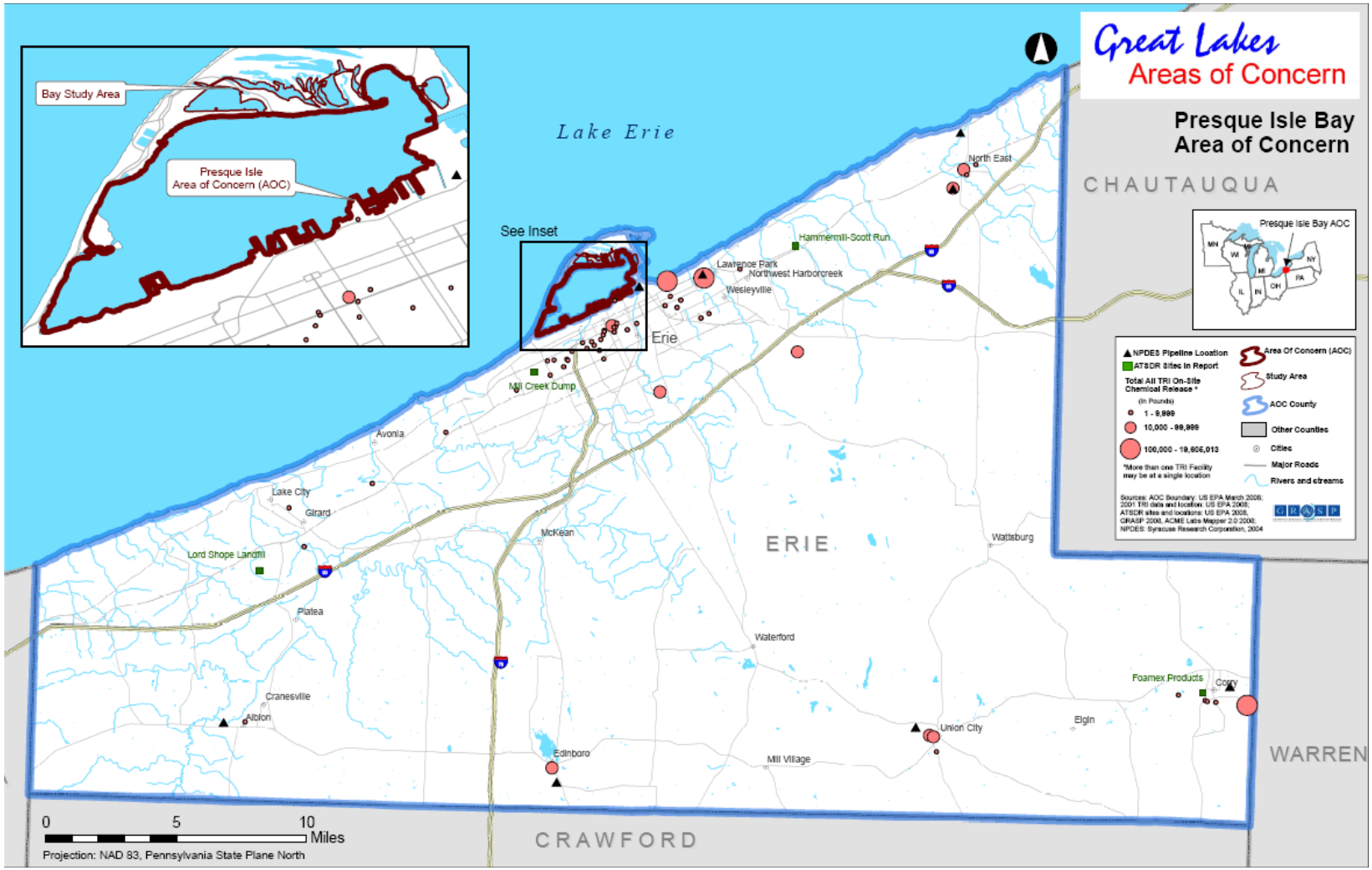

Great Lakes
Areas of Concern
Presque Isle Bay
Area of Concern
Bay Study Area
Presque Isle
Area of Concern (AOC)
See Inset
Lake Erie
CHAUTAUQUA
ERIE
CRAWFORD
WARREN
North East
Hammermill-Scott Run
Lawrence Park
Northwest Harborcreek
Wesleyville
Erie
Mill Creek Dump
Avonia
Lake City
Girard
McKean
Lord Shope Landfill
Platea
Cranesville
Albion
Edinboro
Waterford
Mill Village
Union City
Elgin
Wattsburg
Foamex Products
Corry
Presque Isle Bay AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,806,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Study Area
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
0
5
10
Miles
Projection: NAD 83, Pennsylvania State Plane North

Table 3.2-B. TRI Releases (in pounds, 2001) for Presque Isle Bay AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.0018612	No data	0	1.90292	0.002051	0	0.0020515
(PCDDs and PCDFs)	3							
LEAD	8	4585.96	103	0	0	4688.96	11233	15921.96
LEAD COMPOUNDS	8	213.6502	No data	0	3024.8	3238.450	7951.1	11189.5502
MERCURY	9	12	No data	0	0	12	0	12
MERCURY COMPOUNDS	9	24	No data	0	11	35	0	35
	Total IJC	**4835.612061**	**103**	**0**	**3035.800**	**7974.412**	**19184.1**	**27158.51225**
1,2,4-TRIMETHYLBENZENE		2590	0	0	0	2590	0	2590
ACETALDEHYDE		39000	No data	0	9	39009	0	39009
ALUMINUM (FUME OR DUST)		500	No data	0	0	500	2950	3450
ALUMINUM OXIDE (FIBROUS FORMS)		0	No data	0	0	0	187725	187725
AMMONIA		64533	5	0	0	64538	250	64788
ANTHRACENE		3	No data	0	0	3	0	3
ANTIMONY COMPOUNDS		0	No data	0	0	0	500	500
ASBESTOS (FRIABLE)		250	No data	0	0	250	848380	848630
BARIUM COMPOUNDS		5161	250	0	35005	40416	28345	68761
BENZENE		2529	No data	0	0	2529	0	2529

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
BENZO(G,H,I)PERYLENE		1.0004	No data	0	0	1.0004	37.7278	38.7282
CATECHOL		0	No data	0	1	1	0	1
CERTAIN GLYCOL ETHERS		41044	No data	0	0	41044	0	41044
CHLORINE		1105	No data	0	0	1105	0	1105
CHLORINE DIOXIDE		5905	No data	0	0	5905	0	5905
CHROMIUM		1539	5	0	0	1544	15492	17036
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		1005	0	0	0	1005	157171	158176
COPPER		8589.6	505	0	772.4	9867	13325.4	23192.4
COPPER COMPOUNDS		5470	250	0	3705	9425	22673	32098
CYANIDE COMPOUNDS		471	No data	0	0	471	0	471
DI(2-ETHYLHEXYL) PHTHALATE		0	No data	0	0	0	17000	17000
DICHLOROMETHANE		1245087	No data	0	0	1245087	0	1245087
ETHYLENE GLYCOL		4	No data	0	0	4	0	4
ETHYLENE OXIDE		500	No data	0	0	500	0	500
FORMALDEHYDE		5	No data	0	0	5	0	5
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		507164	No data	0	0	507164	0	507164

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
HYDROGEN FLUORIDE		69250	0	0	0	69250	0	69250
MANGANESE		6011	250	0	5	6266	172466	178732
MANGANESE COMPOUNDS		150	No data	0	50000	50150	28082	78232
METHANOL		1156000	No data	0	31000	1187000	0	1187000
METHYL ETHYL KETONE		762	0	0	0	762	0	762
MOLYBDENUM TRIOXIDE		5	No data	0	0	5	500	505
NAPHTHALENE		874	No data	0	0	874	0	874
N-BUTYL ALCOHOL		5590	0	0	0	5590	0	5590
N-HEXANE		2475	0	0	0	2475	0	2475
NICKEL		6170	260	0	461	6891	266100	272991
NICKEL COMPOUNDS		1000	5	0	0	1005	19485	20490
NITRATE COMPOUNDS		0	5	0	0	5	250	255
NITRIC ACID		4097	No data	0	0	4097	0	4097
PHENANTHRENE		10	No data	0	0	10	0	10
POLYCYCLIC AROMATIC COMPOUNDS		262.2199	No data	0	0	262.2199	254.2716	516.4915
SEC-BUTYL ALCOHOL		25650	No data	0	0	25650	0	25650
STYRENE		89105	0	0	0	89105	0	89105

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		166924	No data	0	0	166924	0	166924
TETRACHLORO-ETHYLENE		51557	No data	0	0	51557	0	51557
TOLUENE		4578	No data	0	0	4578	0	4578
TOLUENE DIISOCYANATE (MIXED ISOMERS)		446	No data	0	0	446	0	446
VANADIUM COMPOUNDS		500	No data	0	0	500	63890	64390
XYLENE (MIXED ISOMERS)		23450	0	0	0	23450	0	23450
ZINC (FUME OR DUST)		755	No data	0	0	755	160000	160755
ZINC COMPOUNDS		930	No data	0	8700	9630	63706	73336
	Total Non-IJC	**3549006.82**	**1535**	**0**	**129658.4**	**3680200.2**	**2068582.3**	**5748782.62**
	Total	**3553842.432**	**1638**	**0**	**132694.2**	**3688174.6**	**2087766.5**	**5775941.132**

Table 3.2-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Presque Isle Bay AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	**2**			
Erie County, PA	2	GE ERIE PLANT GETS	16531GNRLL2901E	ERIE
		INTERNATIONAL PAPER ERIE MILL	16533HMMRM1540E	ERIE
Lead and lead compounds	**20**			
Erie County, PA	20	AMERICAN METER CO.	16503MRCNM920PA	ERIE
		AMERICAN TINNING & GALVANIZING CO.	16501MRCNT522WE	ERIE
		BUILDING MATERIALS MFG. CORP.	16507BLDNG128WB	ERIE
		ELECTRIC MATERIALS CO.	16428LCTRC50SWA	NORTH EAST
		ENGELHARD CORP.	16503CLSCT1707G	ERIE
		ERIE BRONZE & ALUMINUM	16506RBRNZ6300W	ERIE
		ERIE COKE CORP.	16512RCKCRFOOTO	ERIE
		ERIE FORGE & STEEL INC.	16502NTNLF1341W	ERIE
		GE ERIE PLANT GETS	16531GNRLL2901E	ERIE
		GUNITE EMI PLANT	16501MC 603W1	ERIE
		INTERNATIONAL PAPER ERIE MILL	16533HMMRM1540E	ERIE
		KEYSTONE FNDY. DIV.	16512KYSTN944WE	ERIE
		LAMSON & SESSIONS	16505PYRMD1422I	ERIE

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		LINCOLN FNDY. INC.	16505LNCLN1600I	ERIE
		LORD CORP.	16514LRDCR1635W	ERIE
		PENN-UNION CORP.	16412TLDYN229WA	EDINBORO
		PHB DIE CASTING DIV.	16415PRKRW7900W	FAIRVIEW
		SNAP TITE INC. AUTOCLAVE ENGINEERS DIV.	16506SNPTT2930W	ERIE
		SNAP TITE INC. UNION CITY SITE	16438SNPTT201TI	UNION CITY
		URICK FNDY.	16501RCKFN15THC	ERIE
Mercury and mercury compounds	**2**			
Erie County, PA	2	GE ERIE PLANT GETS	16531GNRLL2901E	ERIE
		INTERNATIONAL PAPER ERIE MILL	16533HMMRM1540E	ERIE

Table 3.2-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Presque Isle Bay AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
CHLOROFORM		315.73
COPPER, TOTAL (AS CU)		542.03
DICHLORODIBROMOMETHANE		104.03
NITROGEN, AMMONIA TOTAL (AS N)		174681.70
PHOSPHORUS, TOTAL (AS P)		213160
	Total Non-IJC	**388803.49**
	Total	**388803.49**

3.3. Ashtabula River AOC, Ashtabula County, OH

The Ashtabula River flows through northeastern Ohio and enters Lake Erie at the City of Ashtabula. The river's drainage basin covers 137 square miles. Its major tributaries include Fields Brook, Hubbard Run, and Ashtabula Creek. The Ashtabula AOC is defined as the lower 2 miles of the Ashtabula River, Ashtabula Harbor, and the near shore of adjacent Lake Erie (see AOC map at end of chapter and in Appendix 2).

The Ashtabula River AOC project is among the recent AOC remediation projects initiated under the Legacy Act Sediment Cleanup. Begun in September of 2006, the project is expected to remove over 600,000 cubic yards of PCB-contaminated sediment from the Ashtabula River AOC.

3.3.1. Hazardous Waste Sites Relevant to the Ashtabula River AOC

ATSDR identified four hazardous waste sites in Ashtabula County, OH that during the public health assessment process were determined to pose either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. These conclusions, together with information regarding the type and location of the site and the date and type of assessment document, are summarized in Table 3.3-A.

Table 3.3-A. Hazardous waste sites in Ashtabula County, OH

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Big D Campground, Kingsville OHD980611735	HA SRU	1989 1993	3 4	NPL	Completed
Fields Brook, Ashtabula OHD980614572	HA HA	1986 1996	3 4	NPL	Ongoing
Laskin/Poplar Oil Co., Jefferson Township OHD061722211	HA SRU	1987 1992	3 3	Deleted from NPL	Completed
New Lyme Landfill, New Lyme OHD980794614	HA SRU	1986 1993	3 4	NPL	Ongoing

3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard

HA=Public Health Assessment, SRU=Site Review and Update

3.3.1.1 Big D Campground

This site, which includes a former sand and gravel pit used as a landfill for waste products, is bordered by the Conneaut Creek to the south; open land to the west; and a swamp, farm land, and residential area to the north and east. Big D Campground no longer operates as a landfill, and before ATSDR began work at the site in 1989, it was capped. U.S. EPA reported that the landfill accepted wastes such as drums containing halogenated and nonhalogenated solvents, caustics,

oily wastes, toluene diisocyanate (TDI), TDI residue contaminated with both monochlorobenzene and carbon tetrachloride, and monoethylamine. Many of these compounds contaminated adjacent soil, and volatile organic compounds and heavy metals, including barium, chromium, and lead, contaminated groundwater.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	56
Females aged 15–44	119
Adults 65 and older	82

ATSDR Conclusions: In 1989, ATSDR concluded that because of the potential threat to human health from exposure to contaminants and the lack of monitoring data, this site posed an *Indeterminate Public Health Hazard* (Category 3). Potential pathways included ingestion and direct contract with contaminated groundwater, surface water, soil, and possible ingestion of bioaccumulated contaminants in the food chain, as well as inhalation of volatilized contaminants or contaminants entrained in air.

A subsequent 1993 ATSDR Site Review and Update recategorized the site as posing *No Apparent Public Health Hazard* (Category 4). Remedial actions at the site included the 1994 excavation and onsite incineration of the landfill contents and capping of the site.

U.S. EPA Update: In an October 2006 Fact Sheet, U.S. EPA stated that with regard to the Big D Campground site,

> The second five-year review dated August 27, 2004 found that the remedy was constructed in accordance with the requirements of the ROD. An additional possible pathway had been located at the site: human exposure to indoor air from ground water. U.S. EPA is reviewing information the PRPs submitted regarding indoor air exposure for residences near the Big D Campground. U.S. EPA continues to evaluate groundwater collected at the site to determine if MNA [monitored natural attenuation] will a viable remedy for the site.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OHD980611735.htm. 2006 Oct [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical Pollutants were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.3.1.2 Fields Brook

The Fields Brook site is the 6-square mile watershed of Fields Brook, which flows through the City of Ashtabula. The site extends from within the City of Ashtabula to east of the city. Fields Brook flows into the Ashtabula River, which discharges into Lake Erie—the City of Ashtabula's drinking water source. It then flows through an industrial area that comprises one of the largest and most diversified concentrations of chemical plants in Ohio. Fields Brook became, therefore, the principal receiving stream for many industrial discharges. Sediments from Fields Brook were contaminated with PCBs, VOCs, PAHs, heavy metals (including mercury and lead), phthalates, and low-levels of radionuclides. VOCs and PCBs were detected in Fields Brook fish.

The U.S. EPA reported in 2006 that the Department of Energy would assume control of remediation activities at Reactive Metals Incorporated facility (referred to by U.S. EPA as RMI Extrusion), despite the fact that Reactive Metals/RMI Extrusion was part of the Fields Brook site. DOE coordinated its activities through the Ohio Department of Health Bureau of Radiation Protection and state and federal RCRA programs.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of the Fields Brook site:

Children 6 years and younger	1,122
Females aged 15-44	2,508
Adults 65 and older	2,123

Public Health Outcome Data: In 1988, the Ohio Department of Health completed an epidemiological study of cancers associated with the Fields Brook site. The final document found no evidence of excess cancer mortalities.

ATSDR Conclusions: In 1986, ATSDR's public health assessment concluded Fields Brook was an *Indeterminate Public Health Hazard* (Category 3). In 1996, ATSDR released a public health assessment that evaluated a single industrial site, Reactive Metals Incorporated, located within the Fields Brook site. ATSDR concluded that because fences prevented exposure to onsite uranium-contaminated soil, the Reactive Metals, Inc. site constituted No *Apparent Public Health Hazard* (Category 4). Although a slight uranium contamination of soil was present immediately outside the fence, the levels were too low to present a human health risk from either chemical toxicity or radiological effects.

U.S. EPA Update: In its February 2007 Fields Brook Fact Sheet, U.S. EPA further reported: that

> In 2005, O&M monitoring in the brook identified additional pockets of Dense Non-Aqueous Phase Liquid (DNAPL) contamination in Exposure Units (EU) 6 and 8 and in portions of the DS Tributary. EPA is evaluating the source of the DNAPL and is working with Detrex and the Fields Brook PRPs to resolve issues of responsibility implement additional measures to protect the brook, and clean up the identified contamination.
>
> In EU8, Detrex has installed an interceptor trench to cut off a potential subsurface pathway between the DNAPL source area and Fields Brook. EPA is evaluating whether DNAPL seen in EU8 is material missed during the cleanup or the result of continuous subsurface movement of contamination from the Detrex source area. Additional sampling in EU8 has also identified areas of elevated PCBs in brook sediment and floodplain soil. Plans are underway to delineate the additional PCB material that's been uncovered and to remove material with DNAPL and/or PCB concentrations above cleanup levels.
>
> In EU6, investigations in the area of the old North Sewer outfall have not found a continuing source of DNAPL. Therefore it appears that the material in this area (primarily under the old outfall structure) was material missed during the original cleanup. Plans are being prepared to excavate the DNAPL contamination as soon as weather allows. Detrex is also continuing the investigation of DNAPL now seen in the DS Tributary

> to the northwest of its facility. EPA will use this information to determine whether engineering measures already in place are sufficiently protective.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OHD980614572.htm. 2007 Nov [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues at this site, it identified the IJC-critical pollutants hexachlorobenzene, B[a]A, B[a]P, I[123cd]P, mercury, PCBs, and lead. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.3.1.3 Laskin/Poplar Oil

The Laskin Poplar Oil company site is a 9-acre site in Jefferson Township (Ashtabula County) OH. It is a former waste oil storage site, which at one time included 37 aboveground, inground, and underground oil storage tanks or pits. The oil was contaminated with PCBs and other hazardous substances. Fluid was removed from the tanks in 1981, but sludge residues in the tanks and pits remained a concern. The owners formerly used the oil to heat a greenhouse on the property and for road oiling.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	331
Females aged 15-44	714
Adults 65 and older	553

ATSDR Conclusions: In 1989, ATSDR found that contaminated sludge remaining in the tanks and pits could potentially be released by fire or by some act of nature and was not well characterized. ATSDR therefore concluded this sludge posed an *Indeterminate Public Health Hazard* (Category 3). In addition, ATSDR found that the surrounding soil and the boiler house where the oil was burned were contaminated, and that the contaminants may have had an effect on the local creek. A subsequent ATSDR Site Review and Update also categorized the site as an *Indeterminate Public Health Hazard*. Contaminants of concern included PCBs, 2, 3, 7, 8-TCDD, lead, and mercury in soil and sediment. PAHs and VOCs also were of concern in soil, sediments, and groundwater. Potential onsite exposure pathways included soil ingestion, dermal absorption, or inhalation of dust, contact with sediments or surface water, and the food chain. Although the contaminated groundwater was not a drinking water source, it could migrate into nearby Cemetery Creek. U.S. EPA nonetheless reported that ongoing environmental monitoring activities indicated that removal and remedial activities conducted at this site in the early 1990s were effective.

U.S. EPA Update: In its November 2007 Laskin/Poplar Oil Fact Sheet, U.S. EPA stated that

> The final RA included construction of a groundwater diversion trench and slurry cut-off walls, which have successfully lowered the water table to below the contaminated soil. The soils are further isolated by a low-permeability cap over the site, which has successfully eliminated the direct contact threat and reduced infiltration. Since 1993, private parties have been conducting maintenance and monitoring activities, which has verified that the final RAs have remained effective.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OHD061722211.htm. 2007 Nov [cited 11 Jul 2008].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, it identified the IJC-critical pollutants lead, mercury, polychlorinated biphenyls (PCB), polyaromatic hydrocarbons (PAH), chlorinated dioxins, and chlorinated furans. For a more complete list of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.3.1.4 New Lyme Landfill

This 40-acre landfill was in operation from 1969 to 1978, with most of waste coming from industrial and commercial sources. The landfill is about 20 miles south of the City of Ashtabula, (Ashtabula County) OH. Potential onsite exposure pathways included groundwater ingestion, direct contact with leachate or inhalation exposure to leachate, and inhalation, ingestion, and direct contact with soil.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	14
Females aged 15-44	24
Adults 65 and older	10

ATSDR Conclusions: In 1986 ATSDR concluded that the site was an *Indeterminate Public Health Hazard* (Category 3). The major concern was possible future exposure resulting from residential development. In its 1993 Site Review and Update ATSDR concluded that the site posed *No Apparent Health Hazard* (Category 4). Contaminants of concern for potential exposure included benzo(a)pyrene and other chemicals such as VOCs and chrysotile asbestos. U.S. EPA reported that effective remedial activities were completed in the mid 1990s. Further releases of contaminants and exposure of human populations are therefore unlikely.

U.S. EPA Update: The U.S. EPA January 2007 Fact Sheet for the New Lyme site states in part that

> The second five-year review for the site was completed on March 5, 2003, The five-year review indicated that the site had some issues which included the following:
>
> - low spots or subsidence of the landfill cap along the eastern portion of the site;
> - inadequate monitoring data to determine migration of contaminants within the deep aquifer;
> - high arsenic level at the site; and,
> - lack of analytical projections to predict the length of time until groundwater cleanup goals will be achieved.
>
> To address these site issues, U.S. EPA planned to take the necessary steps to ensure that the low spots along the landfill cap were repaired. These repairs were completed in 2004.
>
> The sampling program for some ground water monitoring wells will be modified. Analytical projections to determine the length of time until

ground water cleanup goals are achieved will be conducted. Also, the high arsenic levels at the site will be further investigated.

The next 5-year review for the New Lyme site should be available sometime in 2008.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OHD980794614.htm. 2007 Jan [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Document. During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, mercury, and polychlorinated biphenyls (PCB) were identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.3.2. Summary and Conclusions for the Ashtabula River AOC

3.3.2.1 Hazardous Waste Sites

During the entirety of its health assessment activities in Ashtabula County, OH, ATSDR categorized four sites as posing either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. According to ATSDR assessments and updated information from www.epa.gov/superfund/sites/npl/npl.htm, two of the sites have been remediated; the remaining two sites are undergoing remediation. The Fields Brook site (Section 3.3.1.2)—a very large site affected by many industrial releases—was remediated for mining residuals and PCB-contaminated soil and sediment and for mining residuals. Additional remediation is, however, necessary for low-level radionuclides and for dense nonaqueous phase liquid. The site was contaminated with the IJC-critical pollutants PCBs, mercury, and lead.

In 2006, the U.S. EPA reported a large mass of dense, nonaqueous phase liquid (DNAPL) below the Detrex Corporation facility (see Table 3.3-E). An extraction system is in place to remove the DNAPL, but the volume of DNAPL is so large the system will need to operate for an extended period. A planned expansion of the extraction system will, however, speed the removal of product. In addition, to prevent subsurface movement of DNAPL south to Fields Brook, in late 2006 Detrex installed an interceptor trench between its facility and Fields Brook.

In 2006, the U.S. EPA further reported that the dredging of the Ashtabula River was ongoing. In addition, excavation work in Fields Brook was completed in 2002, but follow-up work was necessary to address pockets of contamination found during O&M (Operations & Maintenance) sampling in the Fields Brook industrial area.

3.3.2.2 TRI Data

The TRI onsite chemical releases for Ashtabula County in 2001 totaled 6,138,371 pounds, primarily to air. IJC-critical pollutants accounted for 1,970 pounds (0.03%) of this total. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to land), lead and lead compounds (to air and land), and mercury and mercury compounds (primarily to air). See Table 3.3-B.

The major release (5,400,000 pounds) of non-IJC-critical chemicals was of carbonyl sulfide (88% of total onsite releases) to air. No other non-IJC-critical chemical releases of a 300,000-pound magnitude or greater occurred. See Table 3.3-C.

3.3.2.3 NPDES Data

The NPDES permitted discharges for Ashtabula County, OH, are summarized in Table 3.3-D. The average annual permitted discharges in 2004 totaled 187,488 pounds, the majority of which was cyanide, phosphorus, and ammonia nitrogen.

The IJC-critical pollutants lead and mercury were permitted to be discharged in relative modest amounts. Facilities permitted to release these pollutants are listed in Table 3.3-E.

3.3.2.4 Beneficial Use Impairments (BUIs)

Of the three health-related BUIs, fish consumption restrictions was the one impairment at this AOC site. Fish advisories have been posted for this AOC since 1983. Chemical pollutants of concern include a variety of heavy metals and chlorinated organic compounds. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

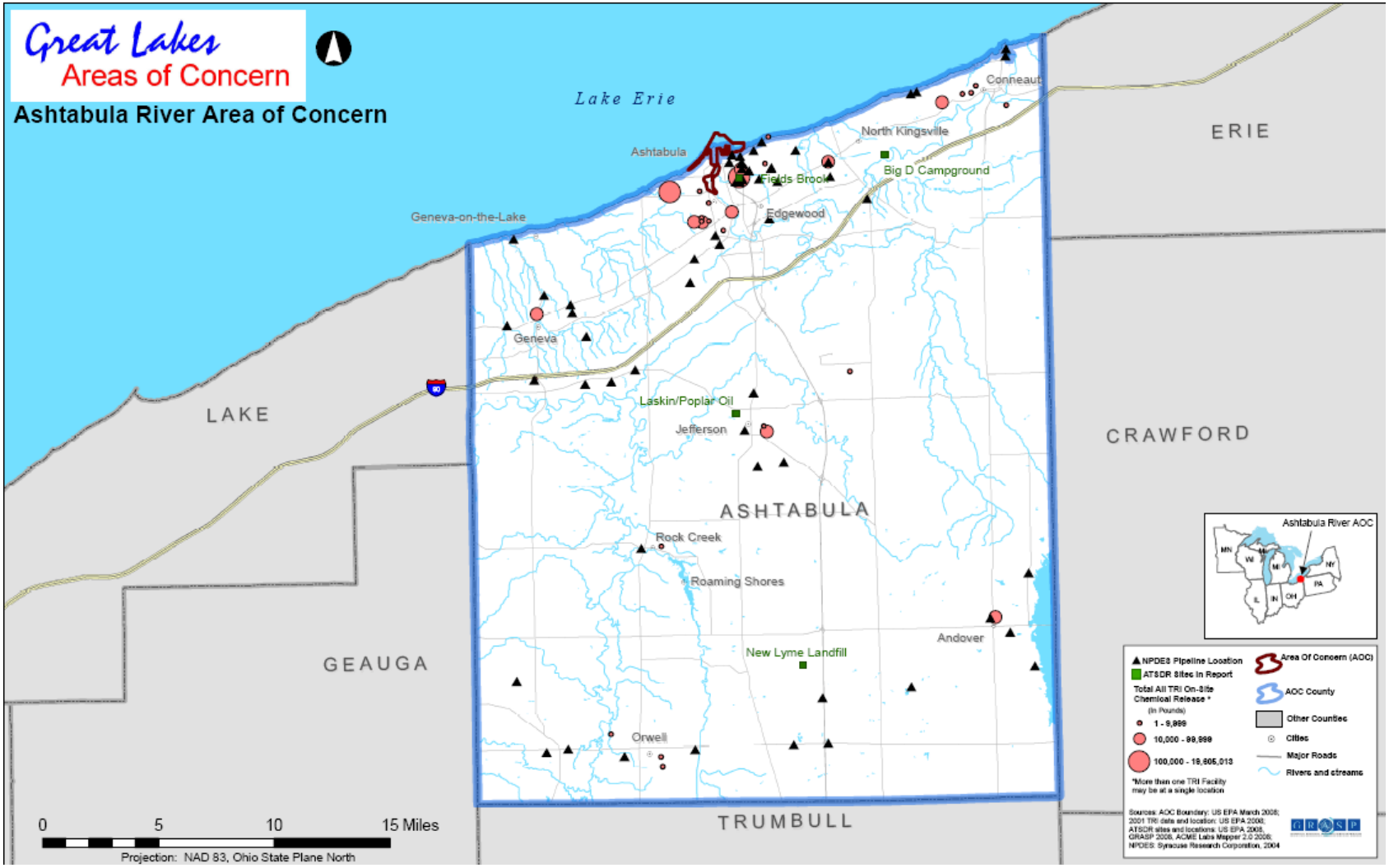

Great Lakes
Areas of Concern
Ashtabula River Area of Concern
Lake Erie
Conneaut
North Kingsville
Ashtabula
Big D Campground
Fields Brook
Edgewood
Geneva-on-the-Lake
Geneva
ERIE
LAKE
Laskin/Poplar Oil
Jefferson
CRAWFORD
ASHTABULA
Rock Creek
Roaming Shores
Andover
New Lyme Landfill
GEAUGA
Orwell
TRUMBULL
0
5
10
15 Miles
Projection: NAD 83, Ohio State Plane North
Ashtabula River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,605,013
*More then one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008; 2001 TRI data and location: US EPA 2008; ATSDR sites and locations: US EPA 2008; GRASP 2008, ACME Labs Mapper 2.0 2008; NPDES: Syracuse Research Corporation, 2004
GRASP

Table 3.3-B. TRI Releases (in pounds, 2001) for the Ashtabula River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00062688	0.000583443	0	0.2855034	0.28671372	0.037485	0.32419872
(PCDDs and PCDFs)	3							
LEAD	8	20.1	No data	0	304	324.1	40	364.1
LEAD COMPOUNDS	8	78.4	40	0	0	118.4	6076	6194.4
MERCURY	9	1396.57	0	0	0	1396.57	217	1613.57
MERCURY COMPOUNDS	9	130	0.5	0	0	130.5	22	152.5
	Total IJC	**1625.07062**	**40.5005834**	**0**	**304.28550**	**1969.85671**	**6355.0374**	**8324.89419**
1,3-DICHLOROPROPYLENE		511	No data	0	0	511	0	511
ALUMINUM (FUME OR DUST)		904	17	0	0	921	574189	575110
ALUMINUM OXIDE (FIBROUS FORMS)		250	No data	0	0	250	31300	31550
ANTIMONY COMPOUNDS		6	No data	0	0	6	7425	7431
BARIUM COMPOUNDS		2102	640	0	0	2742	139146	141888
CARBON DISULFIDE		53400	No data	0	0	53400	0	53400
CARBONYL SULFIDE		5400000	No data	0	0	5400000	0	5400000
CHLORINE		3333	0	0	0	3333	0	3333
CHLOROPICRIN		527	No data	0	0	527	0	527
CHROMIUM		10	1	0	0	11	9	20

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
COBALT		5	No data	0	0	5	4	9
COPPER		765	1	0	5	771	22	793
COPPER COMPOUNDS		255	250	0	0	505	750	1255
DECABROMODIPHENYL OXIDE		0	No data	0	0	0	8926	8926
EPICHLOROHYDRIN		409	0	0	0	409	0	409
ETHYLBENZENE		308	No data	0	0	308	0	308
FORMALDEHYDE		241	No data	0	0	241	0	241
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		193550	0	0	0	193550	0	193550
HYDROGEN FLUORIDE		35000	No data	0	0	35000	0	35000
LITHIUM CARBONATE		47	No data	0	0	47	6458	6505
MANGANESE COMPOUNDS		1314	12799	0	5	14118	51739	65857
METHANOL		5468	0	0	0	5468	0	5468
METHYL ETHYL KETONE		2605	No data	0	0	2605	0	2605
METHYL ISOBUTYL KETONE		254	No data	0	0	254	0	254
N-BUTYL ALCOHOL		2250	No data	0	0	2250	0	2250
NICKEL		265	1	0	0	266	8	274
PHENOL		1415	No data	0	0	1415	0	1415

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
POLYCYCLIC AROMATIC COMPOUNDS		4.838	No data	0	0	4.838	119.7	124.538
STYRENE		253981	0	0	0	253981	228273	482254
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		111000	No data	0	0	111000	0	111000
TERT-BUTYL ALCOHOL		8405	0	0	0	8405	0	8405
TITANIUM TETRACHLORIDE		596	No data	0	0	596	0	596
TOLUENE		21161	0	0	0	21161	0	21161
TRANS-1,3-DICHLOROPROPENE		511	No data	0	0	511	0	511
XYLENE (MIXED ISOMERS)		21273	No data	0	0	21273	0	21273
ZINC COMPOUNDS		551	5	0	0	556	131080	131636
	Total Non-IJC	**6122676.83**	**13714**	**0**	**10**	**6136400.83**	**1179448.7**	**7315849.53**
	Total	**6124301.90**	**13754.5005**	**0**	**314.28550**	**6138370.69**	**1185803.7**	**7324174.43**

Table 3.3-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Ashtabula River AOC

IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	**3**			
Ashtabula County, OH	3	ASHTABULA	44004FRSTN2133L	ASHTABULA
		MILLENNIUM INORGANIC CHEMICALS ASHTABULA PLANT 1	44004SCMCH2900M	ASHTABULA

		MILLENNIUM INORGANIC CHEMICALS ASHTABULA PLANT 2	44004SCMCH2426M	ASHTABULA
Lead and lead compounds	**5**			
Ashtabula County, OH	5	ASHTABULA	44004FRSTN2133L	ASHTABULA
		ELKEM METALS CO. ASHTABULA L.P.	44004LKMMT2700L	ASHTABULA
		GENERAL ALUMINUM MFG. CO.	44030GNRLL1043C	CONNEAUT
		PLASTICOLORS INC.	44004PLSTC2600M	ASHTABULA
		ROCK CREEK ALUMINUM INC.	44084RCKCR2639E	ROCK CREEK
Mercury and mercury compounds	**3**			
Ashtabula County, OH	3	ASHTA CHEMICALS INC.	44004LCPCH3509M	ASHTABULA
		ASHTABULA	44004FRSTN2133L	ASHTABULA
		MILLENNIUM INORGANIC CHEMICALS ASHTABULA PLANT 2	44004SCMCH2426M	ASHTABULA

Table 3.3-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Ashtabula River AOC

Chemical	*IJC Tracking Number*	*Discharge*
LEAD TOTAL RECOVERABLE	8	106.24
LEAD, TOTAL (AS PB)	8	75.65
MERCURY TOTAL RECOVERABLE	9	0.14
MERCURY, TOTAL LOW LEVEL	9	0.67
	Total IJC	**182.70**
1,1,1-TRICHLOROETHANE		8.85
1,1,2,2-TETRACHLOROETHANE		3.22
1,1,2-TRICHLOROETHANE		11.27
1,1-DICHLOROETHANE		6.92
1,1-DICHLOROETHYLENE		8.85
1,2,4-TRICHLOROBENZENE		46.68
1,2-DICHLOROBENZENE		7.24
1,2-DICHLOROETHANE,TOTAL WEIGHT		46.68
1,2-DICHLOROPROPANE		46.68
1,2-TRANS-DICHLOROETHYLENE		5.63
1,3 DICHLOROPROPENE		0.80
1,3-DICHLOROBENZENE		17.71
1,4-DICHLOROBENZENE		5.63
2,4-DIMETHYLPHENOL		3.22
2,4-DINITROPHENOL		288.13
2-NITROPHENOL		15.29
4-NITROPHENOL		23.34
ACENAPHTHENE		4.83
ACENAPHTHYLENE		4.83
ACRYLONITRILE		1.61
ANTHRACENE		0.08

Chemical	*IJC Tracking Number*	*Discharge*
ANTIMONY, TOTAL RECOVERABLE		77.26
ARSENIC, TOTAL RECOVERABLE		40.24
BARIUM, TOTAL RECOVERABLE		20.76
BENZENE		14.49
BENZO(A)ANTHRACENE		3.22
BENZO(B)FLUORANTHENE(3,4-BENZO)		1.61
BENZO(K)FLUORANTHENE		4.83
BIS (2-ETHYLHEXYL) PHTHALATE		57.14
CADMIUM TOTAL RECOVERABLE		36.22
CADMIUM, TOTAL (AS CD)		33
CARBON TETRACHLORIDE		12.07
CHLORINE, TOTAL RESIDUAL		199.11
CHLOROBENZENE		17.71
CHLOROETHANE, TOTAL WEIGHT		25.75
CHLOROFORM		32.19
CHROMIUM TOTAL RECOVERABLE		5251.89
CHROMIUM, TOTAL (AS CR)		218.11
CHRYSENE		2.41
COBALT, TOTAL RECOVERABLE		48.29
COPPER TOTAL RECOVERABLE		291.47
COPPER, TOTAL (AS CU)		263.98
CYANIDE, FREE-WATER PLUS WASTEWATERS		67.61
CYANIDE, TOTAL (AS CN)		67652.78
DIETHYL PHTHALATE		10.46
DIMETHYL PHTHALATE		4.83
DI-N-BUTYL PHTHALATE		4.83
ETHYLBENZENE		37.02

Chemical	*IJC Tracking Number*	*Discharge*
FLUORANTHENE		0.48
FLUORENE		4.83
HEXACHLOROBUTADIENE		0.16
HEXACHLOROETHANE		4.02
IRON, SUSPENDED		45.07
IRON, TOTAL (AS FE)		90.95
MANGANESE, SUSPENDED		45.07
MANGANESE, TOTAL (AS MN)		1620.11
METHYL CHLORIDE		27.04
METHYLENE CHLORIDE		14.16
NAPHTHALENE		4.83
NICKEL TOTAL RECOVERABLE		56.34
NICKEL, TOTAL (AS NI)		303.42
NITROBENZENE		220.52
NITROGEN, AMMONIA TOTAL (AS N)		51667.81
PHENANTHRENE		4.83
PHENOL, SINGLE COMPOUND		4.83
PHENOLICS, TOTAL RECOVERABLE		40.24
PHOSPHORUS, TOTAL (AS P)		57335.73
PYRENE		4.83
SELENIUM, TOTAL RECOVERABLE		153.72
SILVER TOTAL RECOVERABLE		18.27
SILVER, TOTAL (AS AG)		30.58
TETRACHLOROETHYLENE		14.97
TIN, TOTAL (AS SN)		48.29
TOLUENE		7.24
TRICHLOROETHYLENE		10.95

Chemical	*IJC Tracking Number*	*Discharge*
VANADIUM, TOTAL RECOVERABLE		24.14
VINYL CHLORIDE		18.99
ZINC TOTAL RECOVERABLE		280.08
ZINC, TOTAL (AS ZN)		216.50
	Total Non-IJC	**187305.77**
	Total	**187488.47**

Table 3.3-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants Ashtabula River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead	**2**			
Ashtabula County, OH	2	ESAB WELDING PRODUCTS, INC.	OH0063789	ASHTABULA
		RESERVE ENVIRONMENTAL SERV	OH0098540	ASHTABULA
Mercury	**5**			
Ashtabula County, OH	5	ASHTA CHEMICALS, INC.	OH0000752	ASHTABULA
		CITY OF ASHTABULA	OH0023914	ASHTABULA
		CITY OF GENEVA	OH0020109	GENEVA
		DETREX CORP.	OH0001872	ASHTABULA
		RESERVE ENVIRONMENTAL SERV	OH0098540	ASHTABULA

3.4. Cuyahoga River AOC, Cuyahoga and Summit Counties, OH

The Cuyahoga River AOC comprises the lower 45 miles of the river from the Ohio Edison Dam to Cleveland, where the river drains into Lake Erie. The AOC also includes approximately 10 miles of Lake Erie shoreline (see AOC map at end of chapter and in Appendix 2).

3.4.1. Hazardous Waste Sites Relevant to the Cuyahoga River AOC

During the public health assessment process ATSDR identified two hazardous waste sites in Cuyahoga County and Summit County, OH that posed either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Table 3.4-A summarizes these conclusions, together with information regarding the type and location of the site and the date and type of the assessment document, are summarized in Table 3.4-A.

Table 3.4-A. Hazardous waste sites in Cuyahoga and Summit Counties, OH

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remediation Status*
Cady Road, Cuyahoga, North Royalton OHD980614572	HC	2003	1	Non NPL	To be determined
Copley Square Plaza, Copley OH000561322	HA	2007	2	NPL	Ongoing

1=Urgent Public Health Hazard, 2=Public Health hazard, HA = Health Assessment, HC=Health Consultation

The documents listed in Table 3.4-A further evaluate the data for the Cady Road and Copley Square Plaza sites. These evaluations are discussed in the following subsections.

3.4.1.1 Cady Road, Cuyahoga County, OH

This site is a 25-home residential neighborhood. The homes rely on private wells to supply water for drinking and for other household uses. Between 1954 and 1958, at various elevations along Cady Road, oil and gas wells were drilled to a depth of some 3,000 feet. Thereafter the residents complained of gases and odors in the water, the water's oily appearance and taste, of explosions at the wellheads, and of gas bubbling up through the ground. At the time of ATSDR's 2002 health consultation, the area included approximately 13 oil and gas production wells—one former saltwater injection well was about ¼–½ mile from the nearest private water well. Many of these wells had a history of violations for maintenance and accidents. Nevertheless, what remains unclear is whether contamination of the water wells was due to 1) the nearby oil and gas extraction wells and saltwater injection well; or 2) a fault line that caused a major fracture in the shale that underlies the drinking water aquifer, thus allowing the migration of subterranean oil and gas to the upper water-bearing zones.

Demographic Data: The 1990 U.S. Census reported the following demographic profile, from the 1990 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	128
Females aged 15-44	334

Adults 65 and older	192

This population distribution, however, included people who were not exposed—their household water did not come from private water wells. Such wells only supplied the residents in the 25 homes on the west half of Cady Road.

ATSDR Conclusions: In the 2003 health consultation, ATSDR concluded that because of the explosive hazard of combustible gases, the well water presented an *Urgent Public Health Hazard* (Category 1). The dissolved gases found in the well water (e.g., methane, sulfides) were consistent with an oil and gas deposit origin. The urgent public health hazard was due to outgassing of combustibles gases—including methane—from the private well water such that concentrations near two wellheads were at explosive levels. Concentrations and levels in two basements were also near the explosive level. In addition, hydrogen sulfide in the private well water posed a public health hazard because inhalation exposure from the resulting indoor air concentrations might have caused adverse health effects. Moreover, ingestion of sodium at the levels found in the well water could have been harmful to residents who had high blood pressure or who were on low sodium diets.

U.S. EPA Update: Cady Road is an ATSDR petition site. It does that does not appear in the CERCLIS database, and no regulatory action has been taken.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site during ATSDR's assessment of exposure-related issues.

3.4.1.2 Copley Square Plaza

Copley Square Plaza is a former dry cleaning establishment about 5 miles west of Akron, in Copley, Ohio. The site was developed into a shopping center in the 1950s. One of the shopping center tenants was a dry cleaner, which operated at the site from 1962 to 1994. The dry cleaner used various solvents common to the industry at that time. The solvents contaminated groundwater beneath the site and affected nearby workers and residents.

ATSDR Conclusions: In 2007, ATSDR concluded that because of elevated levels of TCE, PCE, DCE, and vinyl chloride in drinking water, that in the past the site posed a *Public Health Hazard* (Category 2) to nearby residents and workers in the past. Although current exposures to drinking water posed *No Apparent Public Health Hazard* (Category 4), vapor intrusion still poses posed an *Indeterminate Public Health Hazard* (Category 3) to nearby residents. Investigations by U.S. EPA and state regulatory agencies are ongoing.

U.S. EPA Update: In its February 2007 Fact Sheet for the Copley Square Plaza site, the U.S. EPA stated

> A passive ground water collection system was installed to collect ground water leaving the eastern side of the dry cleaner and water treatment systems were installed in homes with contaminated wells during the mid-1990s. Ohio EPA has been maintaining the water treatment systems since their installation.
>
> Currently, U.S. EPA is conducting a Remedial Investigation and Feasibility Study (RI/FS) of the site, which will determine the nature and extent of the contamination. Sampling has already been completed, and a

report detailing the results of the Remedial Investigation is expected to be completed by February 28, 2007.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OH0000563122.htm. 2007 Jan [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site. For a more complete listing of hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.4.2. Summary and Conclusions for the Cuyahoga River AOC

3.4.2.1 Hazardous Waste Sites

ATSDR identified two hazardous waste sites in Cuyahoga and Summit Counties as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Well water contaminated with dissolved gases consistent with an origin from oil and gas deposits was found at the Cady Road site in Cuyahoga County. These gasses presented an explosive hazard (methane) and an inhalation hazard (hydrogen sulfide). The groundwater under the Copley Square Plaza site in Summit County also had groundwater contaminated with a number of VOCs associated with dry cleaning. Site investigation at Copley Square Plaza is ongoing. No IJC-critical pollutants were associated with either of these sites.

3.4.2.2 TRI Data

The TRI onsite chemical releases for Cuyahoga and Summit Counties (combined) in 2001 were 5,037,090 pounds, the majority of which was released to air, followed by releases to soil. Cuyahoga County accounted for 68%, and Summit County accounted for 32% of the total onsite releases.

As few as 75,042 pounds (1.5%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to air), lead and lead compounds (primarily to air and land), and mercury and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 3.4-B.

The major releases (≥ 500,000 pounds) of non-IJC-critical chemicals were of zinc compounds (primarily to land) and 1-chloro-1,1-difluoroethane (primarily to air). Other non-IJC-critical chemicals released in substantial onsite quantities (300,000–499,999 pounds) were hydrochloric acid, toluene, methyl ethyl ketone, sulfuric acid, and trichloroethylene (primarily to air), and manganese compounds (primarily to land). See Table 3.4-C.

3.4.2.3 NPDES Data

The NPDES permitted discharges for Cuyahoga and Summit Counties, OH are summarized in Table 4.4-D. The average annual permitted discharges in 2004 totaled 4,924,341 pounds, the majority of which was ammonia nitrogen and phosphorous. Nickel also was permitted for discharge in substantial amounts (approximately 189,000 pounds).

The IJC-critical pollutants lead (approximately 16,000 pounds) and mercury (1.58 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 3.4-E.

3.4.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impairments at this AOC site. No specific information regarding this indicator was found at the U.S. EPA site. Further information is available at the U.S. EPA Web site. See http://www.epa.gov/glnpo/aoc/.

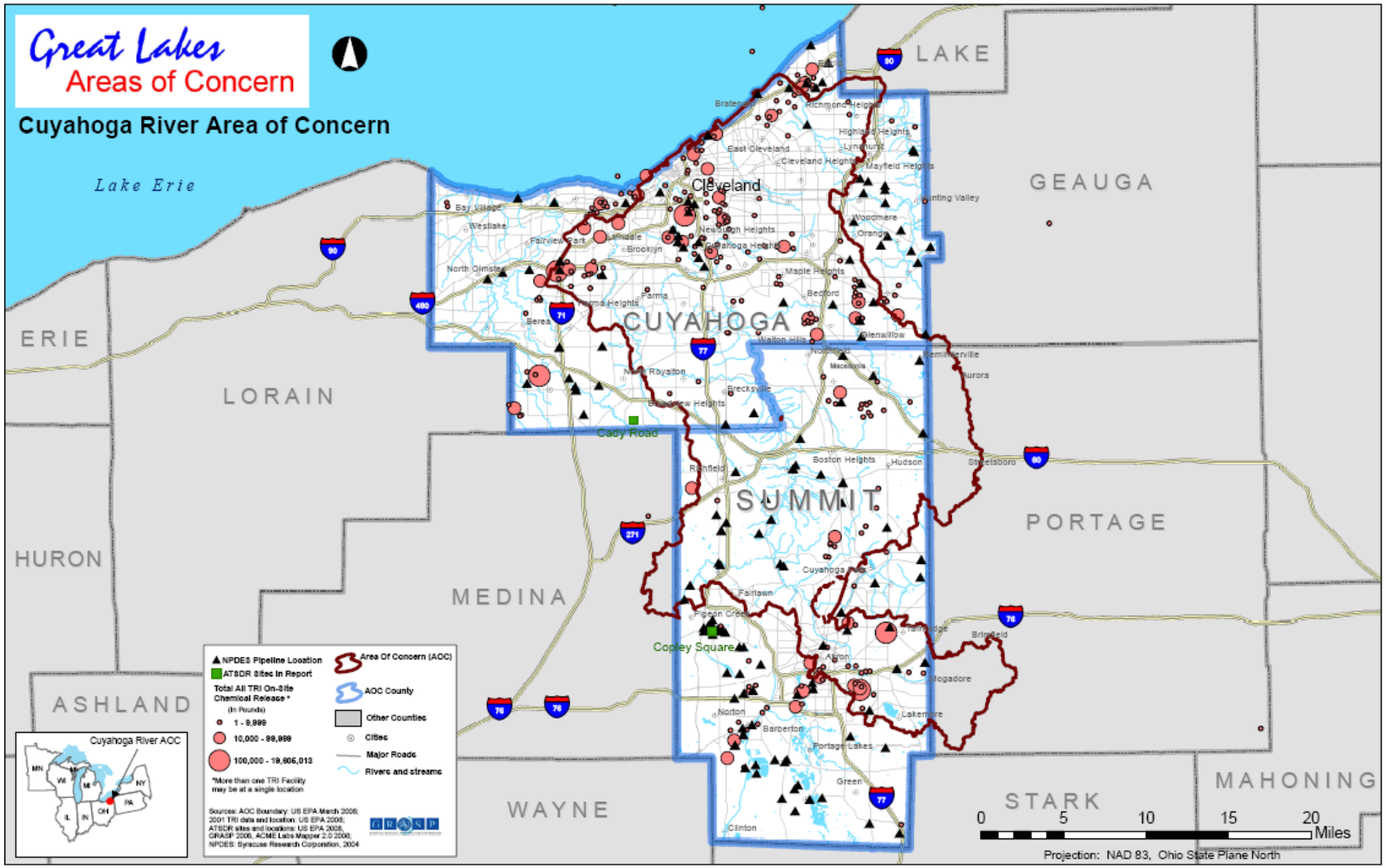

Great Lakes
Areas of Concern
Cuyahoga River Area of Concern
Lake Erie
LAKE
GEAUGA
ERIE
LORAIN
CUYAHOGA
SUMMIT
PORTAGE
HURON
MEDINA
ASHLAND
WAYNE
STARK
MAHONING
Cleveland
Cady Road
Copley Square
NPDES Pipeline Location
ATSDR Sites In Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,606,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Cuyahoga River AOC
0 5 10 15 20 Miles
Projection: NAD 83, Ohio State Plane North

Table 3.4-B. TRI Releases (in pounds, 2001) for the Cuyahoga River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.006514673	0	0	0	0.006514673	0.06370245	0.070217123
(PCDDs and PCDFs)	3							
LEAD	8	6448.830016	30.64	0	5.1	6484.570016	236809.474	243294.044
LEAD COMPOUNDS	8	24518.78246	89.1	0	43891	68498.88246	84424.09	152922.9724
MERCURY	9	0.1	0.006	0	0	0.106	67.5	67.606
MERCURY COMPOUNDS	9	58.74	0.1	0	0	58.84	11.5	70.34
	Total IJC	**31026.45899**	**119.846**	**0**	**43896.1**	**75042.40499**	**321312.6277**	**396355.0326**
1,1-DICHLORO-1-FLUOROETHANE	5868	0	0	0	5868	0	5868	
1,2,4-TRIMETHYLBENZENE		19247	0	0	0	19247	0	19247
1,3-BUTADIENE		10843	0	0	0	10843	0	10843
1,4-DICHLOROBENZENE		540	0	0	0	540	0	540
1-CHLORO-1,1-DIFLUOROETHANE	781687	0	0	0	781687	0	781687	
2-MERCAPTOBENZO-THIAZOLE	10	0	0	0	10	750	760	
4,4'-ISOPROPYLIDENE-DIPHENOL	28	0	0	0	28	1828	1856	
ACRYLIC ACID		13	0	0	0	13	1	14
ACRYLONITRILE		2998	0	0	0	2998	623	3621
ALLYL ALCOHOL		7959	0	0	0	7959	0	7959

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
ALUMINUM (FUME OR DUST)	3749	300	0	0	4049	30783	34832	
AMMONIA		107113	134	0	0	107247	12000	119247
ANILINE		4740	0	0	0	4740	0	4740
ANTIMONY		50	0	0	0	50	5707	5757
ANTIMONY COMPOUNDS		3610	191	0	583	4384	27687	32071
BARIUM		204	0	0	0	204	0	204
BARIUM COMPOUNDS		2240	438	0	0	2678	188309	190987
BENZENE		24016	8	0	0	24024	0	24024
BENZO(G,H,I)PERYLENE		232.225	0.3	0	0	232.525	204	436.525
BUTYL ACRYLATE		339	0	0	0	339	36	375
BUTYRALDEHYDE		20	0	0	0	20	0	20
CADMIUM		21	0	0	0	21	1000	1021
CADMIUM COMPOUNDS		79	0	0	0	79	25836	25915
CARBON DISULFIDE		6	0	0	0	6	0	6
CERTAIN GLYCOL ETHERS		61991	0	0	0	61991	10034	72025
CHLORINE		3022	498	0	0	3520	0	3520
CHLORODIFLUOROMETHANE	5867	0	0	0	5867	0	5867	
CHLOROETHANE		2166	0	0	0	2166	0	2166
CHROMIUM		1880	102	0	0	1982	330145.3	332127.3
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE	589	111	0	24039	24739	128318	153057	

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
MINED IN THE TRANSVAAL REGION)								
COBALT		10	0	0	0	10	250	260
COBALT COMPOUNDS		292	0	0	0	292	5318	5610
COPPER		7035	279	0	0	7314	176210	183524
COPPER COMPOUNDS		1683	305	0	0	1988	105857	107845
CUMENE		209	0	0	0	209	0	209
CYANIDE COMPOUNDS		578	0	0	0	578	250	828
CYCLOHEXANE		2539	0	0	0	2539	0	2539
DECABROMODIPHENYL OXIDE	57	0	0	0	57	50327	50384	
DI(2-ETHYLHEXYL) PHTHALATE	510	0	0	0	510	4280	4790	
DICHLOROMETHANE		110482	0	0	0	110482	317	110799
DIETHANOLAMINE		157	0	0	0	157	2505	2662
DIISOCYANATES		29	0	0	0	29	21656	21685
EPICHLOROHYDRIN		1510	0	0	0	1510	0	1510
ETHYLBENZENE		9686	2	0	0	9688	573	10261
ETHYLENE		1135	0	0	0	1135	0	1135
ETHYLENE GLYCOL		835	0	0	37	872	1509	2381
FORMALDEHYDE		39615	0	0	0	39615	97	39712
FORMIC ACID		28	0	0	0	28	774	802
HYDROCHLORIC ACID (1995	352996	0	0	0	352996	0	352996	

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
AND AFTER 'ACID AEROSOLS' ONLY)								
HYDROGEN FLUORIDE		8149	0	0	0	8149	320	8469
HYDROQUINONE		6	0	0	0	6	0	6
MALEIC ANHYDRIDE		22	0	0	0	22	128	150
MANGANESE		1090	171	0	0	1261	152058	153319
MANGANESE COMPOUNDS		15720	1623	0	328016	345359	884801	1230160
METHANOL		63062	0	0	76012	139074	3564	142638
METHYL ETHYL KETONE		263954	0	0	0	263954	884	264838
METHYL ISOBUTYL KETONE		8018	0	0	0	8018	0	8018
METHYL METHACRYLATE		23138	0	0	0	23138	0	23138
MOLYBDENUM TRIOXIDE		562	0	0	0	562	252	814
N,N-DIMETHYLFORMAMIDE		7846	0	0	0	7846	0	7846
NAPHTHALENE		20831	3	0	0	20834	0	20834
N-BUTYL ALCOHOL		7073	0	0	0	7073	87	7160
N-HEXANE		27526	0	0	0	27526	0	27526
NICKEL		2850	27	0	0	2877	175837.6	178714.6
NICKEL COMPOUNDS		746	74	0	3571	4391	30651	35042
NITRATE COMPOUNDS		5518	101722	0	0	107240	52290	159530
NITRIC ACID		20505	33	0	0	20538	42830	63368
N-METHYL-2-PYRROLIDONE		32001	0	0	0	32001	0	32001

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
PHENOL		24964	30	0	0	24994	550	25544
PHOSGENE		14	0	0	0	14	0	14
POLYCHLORINATED ALKANES	0	0	0	0	0	585	585	
POLYCYCLIC AROMATIC COMPOUNDS	2220.379	1	0	0	2221.379	1334.6	3555.979	
PROPYLENE		2188	0	0	0	2188	0	2188
SODIUM NITRITE		4208	0	0	0	4208	41818	46026
STYRENE		34661	0	0	0	34661	262	34923
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	157490	0	0	0	157490	0	157490	
TETRACHLORO-ETHYLENE		114976	5	0	0	114981	0	114981
THIRAM		25	0	0	0	25	2530	2555
TOLUENE		330191.77	16	0	0	330207.77	1207	331414.77
TRICHLOROETHYLENE		155347	0	0	0	155347	555	155902
TRIETHYLAMINE		15390	0	0	0	15390	0	15390
VANADIUM COMPOUNDS		62	38	0	16112	16212	12687	28899
VINYL ACETATE		1710	0	0	0	1710	0	1710
XYLENE (MIXED ISOMERS)		147122.91	27	0	0	147149.91	3479	150628.91
ZINC (FUME OR DUST)		30356	300	0	0	30656	1232	31888
ZINC COMPOUNDS		22988	4500	0	1269695	1297183	1810561.2	3107744.2
	Total Non-IJC	**3133044.284**	**110938.3**	**0**	**1718065**	**4962047.584**	**4353687.7**	**9315735.284**

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
	Total	**3164070.743**	**111058.146**	**0**	**1761961.1**	**5037089.989**	**4675000.328**	**9712090.317**

Table 3.4-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Cuyahoga River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	5			
Cuyahoga County, OH	4	FORD MOTOR CO. CLEVELAND CASTING	44142FRDMT5600H	BROOK PARK
		FORD MOTOR CO. CLEVELAND ENGINE PLANTS	44142FRDMT17601	BROOK PARK
		LAKESHORE PLANT	44103FRSTN6800S	CLEVELAND
		WABASH ALLOYS L.L.C.	44109WBSHL4365B	CLEVELAND
Summit County, OH	1	GOODYEAR TIRE & RUBBER CO. AKRON TECHNICAL CENTER	44309GDYRT200SM	AKRON
Lead and lead compounds	59			
Cuyahoga County, OH	41	ALCOA CLEVELAND WORKS	44105LMNMC1600H	CUYAHOGA HEIGHTS
		AMERICAN BRONZE CORP.	44115MRCNB2941E	CLEVELAND
		AMERICAN SPRING WIRE CORP.	44146MRCNS26300	BEDFORD HEIGHTS
		AMERICAN STEEL & WIRE CORP. (CLEVELAND DIV.)	44125MRCNS4300E	CUYAHOGA HEIGHTS
		ART GALVANIZING WORKS INC.	44109THRTG3935V	CLEVELAND
		BASIC ALUMINUM CASTINGS CO.	44110BSCLM1325E	CLEVELAND
		CAST SPECIALTIES INC.	44128CSTSP26711	WARRENSVILLE HEIGHTS
		COOPER-STANDARD AUTOMOTIVE	44102STNDR2130W	CLEVELAND

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		CSM INDS. INC.	44117CLMXS21801	EUCLID
		DU PONT CLEVELAND REFINISH SERVICE CENTER	44125DPNTC9200M	GARFIELD HEIGHTS
		FEDERAL METAL CO.	44146THFDR7250D	OAKWOOD VILLAGE
		FERRO CORP. 130CLEVELAND130	44105FRRCR4150E	CLEVELAND
		FORD MOTOR CO. CLEVELAND CASTING	44142FRDMT5600H	BROOK PARK
		FORD MOTOR CO. CLEVELAND ENGINE PLANTS	44142FRDMT17601	BROOK PARK
		FOSECO METALLURGICAL INC.	44142FSCNC20200	CLEVELAND
		GE EUCLID LAMP PLANT	44103GNRLL1814E	CLEVELAND
		GENERAL ENVIRONMENTAL MANAGEMENT L.L.C.	44115RSRCH2655T	CLEVELAND
		GMC METAL FABRICATING DIV.	44130CHVRL5400C	PARMA
		GO/DAN INDS.	44142DNLRD15600	CLEVELAND
		I. SCHUMANN & CO.	44146SCHMN22500	OAKWOOD VILLAGE
		LAKESHORE PLANT	44103FRSTN6800S	CLEVELAND
		LINCOLN ELECTRIC CO.	44117LNCLN22801	EUCLID
		LTV STEEL CO. CLEVELAND WORKS	44127LTVST3100E	CLEVELAND
		METALDYNE INC. BEDFORD HEIGHTS PLANT	44146TTLST25661	BEDFORD HEIGHTS
		MODINE AFTERMARKET HOLDINGS INC.	44136MDNGR20137	STRONGSVILLE
		MORGAN ELECTRO CERAMICS	44146MRGNM232FO	BEDFORD

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		NORTH AMERICAN WIRE PRODS. INC.	44139NRTHM30000	SOLON
		OATEY CO.	44135TYCMP4700W	CLEVELAND
		PPG INDS. OHIO INC. (CL)	44111PPGND3800W	CLEVELAND
		REPUBLIC ANODE FABRICATORS	44136RPBLC11288	STRONGSVILLE
		REPUBLIC METALS	44105RPBLC7930J	CLEVELAND
		RIVER RECYCLING INDS. INC.	44109RVRRC4195B	CLEVELAND
		S. K. WELLMAN CORP.	44142SNTRM5372W	BROOKPARK
		SAINT-GOBAIN CRYSTALS & DETECTORS	44139NGLHR6801C	SOLON
		SHERWOOD	44102SHRWD1201W	CLEVELAND
		STANLEY WORKS	44143STNLY700BE	CLEVELAND
		TDE GROUP INC.	44139TLDNG28850	SOLON
		VENTURE LIGHTING INTL. INC.	44139VNTRL3200A	SOLON
		VICTORY WHITE METAL CO.	44127VCTRY6100R	CLEVELAND
		WABASH ALLOYS L.L.C.	44109WBSHL4365B	CLEVELAND
		WYMAN-GORDON FORGINGS (CLEVELAND) INC.	44127DRPDF3097E	CLEVELAND
Summit County, OH	18	AMERICHEM INC.	44221MRCHM225BR	CUYAHOGA FALLS
		CARGILL INC. SALT DIV.	44314KZSLT2065M	AKRON
		CHEMIONICS CORP.	44278CHMNC390MU	TALLMADGE
		COMMERCIAL ALLOYS CORP.	44087CMMRC1831E	TWINSBURG
		GOODYEAR TIRE & RUBBER CO. AKRON MIX CENTER	44309GDYRT1080R	AKRON

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		GOODYEAR TIRE & RUBBER CO. AKRON TECHNICAL CENTER	44309GDYRT200SM	AKRON
		GOODYEAR TIRE & RUBBER STOW MODEL SHOP	44224GDYRT1549C	STOW
		HARWICK STANDARD DISTRIBUTION CORP.	44305RPBLC60SOU	AKRON
		LANCER DISPERSIONS INC.	44305LNCRD1680E	AKRON
		LOCKHEED MARTIN N.E. & S.S.	44315LRLCR1210M	AKRON
		METALDYNE	44087TTTMT8001B	TWINSBURG
		METALLIC RESOURCES INC.	44087MTLLC2116E	TWINSBURG
		MOTOR PRODS. - OHIO CORP.	44203MTRPR65ERO	BARBERTON
		NOVEON INC.	44301BFGDR240WE	AKRON
		POLYMERICS INC.	44221PLYMR2828S	CUYAHOGA FALLS
		REVLIS CORP.	44203RVLSC2845N	NORTON
		ROCKWELL AUTOMATION INC.	44087RCKWL8440D	TWINSBURG
		STRUKTOL CO. OF AMERICA	44224STRKT201ES	STOW
Mercury and mercury compounds	3			
Cuyahoga County, OH	2	LAKESHORE PLANT	44103FRSTN6800S	CLEVELAND
		VENTURE LIGHTING INTL. INC.	44139VNTRL3200A	SOLON
Summit County, OH	1	GOODYEAR TIRE & RUBBER CO. AKRON TECHNICAL CENTER	44309GDYRT200SM	AKRON

Table 3.4-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Cuyahoga River AOC

Chemical	*IJC Tracking Number*	*Discharge*
LEAD TOTAL RECOVERABLE	8	8165.96
LEAD, TOTAL (AS PB)	8	7876.02
MERCURY, TOTAL LOW LEVEL	9	1.58
	Total IJC	**16043.56**
ARSENIC, TOTAL RECOVERABLE		594.77
CADMIUM TOTAL RECOVERABLE		599.33
CADMIUM, TOTAL (AS CD)		641.45
CHLORINE, TOTAL RESIDUAL		1561.36
CHROMIUM TOTAL RECOVERABLE		199.60
CHROMIUM, HEXAVALENT DISSOLVED (AS CR)		3400.39
CHROMIUM, TOTAL (AS CR)		761.36
COPPER TOTAL RECOVERABLE		32120.83
COPPER, TOTAL (AS CU)		4213.26
CYANIDE, FREE-WATER PLUS WASTEWATERS		11114.10
CYANIDE, TOTAL (AS CN)		5955.71
CYANIDE, FREE (AMEN. TO CHLORINATION)		107.04
NICKEL TOTAL RECOVERABLE		94164.53
NICKEL, TOTAL (AS NI)		95224.48
NITROGEN, AMMONIA TOTAL (AS N)		2844114.26
PHENOLICS, TOTAL RECOVERABLE		197.99
PHOSPHORUS, TOTAL (AS P)		1703210.91
SILVER, TOTAL (AS AG)		26.56
ZINC TOTAL RECOVERABLE		70790.19
ZINC, TOTAL (AS ZN)		39299.60
	Total Non-IJC	**4908297.69**
	Total	**4924341.25**

Table 3.4-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants Cuyahoga River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead	7			
Cuyahoga County, OH	6	AMERICAN STEEL & WIRE	OH0002160	CUYAHOGA HEIGHTS
		ARGO TECH CORPORATION	OH0000281	CLEVELAND
		ISG CLEVELAND	OH0000957	CLEVELAND
		CITY OF BEDFORD HEIGHTS	OH0024058	BEDFORD HEIGHTS
		CITY OF NORTH ROYALTON	OH0026794	NORTH ROYALTON
		ZACLON INC	OH0000990	CLEVELAND
Summit County, OH	1	CITY OF AKRON	OH0023833	AKRON
Mercury	6			
Cuyahoga County, OH	4	CITY OF BEDFORD	OH0024040	BEDFORD
		CITY OF BEDFORD HEIGHTS	OH0024058	BEDFORD HEIGHTS
		CITY OF NORTH OLMSTED	OH0026778	NORTH OLMSTED
		SOLON CITY CENTRAL	OH0027430	SOLON
Summit County, OH	2	CITY OF BARBERTON	OH0024007	BARBERTON
		CITY OF TWINSBURG	OH0027863	TWINSBURG

3.5. Black River AOC, Lorain County, OH

The Black River AOC encompasses the entire Black River watershed, located primarily in Lorain County, OH. The east and west branches of the river flow north. They join to form the mainstream of the Black River, which flows 16 miles farther north, to discharging into Lake Erie at the City of Lorain (see AOC map at end of this section and in Appendix 2).

3.5.1. Hazardous Waste Sites Relevant to the Black River AOC

During the public health assessment process ATSDR identified three hazardous waste sites in Lorain County, OH, found to pose either a public health hazard or an indeterminate public health hazard. Table 3.5-A summarizes these conclusions, together with information regarding the type and location of the site and the date and type of assessment document, are summarized in Table 3.5-A.

Table 3.5 -A. Hazardous waste sites in Lorain County, OH

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Ford Rd Industrial Landfill, Elyria OHD980510002	HC	2002	3	Non NPL	Ongoing
Forest City Technologies OHR000018382	HC	2005	3	Non NPL	Active site; RCRA supervised
Republic Steel Corp. Quarry, Elyria OHD980903447	HA SRU	1989 1993	3 4	Deleted from NPL	Completed

3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard,

HA=Public Health Assessment, HC=Health Consultation, SRU=Site Review and Update

ATSDR provides further evaluation of these data in the public health assessment and other health-related documents listed in Table 3.5-A. These evaluations are discussed in the following subsections.

3.5.1.1 Ford Road Industrial Landfill

This site is an inactive 15-acre landfill in Elyria, OH, that borders on the Black River. The landfill was originally a ravine that became filled with disposed wastes. From the 1950s until 1974, the site accepted industrial wastes. U.S. EPA reported that several local industries dumped into the landfill organics, inorganics, heavy metals, pesticides, catalysts, sanitary sewage sludges, paint sludges, latex sludges, and small quantities of other, unknown hazardous wastes. Often the wastes were then burned; several areas of exposed ash are visible at the site. As of ATSDR's 2002 health consultation the site was not fenced; it was accessible from all sides and was within 1 mile of several residences.

Onsite surface water flows as runoff into the Black River. Surface water also flows into an intermittent stream that drains both into the Black River and into a ravine, from whence the runoff enters a wetland that drains into the Black River. Groundwater flows toward the Black

River as well. Closing and capping of the landfills was not completed under U.S. EPA supervision or guidelines. Sampling results have shown, however, that no landfill gas currently migrates through the existing cap.

In 2006, the U.S. EPA reported that after a review of the Remedial Investigation/Feasibility Study (RI/FS) findings and of the risk assessment conducted at the site, it identified the following contaminants of potential concern (COPCs):

- For soil and sediment, COPCs are PAHs, PCBs, and metals;
- For surface water the COPCs are one SVOC (bis[2-ethyl]phthalate) and five metals (aluminum, antimony, arsenic, iron, and thallium);
- For groundwater, the COPCs are two VOCs (benzene and vinyl chloride)), one SVOC (bis[2-ethyl]phthalate), PCBs, and several metals; and
- For leachate, the COPCs are two VOCs (benzene and chloroform), one SVOC (bis[2-ethyl]phthalate), three pesticides (beta-BHC, dieldrin, and heptachlor), and several metals.

ATSDR Conclusions: In 2002, ATSDR concluded that because of the lack of current environmental monitoring data and the fact that the available data did not provide a complete picture of the contamination's extent of contamination, the site posed an *Indeterminate Public Health Hazard* (Category 3). In that regard, exposed drums and wastes on the northern and southern banks of the landfill may have posed a threat to site visitors.

In 2006, the U.S. EPA reported that people might use that part of the Black River adjacent to the site for recreational activities such as fishing, wading, and swimming. A ditch near the site also intermittently filled with surface water. Consequently, through incidental ingestion and dermal contact exposure pathways, children and adults could have been exposed to Black River sediment and surface water, as well as to onsite pollutants carried into the adjacent ditch by runoff within the Black River. But the small, intermittent stream adjacent to the site only fills with water during significant rain events. This precluded its use for recreational activities such as fishing, swimming, or wading. Similarly, surface water from the ditch did not present significant exposure pathways. Yet the stream's ephemeral nature notwithstanding, substrate (i.e., soil/sediment) within the stream channel could have exposed children and adults to contaminants. On the other hand, surface water from the ditch adjacent to the site was not expected to present significant exposure pathways.

U.S. EPA Update: Ford Road Industrial Landfill is a non-NPL site that does not appear in the CERCLIS database. In its June 2006 Fact Sheet, however, U.S. EPA stated in part that

> U.S. Environmental Protection Agency is proposing to collect and dispose of debris found on the southern and northern side slopes of the Ford Road Industrial Landfill. The Agency also wants to regrade and improve the current landfill cover to ensure all waste remains buried under at least two feet of clean clay or soil cap material. These steps are part of a cleanup plan EPA has proposed to stop landfill pollution from contaminating the nearby Black River, soil and underground water supplies. The proposed cleanup would also protect people and wildlife from coming into contact with landfill pollutants.

Available at: http://www.epa.gov/Region5/sites/fordroad/pdfs/ford-road-proposed-plan-200606.pdf. [cited 29 Jul 2008]. See also Ford Road Landfill Community Involvement Plan.

Available at: http://www.epa.gov/region5/sites/fordroad/pdfs/cic-plan-final-072004.pdf. 2004 Jul [cited 2008 Oct 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site during ATSDR's assessment of exposure-related issues.

3.5.1.2 Forest City Technologies

Forest City Technologies was one of four industries within the north-central Ohio Village of Wellington, 6 miles south of Oberlin. Other local industries include the Sterling Foundry, the Erie Street Landfill, and LESCO, Inc. The village is in an agricultural area drained by tributaries of the Black River.

Demographic Data: 2000 census data reported the Village of Wellington population as 4,500 residents.

Public Health Outcome Data: In 1998, the Ohio Department of Health and Lorain County Health Department evaluated the Village of Wellington and Wellington Township for a possible MS cluster. The state identified 25 definite and probable cases of MS in the community of then-4,200 persons, or a crude rate of 595 cases per 100,000.

ATSDR Conclusions: In 2005, ATSDR determined that the industries within the Village of Wellington posed an *Indeterminate Public Health Hazard* (Category 3). Although human exposures to contaminants at levels of concern were not identified, environmental monitoring data were limited, thus necessitating the indeterminate finding.

U.S. EPA Update: Forest City Technologies is an ATSDR petition site that does not appear in the CERCLIS database, and no regulatory action has been taken with respect to it.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site.

3.5.1.3 Republic Steel Corp. Quarry

The 4.9-acre site includes a water-filled quarry; 7.4 acres of densely vegetated land surround the site itself. Before 1950, the principal onsite activity was a sandstone quarry. From 1950 to 1975, Republic Steel Corp. used the quarry to dispose of waste pickle liquor (sulfuric acid and dissolved metal oxides) and rinse water from pickling operations. The waste flowed in a ditch from the plant to the quarry.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,400
Females aged 15–44	2,469
Adults 65 and older	1,539

ATSDR Conclusions: In 1989, because of the potential threat to human health from exposure to contaminants in quarry water and in sediment, soil, and dust, and possibly in fish, ATSDR identified this site as an *Indeterminate Public Health Hazard* (Category 3). Contaminants of concern included VOCs and SVOCs. A subsequent 1993 ATSDR site review and update concluded, however, that the site posed *No Apparent Public Health Hazard* (Category 4). In 1990, through the removal of contaminated soil, the site was remediated. In 2006, U.S. EPA

reported that the City of Elyria adopted an ordinance to prohibit groundwater and quarry use for recreational purposes. In addition, the property zoning would remain exclusively heavy industrial.

U.S. EPA Update: In its December 2007 Fact Sheet for the Republic Steel Quarry site, the U.S. EPA stated in part that

> The U.S. EPA finalized the deletion of the RSQ site from the NPL on November 12, 2002, after receiving concurrence from the State of Ohio and no public comments on the proposal for deletion. U.S. EPA, with assistance from Ohio Environmental Protection Agency, completed the second five-year review for the site on June 27, 2003. The review included sampling of groundwater and Black River surface water in early 2003. Sampling of the on-site soil, quarry sediment, surface water, and fish tissue were postponed until August, a more optimum time for fish tissue sampling. The second five-year review report indicated that there were no exposure pathways to groundwater contaminants, limited exposures to the quarry media, and that the Black River was not contaminated. The protectiveness statement was deferred, however, until the remaining data could be analyzed. Due to data quality review issues with the August 2003 data, the release of an addendum incorporating these data has been delayed.
>
> The next five-year review is scheduled for completion in June 2008. The five-year review site inspection was conducted on November 8, 2007 by U.S. EPA, OEPA and the city of Elyria. The August 2003 data will be included as part of the upcoming five-year review report.

Available at: http://www.epa.gov/region5superfund/npl/ohio/OHD980903447.htm. 2007 Dec [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs, mercury, and lead were identified at this site. For a more complete listing of hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.5.2. Summary and Conclusions for the Black River AOC, Lorain County, OH

3.5.2.1 Hazardous Waste Sites

ATSDR has categorized three Lorain County hazardous waste sites as a public health hazard or an indeterminate public health hazard. An analysis of the site documents reveals no clear evidence of ongoing human exposure to site-related IJC-critical pollutants at concentrations or at doses that exceed health-based screening values. The Republic Steel Quarry Site has been remediated by removal of contaminated soil, and restriction of access prevents exposure. Although contaminants remain in the quarry sediment, they are below the mixing zone. In the past, however, this site may have contributed to the environmental burden of the IJC-critical pollutants B(a)P and lead, and it may still act as a reservoir for these contaminants.

The Ford Road Industrial Landfill is on the Black River, and surface water and groundwater flow are toward the Black River. This site may have contributed and may continue to contribute to the

Black River AOC's environmental burden of IJC-critical pollutants, including PCBs. In 2008, U.S. EPA reported that a Remedial Investigation and Feasibility Study (RI/FS) and a Record of Decision (ROD) were completed. Implementation of the clean up alternatives as outlined in the ROD is forthcoming. This will prevent the Ford Road Site from contributing to any further contamination of the Black River.

3.5.2.2 TRI Data

Onsite TRI releases in Lorain County totaled 2,940,333.5 pounds, primarily to air. See Table 3.5-B. Of this, 9,594 pounds (0.3%) were IJC-critical pollutants. The IJC-critical pollutants were PCDDs and PCDFs (to air), aldrin (to air), lead and lead compounds (to air and surface water), mercury and mercury compounds (primarily to air), toxaphene (to air), and hexachlorobenzene (to air).

3.5.2.3 NPDES Data

The NPDES permitted discharges for Lorain County, OH are summarized in Table 3.5-C. The average annual permitted discharges in 2004 totaled 238,315 pounds, the majority of which was phosphorus and ammonia nitrogen.

The IJC-critical pollutants lead (approximately 620 pounds) and mercury (<1 pound) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 3.5-D.

3.5.2.4 Beneficial Use Impairments (BUIs)

At the Black River AOC, fish, wildlife, and drinking water consumption restrictions are listed as impaired. Specific advisories have changed over time, and specific fish species are identified as restricted. Consumption advisories include fish and turtles along the mainstream and along the East and West Branches of Findley Lake.

Because of excess sediment loads from upstream, the drinking water source for two communities that obtain water from the West Branch subwatershed is seasonally affected. Further information is available at the U.S. EPA Web site at: http://www.epa.gov/glnpo/aoc/.

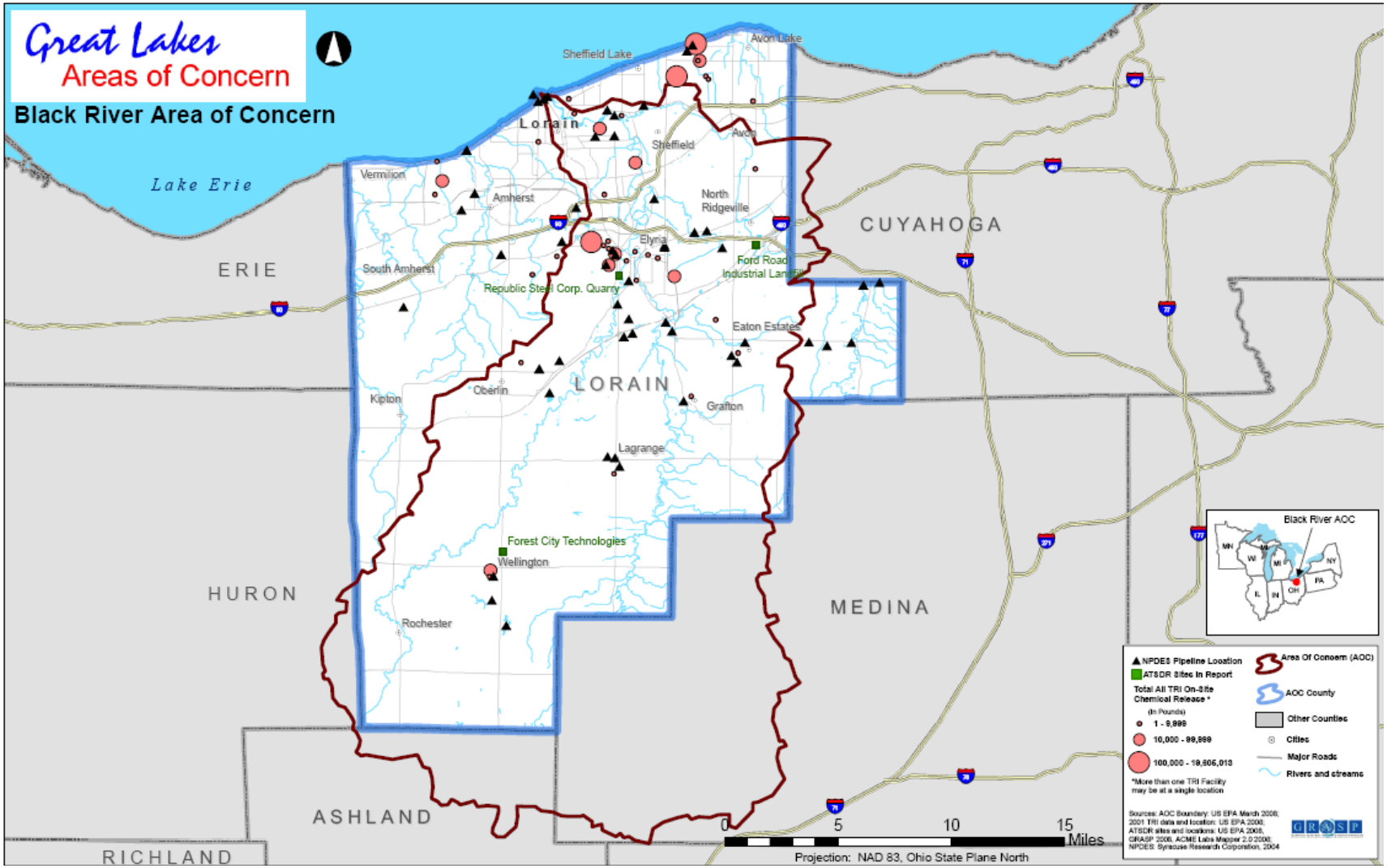

Great Lakes
Areas of Concern
Black River Area of Concern
Lake Erie
Sheffield Lake
Avon Lake
Lorain
Sheffield
Avon
Vermilion
Amherst
North Ridgeville
Elyria
South Amherst
Ford Road Industrial Landfill
Republic Steel Corp. Quarry
Eaton Estates
ERIE
CUYAHOGA
LORAIN
Kipton
Oberlin
Grafton
Lagrange
Forest City Technologies
Wellington
Rochester
HURON
MEDINA
ASHLAND
RICHLAND
Black River AOC
0 5 10 15 Miles
Projection: NAD 83, Ohio State Plane North

Table 3.5-B. TRI Releases (in pounds, 2001) for the Black River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00507877	No data	0	0	0.0050787	0	0.00507877
(PCDDs and PCDFs)	3							
ALDRIN	6	0.03	No data	0	0	0.03	0	0.03
LEAD	8	6790.8587	2260	0	0	9050.8587	105199.916	114250.775
LEAD COMPOUNDS	8	212.85	0.82	0	0	213.67	47719	47932.67
MERCURY	9	1.1	0.14	0	0	1.24	2.3	3.54
MERCURY COMPOUNDS	9	328.27	0.02	0	0	328.29	216	544.29
TOXAPHENE	10	0.1	No data	0	0	0.1	0	0.1
HEXACHLOROBENZENE	11	0.23	No data	0	0	0.23	0	0.23
	Total IJC	**7333.44377**	**2260.98**	**0**	**0**	**9594.4237**	**153137.216**	**162731.640**
1,1,1-TRICHLOROETHANE		64	No data	0	0	64	5	69
1,1,2-TRICHLOROETHANE		3	No data	0	0	3	0	3
1,2,4-TRIMETHYLBENZENE		24676	0	0	0	24676	0	24676
1,2-DICHLOROBENZENE		4	No data	0	0	4	0	4
1,2-DICHLOROETHANE		5	No data	0	0	5	0	5
1,2-PHENYLENEDIAMINE		28	No data	0	0	28	0	28
1,3-PHENYLENEDIAMINE		28	No data	0	0	28	0	28

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
1,4-DIOXANE		3	No data	0	0	3	0	3
2,4,6-TRICHLOROPHENOL		9	No data	0	0	9	0	9
2,4-DINITROTOLUENE		3	No data	0	0	3	0	3
ACETONITRILE		76	No data	0	0	76	27	103
ACRYLAMIDE		1289	No data	0	0	1289	0	1289
ACRYLIC ACID		1647	No data	0	0	1647	0	1647
ACRYLONITRILE		3634	No data	0	0	3634	0	3634
ALACHLOR		5	No data	0	0	5	0	5
ALLYL ALCOHOL		18	No data	0	0	18	0	18
ALUMINUM (FUME OR DUST)	5148		37	0	0	5185	1120	6305
AMMONIA		10519	0	0	0	10519	0	10519
ANILINE		39	No data	0	0	39	0	39
ANTIMONY COMPOUNDS		500	5	0	0	505	12192	12697
ARSENIC		0	No data	0	0	0	12034	12034
ARSENIC COMPOUNDS		369	5	0	0	374	21684	22058
ATRAZINE		5	No data	0	0	5	0	5
BARIUM COMPOUNDS		1265	255	0	0	1520	199172	200692
BENZENE		141	3	0	0	144	0	144
BENZOYL CHLORIDE		267	0	0	0	267	0	267

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
BIPHENYL		3	No data	0	0	3	0	3
BUTYL ACRYLATE		1756	No data	0	0	1756	0	1756
CARBON DISULFIDE		116500	No data	0	0	116500	0	116500
CARBON TETRACHLORIDE		19	No data	0	0	19	0	19
CERTAIN GLYCOL ETHERS		62212	No data	0	0	62212	0	62212
CHLORDANE		1	No data	0	0	1	0	1
CHLORINE		1857	No data	0	0	1857	0	1857
CHLOROBENZENE		29	No data	0	0	29	0	29
CHLOROFORM		22	No data	0	0	22	0	22
CHROMIUM		371	395	0	0	766	1725	2491
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	1353		255	0	0	1608	103912	105520
COBALT COMPOUNDS		500	5	0	0	505	2063	2568
COPPER		940	2405	0	0	3345	15003	18348
COPPER COMPOUNDS		959	255	0	0	1214	69819	71033
CREOSOTE		9	No data	0	0	9	0	9
CRESOL (MIXED ISOMERS)		7	No data	0	0	7	0	7

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CYANIDE COMPOUNDS		14	No data	0	0	14	0	14
CYCLOHEXANE		62	No data	0	0	62	0	62
CYCLOHEXANOL		10	No data	0	0	10	0	10
DI(2-ETHYLHEXYL) PHTHALATE		3	No data	0	0	3	755	758
DIBUTYL PHTHALATE		3	No data	0	0	3	0	3
DICHLOROMETHANE		19126	No data	0	0	19126	5	19131
DIISOCYANATES		74	No data	0	0	74	5	79
DIMETHYL PHTHALATE		24	No data	0	0	24	0	24
DIMETHYL SULFATE		24	No data	0	0	24	0	24
EPICHLOROHYDRIN		4	No data	0	0	4	0	4
ETHYL ACRYLATE		5486	No data	0	0	5486	0	5486
ETHYLBENZENE		26811	3	0	0	26814	5	26819
ETHYLENE GLYCOL		83	No data	0	0	83	48	131
FORMALDEHYDE		50	No data	0	0	50	0	50
FORMIC ACID		4	No data	0	0	4	0	4
HEPTACHLOR		1	No data	0	0	1	0	1
HYDRAZINE		15	No data	0	0	15	0	15
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	1495678		No data	0	0	1495678	0	1495678
HYDROGEN FLUORIDE		96202	0	0	0	96202	0	96202

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
MALEIC ANHYDRIDE		4	No data	0	0	4	0	4
MANGANESE		3737	14000	0	0	17737	124000	141737
MANGANESE COMPOUNDS		1070	10	0	0	1080	58381	59461
METHANOL		26021	No data	0	0	26021	58	26079
METHOXYCHLOR		0.72	No data	0	0	0.72	0	0.72
METHYL ETHYL KETONE		13368	No data	0	0	13368	1887	15255
METHYL ISOBUTYL KETONE		8714	No data	0	0	8714	5	8719
METHYL METHACRYLATE		3230	No data	0	0	3230	5	3235
METHYL TERT-BUTYL ETHER	400		No data	0	0	400	0	400
MOLYBDENUM TRIOXIDE		2015	5	0	0	2020	2975	4995
N,N-DIMETHYLFORMAMIDE		44	No data	0	0	44	0	44
NAPHTHALENE		110	No data	0	0	110	0	110
N-BUTYL ALCOHOL		13352	No data	0	0	13352	5	13357
N-HEXANE		4210	0	0	0	4210	5	4215
NICKEL		899	200	0	0	1099	420	1519
NICKEL COMPOUNDS		787	255	0	0	1042	36582	37624
NITRATE COMPOUNDS		81	24000	0	0	24081	0	24081

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
NITRIC ACID		46	0	0	0	46	6211	6257
NITROBENZENE		3	No data	0	0	3	0	3
N-METHYL-2-PYRROLIDONE		10	No data	0	0	10	0	10
N-METHYLOLACRYLAMIDE		1260	No data	0	0	1260	0	1260
PHENOL		34616	No data	0	0	34616	0	34616
PHTHALIC ANHYDRIDE		34	No data	0	0	34	0	34
POLYCYCLIC AROMATIC COMPOUNDS	9.534		0	0	0	9.534	0	9.534
P-PHENYLENEDIAMINE		28	No data	0	0	28	0	28
PYRIDINE		9	No data	0	0	9	0	9
SELENIUM COMPOUNDS		152	220	0	0	372	891	1263
STYRENE		7813	No data	0	0	7813	5	7818
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	621287		0	0	0	621287	0	621287
TERT-BUTYL ALCOHOL		13201	0	0	0	13201	0	13201
TETRACHLORO-ETHYLENE		57465	No data	0	0	57465	8	57473
TOLUENE		8637	21	0	0	8658	2041	10699
TOLUENE DIISOCYANATE (MIXED ISOMERS)	7		No data	0	0	7	0	7

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
TOLUENE-2,4-DIISOCYANATE	79		No data	0	0	79	5	84
TRICHLOROETHYLENE		5541	No data	0	0	5541	5	5546
TRIFLURALIN		0.87	No data	0	0	0.87	0	0.87
URETHANE		91	No data	0	0	91	5	96
VANADIUM (EXCEPT WHEN CONTAINED IN AN ALLOY)	47		170	0	0	217	452	669
VANADIUM COMPOUNDS		325	5	0	0	330	38107	38437
VINYL ACETATE		36	No data	0	0	36	0	36
XYLENE (MIXED ISOMERS)		164881	15	0	0	164896	156	165052
ZINC (FUME OR DUST)		7693	No data	0	0	7693	0	7693
ZINC COMPOUNDS		2389	4555	0	0	6944	89206	96150
	Total Non-IJC	**2883660.12**	**47079**	**0**	**0**	**2930739.1**	**800989**	**3731728.12**
	Total	**2890993.56**	**49339.98**	**0**	**0**	**2940333.5**	**954126.216**	**3894459.76**

Table 3.5-C. TRI Facilities Releasing IJC-critical Pollutants Onsite

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Lorain County, OH	2	AVON LAKE POWER PLANT	44012FRSTN33570	AVON LAKE
		ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON
Aldrin	1			
Lorain County, OH	1	ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON
Lead and lead compounds	9			
Lorain County, OH	9	AVON LAKE POWER PLANT	44012FRSTN33570	AVON LAKE
		BECOTEK MFG. INC. FORMERLY JOHNSON METALL INC.	44052MRCNC305OB	LORAIN
		FORD MOTOR CO. OHIO ASSEMBLY PLANT	44012FRDMT650MI	AVON LAKE
		INSERVCO INC.	44050NSRVC110CO	LAGRANGE
		NATIONAL BRONZE & METALS (OHIO) INC.	44055NTNLB5311W	LORAIN
		NEW NGC INC.	44052NWNGC1901H	LORAIN
		REPUBLIC TECHS. INTL. LORAIN PLANT	44055SSLRN1807E	LORAIN
		ROCK CREEK ALUMINUM INC.	44035RCKCR320HU	ELYRIA
		ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON
Mercury and mercury compounds	3			
Lorain County, OH	3	AVON LAKE POWER PLANT	44012FRSTN33570	AVON LAKE
		REPUBLIC TECHS. INTL. LORAIN PLANT	44055SSLRN1807E	LORAIN
		ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Toxaphene	1			
Lorain County, OH	1	ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON
Hexachlorobenzene	1			
Lorain County, OH	1	ROSS INCINERATION SERVICES INC.	44044RSSNC36790	GRAFTON

Table 3.5-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Black River AOC

Chemical	*IJC Tracking Number*	*Discharge*
Lead Total Recoverable	8	193.16
Lead, Total	8	427.36
Mercury Total Recoverable	9	0.62
Mercury, Total Low Level	9	0.01
	Total IJC	621.15
Cadmium Total Recoverable		59.56
Copper Total Recoverable		1068
Cyanide, Free-Water Plus Waste Waters		1046.27
Cyanide, Total (AS CN)		3822.92
Nickel Total Recoverable		548.89
Nitrogen, Ammonia Total (AS N)		89649.86
Phenolics, Total Recoverable		127.16
Phosphorus, Total (AS P)		140731.70
Zinc, Total (AS ZN)	**Total Non-IJC**	**237694.20**
	Total	**238315.35**

Table 3.5-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Black River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead	3			
Lorain County, OH	3	City of Amherst	OH0021628	Amherst
		Oberlin Water Env. Protection	OH0020427	Oberlin
		Republic Engineered Products	OH0001562	Lorain
Mercury	4			
Lorain County, OH	4	Avon Lake Wastewater Plant	OH0023981	Avon Lake
		City of Amherst	OH0021628	Amherst
		City of Lorain	OH0026093	Lorain
		Oberlin Water Env. Protection	OH0020427	Oberlin

3.6. Maumee River AOC, Lucas, Ottawa, and Wood Counties, OH

The Maumee River AOC includes all of Lucas County, substantial portions of Ottawa and Wood Counties, and approximately 23 miles of the Maumee River, the Maumee Bay, the Ottawa and Toussaint Rivers, and several creeks (see AOC map at end of chapter and in Appendix 2).

3.6.1. Hazardous Waste Sites Relevant to the Maumee River AOC

ATSDR has categorized one hazardous waste site in Lucas, Ottawa, and Wood Counties, OH, as an indeterminate public health hazard.

Table 3.6 -A. Hazardous waste sites in Ottawa County, OH

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remediation Data*
Brush Wellman, Elmore OHD004212999	HC EI HC	2002 2003 2006	3 NA 3	Non NPL	Not Needed

3-Indeterminate Public Health Hazard, HC=Health Consultation, EI=Exposure Investigation, NA=Not applicable

3.6.1.1 Brush Wellman Elmore Plant

Situated on 470 acres in a semi-rural area between the villages of Elmore and Oak Harbor, OH, the Brush Wellman plant is the principal U. S. producer of beryllium, beryllium alloy, and beryllium oxide. Recent well water samples collected near the site did not, however, contain beryllium.

Public Health Outcome Data: In July 2006, ATSDR offered testing for beryllium sensitivity for citizens who lived with beryllium workers, who worked with beryllium metals in a local machine shop, who lived within 1.25 miles of the Brush Wellman plant, or who had been diagnosed with sarcoidosis. Eighteen persons responded; all 18 had normal beryllium lymphocyte proliferation test results, with no one diagnosed as beryllium-sensitive. The possibility remains, however, that other community residents who do not work with beryllium have been sensitized.

ATSDR Conclusions: In 2002 and 2006, ATSDR concluded that in the past, short term beryllium releases posed an *Indeterminate Public Health Hazard* (Category 3) to residents near the plant. That said, current beryllium emissions from the plant were below levels expected to cause adverse health effects and did not pose a public health hazard. Similarly, the beryllium levels in wellwater samples collected from private residences near the plant posed *No Apparent Public Health Hazard* (Category 5).

U.S. EPA Update: This Brush Wellman site is an ATSDR petition site. It is an operating facility under RCRA oversight. Brush Wellman is not a federal site. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0504151 [cited 2008 Oct 8]. See also Order Denying Review, RCRA Appeal 92-17. Available at: http://www.epa.gov/eab/disk1/brush.pdf [cited 2008 Oct 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site.

3.6.2. Summary and Conclusions for the Maumee River AOC

3.6.2.1 Hazardous Waste Site Data

In 2002 and 2006, ATSDR concluded that because of the potential for past exposures to beryllium emissions, the Brush Wellman Elmore Plant presented an *Indeterminate Public Health Hazard* (Category 3). But current beryllium emissions from the plant pose no public health hazard.

3.6.2.2 TRI Data

Onsite TRI releases in Lucas, Ottawa, and Wood Counties (combined) totaled 16,694,945 pounds, the majority of which was released in Lucas County and to land. See Table 3.6-B. Of this, about 13.4% (2,240,392 pounds) were IJC-critical pollutants, mainly lead. The IJC-critical pollutants released were PCBs (to land), PCDDs and PCDFs, (primarily to air and land), lead and lead compounds (primarily to land), and mercury and mercury compounds (to air and land).

3.6.2.3 NPDES Data

The NPDES permitted discharges for Lucas County, OH are summarized in Table 3.6-C. The average annual permitted discharges in 2004 totaled 7,178,272 pounds—mostly ammonia nitrogen. Permitted phosphorus discharges also occurred in substantial amounts (approximately 519,000 pounds).

Permitted discharges included the IJC-critical pollutants lead (approximately 10,700 pounds) and mercury (12 pounds). Facilities permitted to release these pollutants are listed in Table 3.6-D.

3.6.2.4 Beneficial Use Impairments (BUIs)

In 9 of 12 watersheds, restrictions on fish and wildlife consumption are impaired. No additional information was found at the U.S. EPA Web site.

A summary box on the U.S. EPA Web site states that at in this AOC, drinking water restrictions are an impairment. Additional information in a summary table listing the various watersheds indicates, however, that drinking water restrictions are either not applicable or not affected. Further information is available at the U.S. EPA Web site at http://www.epa.gov/glnpo/aoc/.

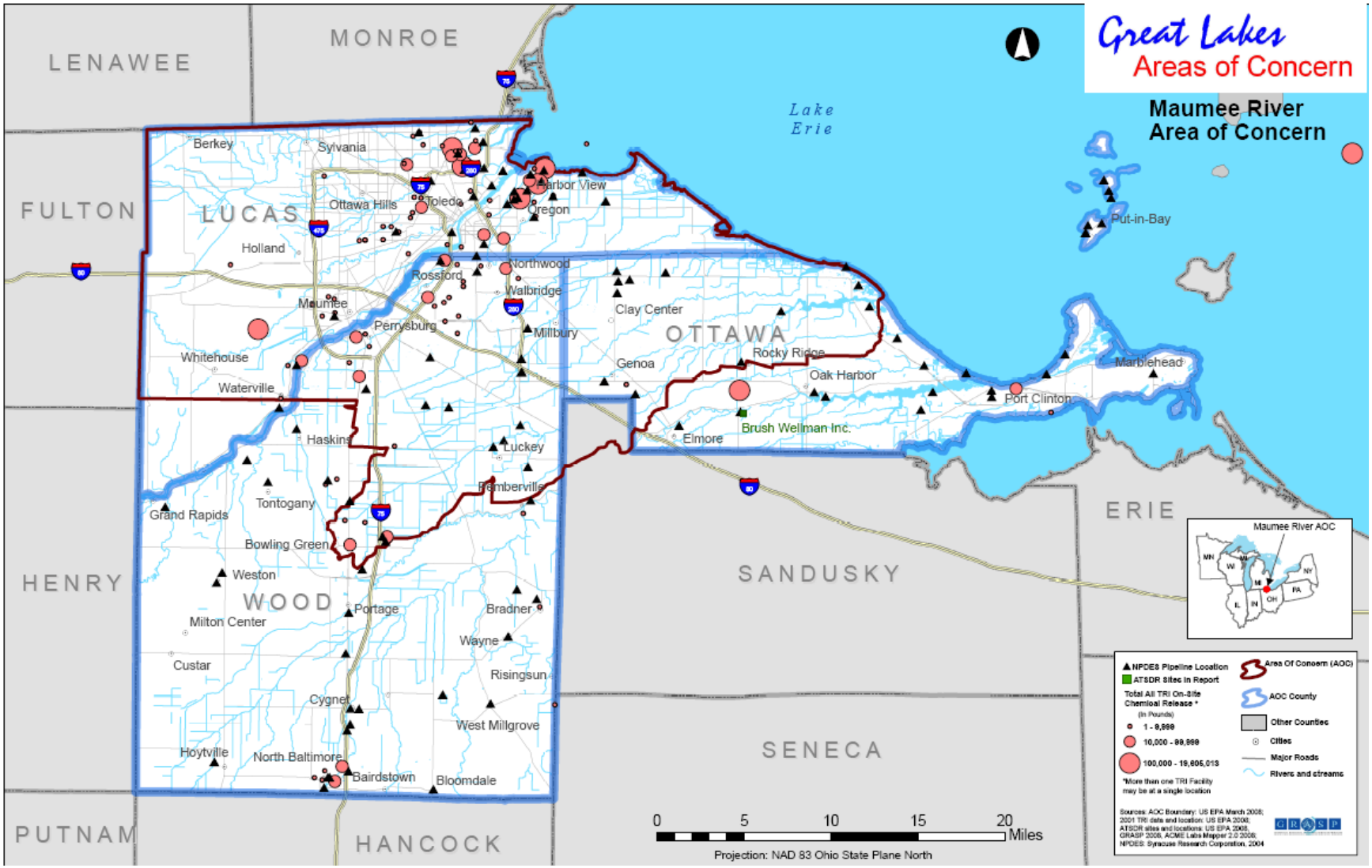

Great Lakes
Areas of Concern
Maumee River
Area of Concern
Lake
Erie
LENAWEE
MONROE
FULTON
LUCAS
HENRY
WOOD
OTTAWA
SANDUSKY
ERIE
SENECA
PUTNAM
HANCOCK
Berkey
Sylvania
Toledo
Harbor View
Oregon
Ottawa Hills
Holland
Northwood
Rossford
Walbridge
Maumee
Perrysburg
Millbury
Clay Center
Whitehouse
Waterville
Genoa
Rocky Ridge
Oak Harbor
Marblehead
Port Clinton
Put-in-Bay
Brush Wellman Inc.
Elmore
Haskins
Luckey
Bemberville
Tontogany
Grand Rapids
Bowling Green
Weston
Milton Center
Portage
Bradner
Wayne
Custar
Risingsun
Cygnet
West Millgrove
Hoytville
North Baltimore
Bairdstown
Bloomdale
0 5 10 15 20 Miles
Projection: NAD 83 Ohio State Plane North
Maumee River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,805,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams

Table 3.6-B. TRI Releases (in pounds, 2001) for the Maumee River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
POLYCHLORINATED BIPHENYLS	1	0.0000001	0	0	51	51.0000001	0	51.0000001
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00237699	0.0007938	0	0.004851	0.00802179	0	0.00802179
(PCDDs and PCDFs)	3							
LEAD	8	430.1	2.3	0	2234245.4	2234677.8	7915.64	2242593.44
LEAD COMPOUNDS		1345.6	355	0	3400	5100.6	4837.583	9938.183
MERCURY	9	0.1	0	0	30	30.1	0.791	30.891
MERCURY COMPOUNDS	9	254.4	5.35	0	273.1	532.85	7.2	540.05
	Total IJC	2030.202377	362.6507938	0	2237999.505	2240392.358	12761.214	2253153.572
1,2,4-TRIMETHYLBENZENE		30563	17	0	250	30830	816	31646
1,2-DIBROMOETHANE		3005	0	0	0	3005	0	3005
1,3-BUTADIENE		350	0	0	0	350	0	350
1,4-DICHLOROBENZENE		1004	0	0	0	1004	0	1004
ACETALDEHYDE		1300	0	0	0	1300	0	1300
ALUMINUM (FUME OR DUST)	255		0	0	357000	357255	250	357505
ALUMINUM OXIDE (FIBROUS FORMS)	500		250	0	0	750	5	755
AMMONIA		121006	5100	0	0	126106	1220	127326
ANTIMONY COMPOUNDS		2864	5	0	0	2869	19260	22129

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
BARIUM		10	0	0	121000	121010	260	121270
BARIUM COMPOUNDS		2492	185	0	130000	132677	158454	291131
BENFLURALIN		385	0	0	0	385	0	385
BENZENE		22150	19	0	250	22419	10	22429
BENZO(G,H,I) PERYLENE		2.1076608	0	0	0	2.1076608	3	5.1076608
BERYLLIUM		241	25	0	54580	54846	796	55642
BROMOCHLORO-DIFLUOROMETHANE	1000		0	0	0	1000	0	1000
BROMOTRIFLUOROMETHANE	4653		0	0	0	4653	0	4653
BUTYL ACRYLATE		218	0	0	0	218	0	218
BUTYRALDEHYDE		1200	0	0	0	1200	0	1200
CADMIUM		10	0	0	56000	56010	15	56025
CADMIUM COMPOUNDS		0	1	0	0	1	1753	1754
CARBON DISULFIDE		56851	0	0	0	56851	0	56851
CARBONYL SULFIDE		7	0	0	0	7	0	7
CERTAIN GLYCOL ETHERS		474072	250	0	750	475072	15992	491064
CHLORODIFLUOROMETHANE	2512		0	0	0	2512	0	2512
CHROMIUM		506	0	0	523000	523506	1990	525496
CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE	306		51	0	7100	7457	7352	14809

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
TRANSVAAL REGION)								
COPPER		810	84	0	605858	606752	14349	621101
COPPER COMPOUNDS		22	0	0	0	22	2050	2072
CUMENE		502	5	0	250	757	0	757
CYCLOHEXANE		13226	5	0	250	13481	0	13481
DI(2-ETHYLHEXYL) PHTHALATE	0		0	0	0	0	250	250
DIAZINON		5100	0	0	0	5100	0	5100
DICHLORODIFLUOROMETHANE	2716		0	0	0	2716	0	2716
DICHLOROMETHANE		9718	0	0	0	9718	0	9718
DIETHANOLAMINE		500	0	0	0	500	0	500
DIISOCYANATES		1	0	0	0	1	0	1
ETHYLBENZENE		59225	18	0	250	59493	260	59753
ETHYLENE		5902	0	0	0	5902	0	5902
ETHYLENE GLYCOL		3433	250	0	5	3688	974	4662
FORMALDEHYDE		51378	0	0	0	51378	6753	58131
FORMIC ACID		1750	0	0	0	1750	0	1750
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	53968		0	0	0	53968	0	53968
HYDROGEN FLUORIDE		56022	0	0	0	56022	0	56022
MANGANESE		330	106	0	2420000	2420436	3516	2423952

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
MANGANESE COMPOUNDS	310		6600	0	13000	19910	5560	25470
METHANOL		89737	0	0	0	89737	2228	91965
METHYL ACRYLATE		184	0	0	0	184	0	184
METHYL ETHYL KETONE		711912	250	0	0	712162	3700	715862
METHYL ISOBUTYL KETONE	109170		0	0	0	109170	0	109170
METHYL METHACRYLATE		1884	0	0	0	1884	0	1884
METHYL TERT-BUTYL ETHER	4075		0	0	0	4075	0	4075
MOLYBDENUM TRIOXIDE		0	0	0	0	0	250	250
NAPHTHALENE		2121	29	0	0	2150	52	2202
N-BUTYL ALCOHOL		362737	0	0	0	362737	5	362742
N-HEXANE		38015	5	0	250	38270	0	38270
NICKEL		25	23	0	36032	36080	4361	40441
NICKEL COMPOUNDS		1606	937	0	71000	73543	16112	89655
NITRATE COMPOUNDS		0	0	0	0	0	32	32
NITRIC ACID		3521	0	0	0	3521	0	3521
N-METHYL-2-PYRROLIDONE	25750		5	0	0	25755	250	26005
OXYDIAZON		335	0	0	0	335	0	335
O-XYLENE		10	0	0	0	10	0	10
PHENANTHRENE		6	0	0	0	6	33	39
PHENOL		5601	0	0	0	5601	10440	16041

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
POLYCHLORINATED ALKANES	0		0	0	0	0	247	247
POLYCYCLIC AROMATIC COMPOUNDS	809.578738		0.005	0	1.1	810.683738	10532	11342.68374
PROPYLENE		13454	0	0	0	13454	0	13454
SODIUM NITRITE		5	0	0	0	5	257	262
STYRENE		68937	0	0	0	68937	33292	102229
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	179950		0	0	0	179950	0	179950
TETRACHLORO-ETHYLENE		61961	0	0	0	61961	0	61961
TOLUENE		118234	269	0	750	119253	1867	121120
TRICHLOROETHYLENE		16420	0	0	0	16420	250	16670
TRICHLOROFLUOROMETHANE	165		0	0	0	165	0	165
TRIFLURALIN		1110	0	0	0	1110	0	1110
VANADIUM (EXCEPT WHEN CONTAINED IN AN ALLOY)	10		0	0	13500	13510	505	14015
VANADIUM COMPOUNDS		7103	13	0	330000	337116	4900	342016
XYLENE (MIXED ISOMERS)		344110	279	0	750	345139	280	345419
ZINC (FUME OR DUST)		1000	0	0	6520000	6521000	6505	6527505
ZINC COMPOUNDS		3212	5001	0	7400	15613	729396	745009
	Total Non-IJC	**3165544.686**	**19782.005**	**0**	**11269226.1**	**14454552.79**	**1067382**	**15521934.79**

Chemical		*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
	Total	**3167574.889**		**20144.65579**	**0**	**13507225.6**	**16694945.15**	**1080143.214**	**17775088.36**

Table 3.6-C. TRI Facilities Releasing IJC-critical Pollutants Onsite

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Polychlorinated biphenyls	1			
Lucas County, OH	1	ENVIROSAFE SERVICES OF OHIO INC.	43616NVRSF876OT	OREGON
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	3			
Lucas County, OH	3	BAYSHORE PLANT	43616FRSTN4701B	OREGON
		BP AMERICA INC. TOLEDO REFY.	43616SHLCM4001C	OREGON
		ENVIROSAFE SERVICES OF OHIO INC.	43616NVRSF876OT	OREGON
Lead and lead compounds	15			
Lucas County, OH	12	BAYSHORE PLANT	43616FRSTN4701B	OREGON
		BP AMERICA INC. TOLEDO REFY.	43616SHLCM4001C	OREGON
		CREATIVE PRODS. INC.	43528CRTVP1430K	HOLLAND
		ENVIROSAFE SERVICES OF OHIO INC.	43616NVRSF876OT	OREGON
		GM POWERTRAIN TOLEDO TRANSMISSION	43692GNRLM1455W	TOLEDO
		JOHNS MANVILLE	43566MNVLL6050R	WATERVILLE
		JOHNSON CONTROLS INC. BATTERY GROUP	43528JHNSN10300	HOLLAND
		LIBBEY GLASS INC.	43611LBBYG940AS	TOLEDO
		POWERLAB INC.	43537PWRLB370WD	MAUMEE
		SEM-COM CO. INC.	43607SMCMC1040N	TOLEDO
		SUNOCO INC. (R&M)	43616SNRFN1819W	OREGON
		TEXTILEATHER CORP.	43608DVRST3729T	TOLEDO
Ottawa County, OH	2	GRAYMONT DOLIME OH INC.	43430GRYMN21880	GENOA
Wood County, OH	1	TECHNEGLAS INC.	43551NGTVP25875	PERRYSBURG
Mercury and mercury compounds	4			
Lucas County, OH	2	BAYSHORE PLANT	43616FRSTN4701B	OREGON
		BP AMERICA INC. TOLEDO REFY.	43616SHLCM4001C	OREGON

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Ottawa County, OH	2	GRAYMONT DOLIME OH INC.	43430GRYMN21880	GENOA
		UNITED STATES GYPSUM CO.	43433NTDSTGYPSU	GYPSUM

Table 3.6-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Maumee River AOC

Chemical	*IJC Tracking Number*	*Discharge*
LEAD TOTAL RECOVERABLE	8	19.32
LEAD, TOTAL (AS PB)	8	10704.90
MERCURY, TOTAL (AS HG)	9	12.07
	Total IJC	**10736.29**
BERYLLIUM, TOTAL RECOVERABLE (AS BE)		5955.71
CADMIUM TOTAL RECOVERABLE		2301.80
CADMIUM, TOTAL (AS CD)		1666.16
CHROMIUM, HEXAVALENT (AS CR)		1835.00
CHROMIUM, HEXAVALENT DISSOLVED (AS CR)		7629.74
CHROMIUM, TOTAL (AS CR)		16581.29
COPPER TOTAL RECOVERABLE		17376.17
COPPER, TOTAL (AS CU)		13883.88
CYANIDE, FREE-WATER PLUS WASTEWATERS		660.04
NICKEL TOTAL RECOVERABLE		11267.55
NICKEL, TOTAL (AS NI)		4.02
NITROGEN, AMMONIA TOTAL (AS N)		6556864.47
PHENOLICS, TOTAL RECOVERABLE		5376.23
PHOSPHORUS, TOTAL (AS P)		518999.45
SILVER TOTAL RECOVERABLE		1115.81
SILVER, TOTAL (AS AG)		869.21
SULFIDE, TOTAL (AS S)		5142.83
ZINC, TOTAL (AS ZN)		6.04
	Total Non-IJC	**7167535.40**
	Total	**7178271.69**

Table 3.6-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants Maumee River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead	3			
Lucas County, OH	1	CITY OF TOLEDO	OH0027740	TOLEDO
Mercury	1			
Lucas County, OH	1	CITY OF TOLEDO	OH0027740	TOLEDO

3.7. River Raisin AOC, Monroe County, MI

The River Raisin AOC is in the southeastern part of Michigan's Lower Peninsula and is defined as the lower (2.6 mile) portion of the River Raisin, downstream from Dam #6 at Winchester Bridge in the City of Monroe. The AOC extends for 1 mile both north and south along the near shore and extends ½ mile into Lake Erie (see AOC map at end of chapter and in Appendix 2).

3.7.1. Hazardous Waste Sites Relevant to the River Raisin AOC

ATSDR has evaluated the data for one hazardous waste site in Monroe County, MI, and 18 hazardous waste sites in Wayne County, MI, and has reached conclusions regarding public health threats these sites posed or still pose. Table 3.7-A summarizes the conclusions for the one Monroe county site, together with information regarding the type and location of the site and the date and type of public health assessment product.

Table 3.7-A. Hazardous waste sites in Monroe County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Consolidated Packaging Corp., Monroe MID980999882	HC	1995	3	Non NPL	Ongoing

3=Indeterminate Public Health Hazard, HC=Health Consultation

3.7.1.1 Consolidated Packaging Corp.

This 97-acre site is on the east side of the City of Monroe (Monroe County) MI. A paper and paperboard plant formerly occupied the site. Originally wetlands, the site was filled in with various materials, including commercial and industrial waste. Consolidated Packaging operated at the site for 80 years, from 1898 through 1978. The plant structures have since been demolished; all that remains are seven lagoons formerly used for waste water disposal, storage, and treatment. These lagoons take up a large part of the site. While the plant was operating, overflow from the lagoons traveled through drainage ditches into nearby River Raisin.

A waste water treatment plant, a closed industrial landfill, and a residential area border the site. The River Raisin flows east-southeast, fewer than 200 feet north of the site, emptying into Lake Erie approximately 2 miles away. Another industrial facility is on the opposite bank of the river, and two hazardous waste sites, with PCB- and heavy metal-contaminated sediments, are slightly downstream, also on the opposite bank of the river. Information regarding this site is taken from the 1995 ATSDR health consultation and the U.S. EPA 2005 site update.

ATSDR Conclusions: In 1995, because of the potential threat to human health from exposure to contaminants and because of incomplete monitoring data, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). Trespassers could be exposed to soil, sediments, and surface water containing PCBs and metals at concentrations potentially of human health concern. Data are unavailable on concentrations of surface soil contaminants, but available soil data (at depths greater than 3 inches) do not indicate a significant health hazard to occasional trespassers.

Concentrations of PAHs, including B(a)P, were comparable to background concentrations in urban soil. The sediment in the lagoons was contaminated with the IJC-critical pollutant, PCBs. Fish and turtles had been seen in the drainage ditch, and before the lagoons were fenced, children reportedly fished in them. No data were available on contaminant concentrations in fish from the lagoons and the ditch, but fish taken from the River Raisin near the site had elevated PCB concentrations. The Consolidated Packaging Corporation is, however, one of many possible sources for the PCB contamination of the fish. Although groundwater at the site contains various contaminants— including PCBs—at concentrations above health-based screening values, the site has no producing wells. Groundwater flow is toward the northeast, and is thought to discharge into the River Raisin.

The Visteon plant adjacent to the Raisin River has been identified as a source of PCBs in the river, and, as reported by U.S. EPA (in June 2004). PCB wastes are now stored in an onsite disposal cell. U.S. EPA also reports reported that bacterial levels in the waters have led to beach closings. Site remediation is ongoing.

U.S. EPA Update: In its Brownfields 2005 Fact Sheet, U.S. EPA stated in part that

> EPA has selected the City of Monroe for a brownfields revolving loan fund grant. The grant will be used to capitalize a revolving loan fund from which the City of Monroe will provide loans and subgrants to support cleanup activities for sites contaminated with hazardous substances. The grant will target the 45-acre former Consolidated Packaging Corporation Northside Plant located at 921 East Elm Avenue, within the Mason Run development area.

Available at**:** http://www.epa.gov/swerosps/bf/05grants/monroe.htm. [cited 29 Jul 2008].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, dioxins, furans, lead, several PAHs, including B[a}A, B[a]P, B[b]F B[k]F, I[123cd]P, and mercury were identified at this site.

3.7.2. Summary and Conclusions for the River Raisin AOC, Monroe County, MI

3.7.2.1 Hazardous Waste Sites

Consolidated Packaging Corporation was the one hazardous waste site in Monroe County, MI, categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. The soil and sediment at this site was contaminated with the IJC-critical pollutants PCBs, PAHs, dioxin, furans, lead, and mercury. Onsite groundwater, contaminated with PCBs, could have discharged into the River Raisin. Because monitoring data are were inadequate to determine whether chemicals in completed exposure pathways pose a public health hazard, the site was considered an *Indeterminate Public Health Hazard* (Category 3).

Issues for Follow-Up

In its 2002 health consultation, ATSDR recommended additional monitoring of the Consolidated Packaging Corporation site to determine concentrations of surface soil contaminants. Additional issues for follow-up include determining whether groundwater contaminated with PCBs was actually discharging to the River Raisin.

3.7.2.2 TRI Data

Onsite TRI releases in Monroe County MI totaled 16,700,032 pounds, the majority of which was released to air, followed by releases to soil. See Table 3.7-B. Releases to water were minimal. Of these releases, some 66,177 pounds (0.4%) were IJC-critical pollutants. The IJC-critical pollutants included PCDDs and PCDFs (released to air), lead and lead compounds (primarily to land), mercury and mercury compounds (to air and land), and hexachlorobenzene (to air). The major onsite releases (≥500,000 pounds) of non-IJC-critical chemicals were of hydrochloric acid, ethylene, sulfuric acid, and hydrogen fluoride (to air); and barium compounds (primarily to land). Table 3.7-C lists the facilities that released these pollutants.

3.7.2.3 NPDES Data

The NPDES permitted discharges for Monroe County, MI, are summarized in Table 3.7-D. The average annual permitted discharges in 2004 totaled 1,008,051 pounds—mostly ammonia nitrogen (approximately 783,000 pounds)—and phosphorus and strontium (slightly more than 100,000 pounds each). No IJC-critical pollutants were the subject of permitted (i.e., quantity average limit) discharge amounts.

3.7.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption at this site are listed as impairments. Several specific restrictions are in force as well as general advisories for mercury at inland lakes and rivers. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

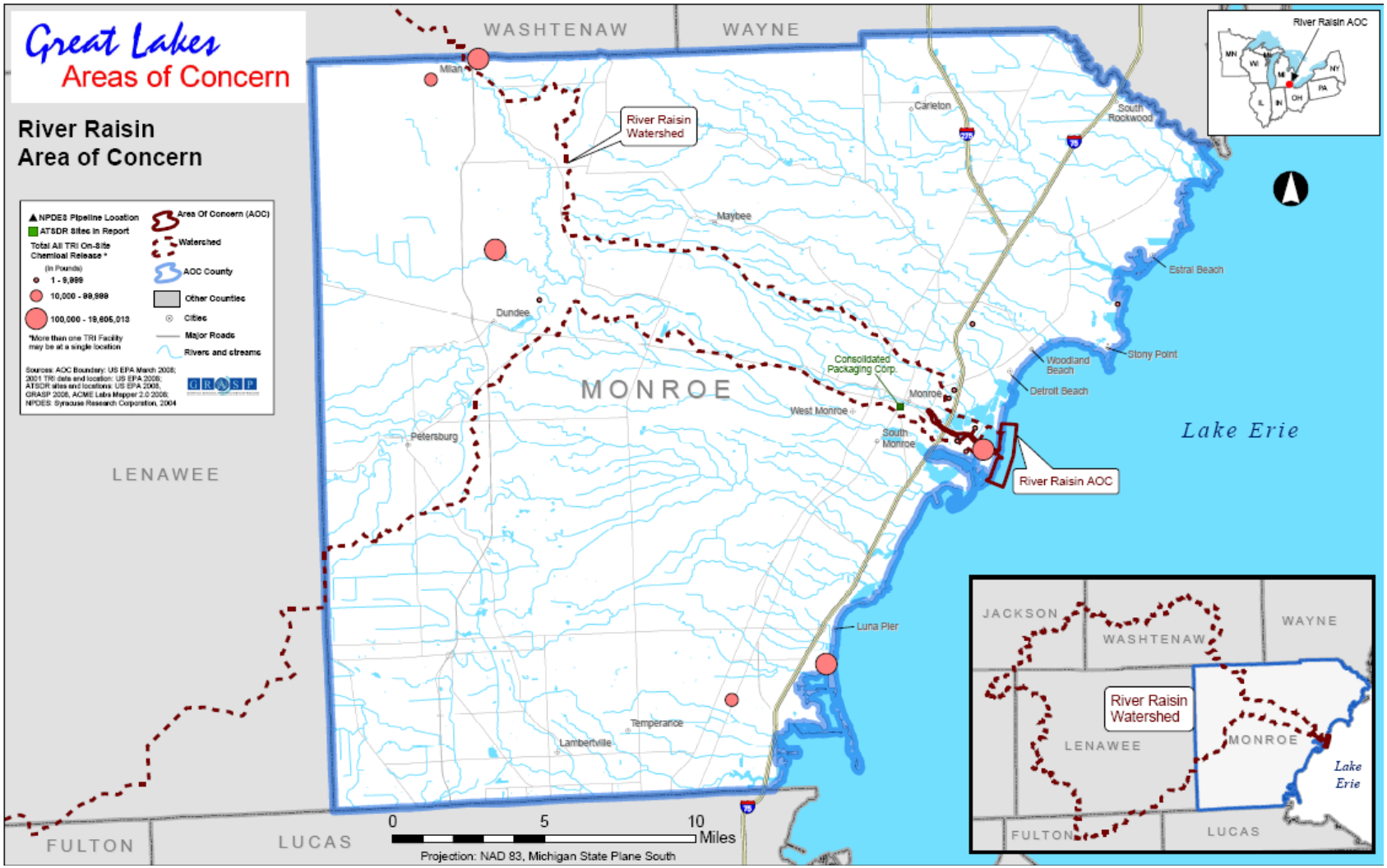

Great Lakes
Areas of Concern
River Raisin
Area of Concern
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,805,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Watershed
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008; 2001 TRI data and location: US EPA 2008; ATSDR sites and locations: US EPA 2008; GRASP 2008; ACME Labs Mapper 2.0 2008; NPDES: Syracuse Research Corporation, 2004
GRASP
WASHTENAW
WAYNE
MONROE
LENAWEE
FULTON
LUCAS
River Raisin Watershed
River Raisin AOC
Milan
Dundee
Petersburg
Maybee
Carleton
South Rockwood
Estral Beach
Stony Point
Woodland Beach
Detroit Beach
Consolidated Packaging Corp.
Monroe
West Monroe
South Monroe
Luna Pier
Temperance
Lambertville
Lake Erie
0
5
10
Miles
Projection: NAD 83, Michigan State Plane South
River Raisin AOC
MN
WI
MI
NY
IL
IN
OH
PA
JACKSON
WASHTENAW
WAYNE
River Raisin Watershed
LENAWEE
MONROE
Lake Erie
FULTON
LUCAS

Table 3.7-B. TRI Releases (in pounds, 2001) for the River Raisin AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.007667447	No data	0	0	0.007667447	0	0.007667447
(PCDDs and PCDFs)	3							
LEAD	8	3.79	No data	0	1160.5	1164.29	1	1165.29
LEAD COMPOUNDS	8	965	161	0	62622	63748	5911.75	69659.75
MERCURY	9	58	No data	0	0	58	0	58
MERCURY COMPOUNDS	9	879.6	1	0	313	1193.6	0.1	1193.7
HEXACHLOROBENZENE	11	13.6	0	0	0	13.6	0	13.6
	Total IJC	**1919.997667**	**162**	**0**	**64095.5**	**66177.49767**	**5912.85**	**72090.34767**
1,2,4-TRIMETHYLBENZENE		24250	No data	0	0	24250	0	24250
1,3-BUTADIENE		90717	No data	0	0	90717	0	90717
AMMONIA		89097	980	0	0	90077	0	90077
ANTIMONY COMPOUNDS		250	No data	0	0	250	500	750
ARSENIC COMPOUNDS		406	1200	0	40000	41606	0	41606
BARIUM COMPOUNDS		8937	8800	0	1750000	1767737	0	1767737
BENZENE		137898	No data	0	0	137898	0	137898
BENZO(G,H,I) PERYLENE		3136.2	0	0	0	3136.2	0	3136.2
BERYLLIUM COMPOUNDS		48	0	0	12000	12048	0	12048
CERTAIN GLYCOL ETHERS		47598	No data	0	0	47598	0	47598

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CHROMIUM		2661	No data	0	35	2696	458	3154
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		2478	2320	0	78800	83598	12842	96440
COMPOUNDS		250	49	0	28000	28299	0	28299
DIISOCYANATES		41	493022	0	0	41	0	41
ETHYLBENZENE		53100	No data	0	0	53100	0	53100
ETHYLENE		1524027	No data	0	0	1524027	0	1524027
ETHYLBENZENEETHYLENE		531001524027	No data	0	0	531001524027	0	531001524027
		551000	No data	0	0	551000	0	551000
MANGANESE		245	No data	0	461	706	53	759
MANGANESE COMPOUNDS		3279	6729	0	0	96008	0	96008
METHANOL		27300	No data	0	0	27300	0	27300
METHYL ETHYL KETONE		24250	No data	0	0	24250	0	24250
METHYL ISOBUTYL KETONE		17250	No data	0	0	17250	0	17250
NAPHTHALENE		35053	No data	0	0	35053	0	35053
N-BUTYL ALCOHOL		30250	No data	0	0	30250	0	30250
NICKEL		635	No data	0	0	670	0	2571
NICKEL COMPOUNDS		1019	863	0	0	60882	6	60888
POLYCYCLIC AROMATIC COMPOUNDS		15693.5	0	0	39	15732.5	0	15732.5

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
SELENIUM COMPOUNDS		9000	2800	0	6900	18700	0	18700
NICKEL COMPOUNDS	1019		863	0	59000	60882	6	60888
POLYCYCLIC AROMATIC COMPOUNDS	15693.5			0	0	39	0	15732.5
		9000	2800	0	0	15000	0	15000
VANADIUM COMPOUNDS		6084	4200	0	175300	185584	0	185584
XYLENE (MIXED ISOMERS)		367313	No data	0	0	367313	0	367313
TRICHLOROETHYLENE		121	No data	0	0	718	0	718
ZINC COMPOUNDS		6994	4528	0	130005	141527	0	214299
	Total Non-IJC	**13877691.7**	**35491**	**0**	**175300**	**16633854.7**	**0**	**16725424.7**
	Total	**367313121**	**35653**	**0**	**0597**	**367313718**	**0**	**367313718**

Table 3.7-C. TRI Releases (in pounds 2001) for River Raisin AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.007667447	No data	0	0	0.007667447	0	0.007667447
(PCDDs and PCDFs)	3							
LEAD	8	3.79	No data	0	1160.5	1164.29	1	1165.29
LEAD COMPOUNDS	8	965	161	0	62622	63748	5911.75	69659.75
MERCURY	9	58	No data	0	0	58	0	58
MERCURY COMPOUNDS	9	879.6	1	0	313	1193.6	0.1	1193.7
HEXACHLOROBENZENE	11	13.6	0	0	0	13.6	0	13.6
	Total IJC	**1919.997667**	**162**	**0**	**64095.5**	**66177.49767**	**5912.85**	**72090.34767**
1,2,4-TRIMETHYLBENZENE		24250	No data	0	0	24250	0	24250
1,3-BUTADIENE		90717	No data	0	0	90717	0	90717
AMMONIA		89097	980	0	0	90077	0	90077
ANTIMONY COMPOUNDS		250	No data	0	0	250	500	750
ARSENIC COMPOUNDS		406	1200	0	40000	41606	0	41606
BARIUM COMPOUNDS		8937	8800	0	1750000	1767737	0	1767737
BENZENE		137898	No data	0	0	137898	0	137898
BENZO(G,H,I) PERYLENE		3136.2	0	0	0	3136.2	0	3136.2
BERYLLIUM COMPOUNDS		48	0	0	12000	12048	0	12048
CERTAIN GLYCOL ETHERS		47598	No data	0	0	47598	0	47598

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CHROMIUM		2661	No data	0	35	2696	458	3154
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		2478	2320	0	78800	83598	12842	96440
COBALT COMPOUNDS		250	49	0	28000	28299	0	28299
COPPER COMPOUNDS		2222	3022	0	353500	358744	3038	361782
DIISOCYANATES		41	No data	0	0	41	0	41
ETHYLBENZENE		53100	No data	0	0	53100	0	53100
ETHYLENE			No data	0	0	1524027	0	1524027
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		9901000	No data	0	0	9901000	0	9901000
HYDROGEN FLUORIDE		551000	No data	0	0	551000	0	551000
MANGANESE		245	No data	0	461	706	53	759
MANGANESE COMPOUNDS		3279	6729	0	86000	96008	0	96008
METHANOL		27300	No data	0	0	27300	0	27300
METHYL ETHYL KETONE		24250	No data	0	0	24250	0	24250
METHYL ISOBUTYL KETONE		17250	No data	0	0	17250	0	17250
NAPHTHALENE		35053	No data	0	0	35053	0	35053
N-BUTYL ALCOHOL		30250	No data	0	0	30250	0	30250
NICKEL		635	No data	0	35	670	1901	2571

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
NICKEL COMPOUNDS		1019	863	0	59000	60882	6	60888
POLYCYCLIC AROMATIC COMPOUNDS		15693.5	0	0	39	15732.5	0	15732.5
SELENIUM COMPOUNDS		9000	2800	0	6900	18700	0	18700
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		777000	No data	0	0	777000	0	777000
TOLUENE		102089	No data	0	0	102089	0	102089
TRICHLOROETHYLENE		15000	No data	0	0	15000	0	15000
VANADIUM COMPOUNDS		6084	4200	0	175300	185584	0	185584
XYLENE (MIXED ISOMERS)		367313	No data	0	0	367313	0	367313
ZINC (FUME OR DUST)		121	No data	0	597	718	0	718
ZINC COMPOUNDS		6994	4528	0	130005	141527	72772	214299
	Total Non-IJC	**13877691.7**	**35491**	**0**	**2720672**	**16633854.7**	**91570**	**16725424.7**
	Total	**13879611.7**	**35653**	**0**	**2784767.5**	**16700032.2**	**97482.85**	**16797515.05**

Table 3.7-D. TRI Facilities Releasing IJC-critical Pollutants Onsite for the River Raisin AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	3			
Monroe County, MI	3	DETROIT EDISON MONROE POWER PLANT	48161DTRTD3500E	MONROE
		HOLCIM (US) INC. - DUNDEE PLANT	48131DNDCM6211N	DUNDEE
		J. R. WHITING GENERATING PLANT	48157JRWHT4525E	ERIE
Lead and lead compounds	6			
Monroe County, MI	6	DETROIT EDISON FERMI 2 PLANT	48166DTRTD6400N	NEWPORT
		DETROIT EDISON MONROE POWER PLANT	48161DTRTD3500E	MONROE
		DIAMOND ELECTRIC MFG. CORP.	48131DMNDL110RE	DUNDEE
		HOLCIM (US) INC. - DUNDEE PLANT	48131DNDCM6211N	DUNDEE
		J. R. WHITING GENERATING PLANT	48157JRWHT4525E	ERIE
		NORTH STAR STEEL CO. MICHIGAN DIV.	48161NRTHS3000E	MONROE
Mercury and mercury compounds	4			
Monroe County, MI	4	DETROIT EDISON MONROE POWER PLANT	48161DTRTD3500E	MONROE
		HOLCIM (US) INC. - DUNDEE PLANT	48131DNDCM6211N	DUNDEE
		J. R. WHITING GENERATING PLANT	48157JRWHT4525E	ERIE
		NORTH STAR STEEL CO. MICHIGAN DIV.	48161NRTHS3000E	MONROE
Hexachlorobenzene	1			
Monroe County, MI	1	DETROIT EDISON MONROE POWER PLANT	48161DTRTD3500E	MONROE

Table 3.7-E. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, River Raisin AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
BARIUM, TOTAL (AS BA)		401.50
COPPER, TOTAL (AS CU)		390.55
HYDROGEN SULFIDE		1.10
NITROGEN, AMMONIA TOTAL (AS N)		783477.25
PHOSPHORUS, TOTAL (AS P)		108458.66
SELENIUM, TOTAL (AS SE)		1416.20
SILVER, TOTAL (AS AG)		80.30
STRONTIUM,TOTAL (AS SR)		113150
THALLIUM, TOTAL (AS TL)		675.25
	Total Non-IJC	**1008050.81**
	Total	**1008050.81**

3.8. Rouge River AOC, Wayne and Oakland Counties, MI

The Rouge River has four main branches that flow primarily through Wayne and Oakland Counties, discharging into the Detroit River near the south end of Zug Island. Oakland County is relevant not only to the Rouge River AOC, but also to the Clinton River AOC, discussed in Section 3.9 of this document (see AOC map at end of chapter and in Appendix 2).

3.8.1. Hazardous Waste Sites Relevant to the Rouge River AOC

ATSDR has evaluated the data for hazardous waste sites in Wayne and Oakland Counties, MI, and reached conclusions regarding the public health threat posed by these sites. These conclusions—for sites categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some point during their assessment history—together with information regarding the type and location of the site and the date and type of assessment document, are summarized in Tables 3.8-A and 3.8-B. The total number of sites is 25: 19 in Wayne County and 6 in Oakland County.

Table 3.8-A. Hazardous Waste Sites in Wayne County, Michigan

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remediation Status*
Carter Industrial, Inc., Detroit MID980274179	HA	1992	2	Deleted from NPL	Completed
EQ Resource Recovery Fire, Romulus MID060975844	HC	2006	1	Non NPL	Completed
Federal Marine Terminal Riverview, MID980504765	HC	2003	2	Non NPL	Ongoing
Ford Motor Co. Allen Park Clay Mine, Allen, Park MID980568711	HA	1994	3	Non NPL	Active site; RCRA supervised
FWS-Detroit River, Wayne County MIN000509205	HC	2007	2	Non NPL	Ongoing
Globe Building Property Detroit	HC	2005	3	Non NPL	Ongoing
Grand Haven, Hamtramck MIDCRA05D000	HC	2006	2	Non NPL	Completed
Gratiot Trailer Park, Detroit MISFN0507941	HC	1999	2	Non NPL	Ongoing
Joy Road Dump/Holiday Park/Holiday Nature Preserve, Westland MISFN0507950	HC	2000	2	Non NPL	Completed

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remediation Status*
Lower Ecorse Creek Dump, Wyandotte MID985574227	HC HV HC HC HA	1990 1993 1994 1994 1995	1 1 N.S. N.S. 4	Deleted from NPL	Completed
Master Metals Inc. #2, Detroit MID039108824	HC HC	1997 2005	2 4	Non NPL	Completed
Michigan Industrial Finishes, Hamtramck MIN000509131	HC	2005	1	Non NPL	Completed
Mill Street Plant Brownfields Redevelopment, Ecorse MIXCRA973000	HC	2005	3	Non NPL	Ongoing
Old World Trade Center, Detroit MI0001094465	HC	1997	2	Non NPL	Ongoing
Packard Plant, Detroit MIR000037689	HC	1998	2	Non NPL	Ongoing
Proposed Beard Street School, Detroit MIXCRA704000	HC HC	2001 2002	3 5	Non NPL	Completed
Wholesale Russell/Mack MIXCRA327000, MISFN0507878	HC	1997	2	Non NPL	Completed
WorldMed Mercury, Detroit MIN000509958	HC	2006	2	Non NPL	Completed
Zonolite Co/W.R. Grace, Dearborn MIXCRA822000	HC	2005	2	Non NPL	Ongoing

1=Urgent Public Health Hazard, 2=Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard, 5=No Public Health Hazard

HA=Public Health Assessment, HC=Health Consultation, HV = Health Advisory, SRU=Site Review and Update, N.S. = Not Stated

The Wayne County sites are discussed first, followed by the Oakland County sites, which are relevant to the Clinton River AOC as well as to the Rouge River AOC.

3.8.1.1 Carter Industrials, Inc.

Metals and PCBs from electrical capacitors and transformers extensively contaminated this former scrap metal yard in Detroit (Wayne County) MI. PCB-laden sediment appeared in the sewers that drained the site, and that sewer effluent flowed into the Detroit River. As of 1992, PCB-contaminated surface soils from nearby properties had been piled onto the Carter site, and the piles of waste had been covered. The site was eventually fenced, and the transformers and barrels containing PCBs were removed. A surface water runoff collection and activated carbon treatment system was installed. U.S. EPA estimated that the total amount of PCBs in the onsite soils could have been as much as 17 tons. Information regarding this site is from ATSDR's 1992 public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: the 2000 U.S. Census reports the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,444
Females aged 15-44	3,199
Adults 65 and older	1,734

Public Health Outcome Data: The results of a 1986 Michigan Department of Public Health study of 235 blood samples from people living in the residential area surrounding the site showed no remarkably high PCB concentrations compared with the general population. Blood lead was checked in 60 subjects. Levels were higher than CDC's then-operable 25-µg/DL level of concern in 5 subjects; but 3 of them were 3 years or less in age and therefore unlikely to have been on the site.

ATSDR Conclusions: In 1992, ATSDR concluded that due to the presence of hazardous substances on the site and the difficulty of maintaining site security, this site was a *Public Health Hazard* (Category 2). Inhalation of PCB-contaminated fugitive dusts was considered a principal route of exposure—PCBs were, for example, found in particulates in the rain gutters of nearby homes. But that sampling appears to have preceded the removal of PCB-contaminated soil from yards adjacent to the site and the covers over the soil mounds. Although PCBs also were found in the storm sewers that drain the site and that empty into the Detroit River, the greatest concern was for trespassers' direct exposure to the onsite PBC-contaminated soil. Blood samples from nearby residents, taken before any remediation of either the site or the surrounding area, did not, however, indicate that the residents' exposures exceeded those of the general population.

U.S. EPA Update: U.S. EPA states in its October 2007 Carter Industrials, Inc. Fact Sheet that

> The site cleanup commenced in August 1996 and was completed by December 1996. During the negotiations for Remedial Design and Remedial Action, the potentially responsible parties would not agree to cleanup the 1.25 miles of combined sewers that were contaminated with as much as 20,000 ppm PCBs. They argued that there were other additional sources of PCBs to the sewers, and these parties should also be held liable. U.S. EPA refused to delete the site from the National Priorities List (NPL) until the sewer cleanup was completed. The respondents acquiesced, and the sewer line cleanup occurred during summer and fall 1996. The site was deleted from the NPL on March 25, 1997.

Success Story

> The Site was cleaned up and deleted from the NPL and the US EPA recovered most of the moneys that it had expended as well as securing the PRPs agreement to implement a $12 million cleanup.
>
> **Property Reuse**
>
> The site is ready for unrestricted re-use.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980274179.htm. 2007 Oct [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and lead were identified at this site. For a more complete listing of the hazardous substances found at the site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.2 EQ Resource Recovery Explosion and Fire

In 2005, a hazardous waste tank at the EQ Resource Recovery plant in Romulus (Wayne County) MI, exploded and burned. The explosion ignited fires in surrounding tanks. U.S. EPA assisted the local hazmat team with response activities and with containment assessments. As the fires were brought under control, U.S. EPA and the Wayne County Health Department requested an assessment of the air, soot, and fire-related debris. Michigan Department of Community Health and ATSDR provided toxicological expertise in assessing public health implications of the contamination. ATSDR and MDCH found that the explosion and fire at the facility posed an urgent public health hazard warranting an evacuation, which local officials in fact ordered. Today, however, concentrations of volatile organic compounds (VOCs) in the air, polycyclic aromatic hydrocarbons (PAHs) in soot, and metals in soot and debris posed no apparent short-term public health hazard. Additionally, any residual contaminant concentrations likewise posed no apparent current or future public health hazard.

ATSDR Conclusions: In 2006, Michigan Department of Community Health and ATSDR concluded that the August 2005 explosion at the EQ Resource Recovery facility posed an *Urgent Public Health Hazard* (Category 1). At the time, the fire and the sudden release of chemicals threatened the immediate safety and welfare of residents and businesses downwind from the site. Evacuation was prudent and necessary. Since 2006, however, VOCs and PAH levels have been below screening levels for short-term exposure, and weathering, together with cleaning, has removed much of the soot. While chemicals from soot may still be present in some residential yards, the concentrations should not pose a public health concern—metals did not exceed screening levels.

U.S. EPA Update: In the Onscene Coordinator Site File for EQ Resource Recovery Explosion and Fire, U.S. EPA states in part that

> Continuous air monitoring of the perimeter of the facility and in the neighborhood downwind of the facility was conducted utilizing Area Raes, which were monitoring for VOCs, hydrogen sulfide, carbon monoxide, oxygen and lower explosive limit. U.S. EPA [Superfund Technical Assessment & Response Team] START and [Response Engineering and Analytical Contract] REAC contractors continued investigating the residential area impacted by the plume by collecting four wipe samples from twenty residential properties, two from the upwind and downwind side facing the fire. The EPA-ERT laboratory analyzed the wipe forty samples (with additional samples for field and laboratory

blanks) for BNAs and metals. Laboratory results were shared with the health agencies, which determined that levels were below health concern.

Available at: http://epaosc.net/site_profile.asp?site_id=1785%20. [cited 2008 Jul 29]. See also the MDCH 2005 Sep 26 Fact Sheet on the EQ explosion at: http://www.michigan.gov/documents/EQ_Data_Results_Factsheet_137513_7.pdf [cited 2008 Oct 15].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PAHs was identified at this site.

3.8.1.3 Federal Marine Terminal Riverview

The 4-acre City of Riverview boat launch ramp is in Wayne County, MI, on the west bank of the Detroit River's Trenton Channel. The boat launch area comprises an asphalt-paved parking lot and three boat docks. Since 1951 and through the 1950s and 1960s, the Wyandotte Chemicals Corporation (now owned by Germany's BASF AG) used a 30-acre parcel north of the boat launch ramp to dispose of laboratory wastes, cinders, construction debris, rock, clay, and general plant refuse. In 1998, the Michigan Department of Environmental Quality (MDEQ) determined that past remedial actions were not sufficient to prevent migration of pollutants from the property, and particularly not sufficient to prevent contamination of the groundwater that discharged to the Detroit River. In 2003, as MDEQ and BASF were continuing negations about the proper remedy for the property, several studies of the BASF Riverview property established that the groundwater was heavily contaminated with metal, ammonia, cyanide, volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), polychlorinated biphenyls (PCBs), and chlorinated dibenzo-p-dioxins and dibenzofurans.

As stated, the groundwater from under the BASF property discharged directly into the Detroit River, upstream of the boat launch ramp. Arsenic, benzo(a)pyrene, dibenzo(a,h)anthracene, PCBs, and total dioxin total equivalencies (TEQs) at concentrations exceeding MDEQ residential direct contact criteria (DCC) were detected in sediment samples taken from the boat launch area. Data on human consumption of sport-caught fish showed that total dioxin TEQs were detected in surface water at concentrations above the applicable MDEQ ambient water quality criteria (AWQC). Consequently, mercury concentrations in Detroit River surface water near the boat launch presented a human health hazard via ingestion of sport-caught fish. Information on this site is taken from the ATSDR's 2003 health consultation.

ATSDR Conclusions: In 2003, ATSDR concluded that under current site conditions, sediment and surface water at the City of Riverview boat launch presented *No Public Health Hazard* (Category 5). Recreational ramp users would not be exposed to contaminants at levels expected to cause adverse health effects. Surface water samples taken from the Detroit River near the boat launch, however, exceeded the mercury water quality standard for human consumption of sport fish. And Detroit River fish samples contained levels of mercury possibly harmful to human health. Accordingly, the site posed a *Public Health Hazard* (Category 2). Fish consumption advisories were placed in river locations where state authorities recommended limits on the amount of fish eaten. Thus if existing fish advisories were followed, mercury concentrations in fish would not pose a health hazard.

U.S. EPA Update: The City of Riverview Boat Launch site is not a federal site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: On August 9, 2006, the Michigan Department of Environmental Quality entered into a Consent Order with BASF to conduct Interim Response Activities, including:

- removal of the contaminated sediments (completed January 31, 2007),
- installation of steel sheet pile to wall off the site from the Detroit River (completed January 31, 2007), and
- construction of a groundwater interception trench and a groundwater remediation system.

The groundwater system will be completed by September 30, 2008. After an initialization period, the system will be turned on and run indefinitely. BASF is required to submit progress reports to the MDEQ on a regular basis for the duration of the remedy. (Beth Vens, Michigan Department of Environmental Quality, personal communication, 2008 August 20).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B(a)P,dibenzo(a,h)anthracene, dioxins, PCBs, and mercury were identified at this site.

3.8.1.4 Ford Motor Co. Allen Park Clay Mine

Before 1956, the Ford Motor Company's Allen Park (Wayne County) MI, Clay Mine landfill was exclusively a clay mine. Beginning in 1956, Ford deposited wastes from its Rouge plant in the clay mine pits. U.S. EPA classified some of these wastes as hazardous (e.g., electric arc furnace dust and decanter tank tar sludge). From 1980 to 1986, Ford disposed of the hazardous wastes separately, depositing them in an onsite hazardous waste management area. By 1986, Ford also closed this area, expanded the site's leachate collection system, and covered the landfill areas with a clay cap. Information regarding this site is from ATSDR's 1994 public health assessment.

Public Health Outcome Data: The Michigan Cancer Foundation conducted two studies of cancer incidence for the communities surrounding the site, which ATSDR evaluated and followed up:

1983 Cancer Study: The occurrence of cancer from 1973 to 1981 was evaluated in two census tracts that comprised the Snow Woods area of Dearborn, MI. In comparison with rates for the City of Dearborn, for Wayne County, and for the tri-county area (Wayne, Oakland, and Macomb Counties), statistically significant excesses of cancer were brain cancer in both men and women and liver cancer in women. Because the neighborhoods were predominantly white, comparisons were made by age and sex for the white population only. Risk factors such as occupational history, smoking, alcohol use, and residential history were not taken into account.

1989 Cancer Study: This study followed up and expanded the 1983 effort. The study area grew to 10 census tracts in the communities of Snow Woods, Melvindale, and Allen Park, all of which surround the Allen Park Clay Mine. The data considered cancer occurrence from 1973 to 1986. The comparison communities were the City of Dearborn (excluding Snow Woods) and Wayne County (excluding the three study communities). Methods of comparison were similar to the 1983 study, except that telephone interviews with relatives collected information on brain cancer cases and on occupational, smoking, and residential histories. A review of cancer rate data for the comparison populations of City of Dearborn and Wayne County and for the study area revealed that the total number of study area cancer cases was lower than expected. The one higher-than-expected cancer rate was in Snow Woods residents, with 16 cases of brain cancer over the 14-year study period versus 6 expected. Although histories for 2 of the 16 cases could

not be determined, 9 of the 16 were found to have lived near the site for 20 years or more. All but one of the 7 men with brain cancer smoked, and 5 of the 7 had worked in occupations with exposure to car engine exhaust. One of the women with brain cancer smoked, and among the women, no consistent occupational history appeared.

ATSDR evaluated the two previous studies and concluded that from 1973 to 1986, the results indicate a consistent, higher-than-expected number of cases of brain cancer in Snow Woods. ATSDR then evaluated the current information (1973–1990) on the number of brain and liver cancers in the study area. From 1973 to 1990, a brain cancer rate excess did occur in Snow Woods, but liver cancer rates in all three study communities were comparable to those in Wayne County and to those in adjacent Macomb and Oakland Counties.

ATSDR concluded that the Allen Park Clay Mine site was not the cause of the excess brain cancers. No completed environmental and human exposure pathways were found for the site, the information about potential pathways did not indicate lead, and carcinogenic PAHs were not at concentrations that could account for an elevated brain cancer incidence. Some occupational exposures, however, might have been related to brain cancer.

ATSDR Conclusions: In 1994, ATSDR concluded that because additional information was needed to evaluate possible air exposure pathways, particularly with regard to past exposures to airborne carcinogenic PAHs, this site posed an *Indeterminate Public Health Hazard* (Category 3).

No completed exposure pathways for human populations have ever been identified, and the elevated occurrence of brain tumors seen in one of the communities near the site is not attributable to site contaminants. Remediation at this site has been completed.

U.S. EPA Update: The Ford Motor Co. Allen Park site is not a federal site. It is an ATSDR petition site and an operating facility under RCRA oversight.

Available at: http://oaspub.epa.gov/enviro/multisys2.get_list?facility_uin=110001102627. [cited 2008 Oct 8].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs and lead were identified at this site.

3.8.1.5 FWS-Detroit River International Wildlife (a/k/a Grassy Island)

Grassy Island is a 72-acre artificial island in the Detroit River, east of Wyandotte, MI. In 1959, the U.S. Army Corps of Engineers (COE) constructed a 6-foot confining dike around the island. Beginning in 1960, the Corps used the island as a repository for sediments from the Rouge River collected during maintenance dredging. The major industrial facilities along the Rouge River in the 1960s produced steel-fabricated metals, heavy chemicals, pulp and paper, cement, and meat-rendering products. The primary wastes released to the river were iron, oxygen-demanding materials, bacteria, suspended solids, oil, pickling liquor, phenols, chlorides, cyanides, toxic metals, and ammonia. Other Rouge River contaminant sources included sewage treatment plant effluent and stormwater outfalls. Over a 22-year period, some 3 million cubic yards of dredge materials were dumped onto Grassy Island. In 1987, the U.S. Fish and Wildlife Service (FWS) took over the management of Grassy Island, but FWS management only extended to posting signs on the property and conducting various surveys. In March, 2006, FWS requested assistance from the Michigan Department of Community Health (MDCH) to determine what public health issues, if any, the island contamination presented, currently or in the future. Information for this site is taken from ATSDR's 2007 health consultation.

ATSDR Conclusions: In 2007 ATSDR concluded that insofar as exposures to for persons who accessed the island no more than once a week, were concerned, of Grassy Island contamination posed *No Apparent Public Health Hazard* (Category 4). Exposure to the average concentration of the various contaminants in the soil was not expected to cause adverse health effects. Yet Grassy Island physical hazards remained: steep dike walls, treacherous riprap, and dense vegetation with no established foot-trails. The integrity of the dike walls remained in question, given that the exterior 6-foot dike was not built with engineering controls.

Because as of 2007 contaminant levels in deer taken from Grassy Island were not known, eating these animals posed an *Indeterminate Public Health Hazard* (Category 3). If, however, people adhered to the advice in the MDCH Family Fish Consumption Guide, eating fish taken from the Detroit River near Grassy Island posed *No Apparent Public Health Hazard* (Category 4).

The FWS placed and, as of 2007, maintained warning signs around the perimeter of the island. FWS was also working with MDEQ to address the contamination and to inspect the dike routinely to ensure its stability.

U.S. EPA Update: The FWS-Detroit River International Wildlife site is a non-NPL site classified as Federal-Facility Lead Cleanup. In July of 2008 the FWS stated that

> The Service is currently moving forward on plans to more fully characterize the risks from the identified contaminants and evaluate the feasibility of several approaches to both remediate contaminant risks and enhance long-term benefits of the area for fish and wildlife. The process the Service is using is the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) framework for conducting remedial activities.

Available at: http://www.fws.gov/midwest/GrassyIsland/ [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B(a)P, DDT, PCBs, lead and mercury were identified at this site.

3.8.1.6 Globe Building Property

Between 1884 and 1950, the Globe Building on Atwater Street in the City of Detroit housed various metals works and machine shops. Between 1950 and 1991, the building was a warehouse, but by 1999 it was abandoned. At some point, four 20,000-gallon underground storage tanks had been installed at the property. Although no information on installation dates was found, two of these tanks were removed in 1990. No available record indicates when the other two tanks were removed. The Globe Building Property and 107 surrounding parcels were historically used for industrial purposes and collectively comprised the 67-acre proposed Waterfront Reclamation and Casino Development Project.

ATSDR Conclusion: In 2005, ATSDR concluded that at the time of its evaluation the site presented an *Indeterminate Public Health Hazard* (Category 3) for future exposures. At the time a reclamation plan for the property had not been determined, environmental monitoring data was insufficient to rule out onsite contamination at levels of health concern, and the two 20,000-gallon underground storage tanks had not been located. Although onsite soils were contaminated with PAHs, PCBs, arsenic, cadmium, chromium, cobalt, copper, lead, and vanadium at levels above comparison values, these chemicals did not rise to levels of concern for short-term exposures. The abandoned onsite building did, however, contain asbestos.

U.S.EPA Update: The Globe Building Property site is not a federal site and is not included in the CERCLIS database. But see Brownfields 2007 Grant Fact Sheet. Available at: http://www.epa.gov/brownfields/07arc/r05_mi_detroit.htm [cited 2008 Nov 5].

3.8.1.7 Grand Haven Hamtramck

The I-75/Caniff Street "Grand Haven" Area is in the City of Hamtramck, MI, between Detroit and Highland Park and between Interstate 94 and Davison Highway. In the past, three metals smelters—Continental Metals, Federated Metals, and Commodity Metals—operated near this site. Commodity Metals was not on the original list investigated by Michigan Department of Environmental Quality (MDEQ), but U.S. EPA refers to the site as "Commodity Metals." Lead-based paint is a significant component of the onsite hazards. Information for this site is taken from ATSDR's 2006 evaluation.

Public Health Outcome Data: To determine the proportion of children with elevated blood lead levels (BLLs) in the I-75/Canniff area, existing data from 2000 to 2004 was compiled for children under 6 years of age. For the Hamtramck area (ZIP code 48212), 5050 children were tested. Of those, 444 (or 9%) confirmed cases of elevated BLLs were found. Within a ½-mile radius centered on the I-75/Caniff Street area, 755 children were tested. Of those, 79 (or 10.6%) confirmed cases of elevated BLLs were found. In these instances, however, several exposures were probably involved, including exposures to contaminated soil and lead-based paints.

Demographic Data: Children 6 years of age or under in the "Grand Haven" Area from the ZIP Code 48212 were tested for Blood Lead Levels (BLLs). The sensitive subpopulations include:

Children 6 years and younger	22,132
Females aged 15–44	Not Reported
Adults 65 and older	Not Reported

ATSDR Conclusions: In 2006, ATSDR concluded that ongoing exposure to lead in the "Grand Haven" area put residents—especially children 6 years of age and younger—at risk of lead-related health effects and therefore posed a *Public Health Hazard* (Category 2). The combined exposure to contaminated soil, lead-based paint, and other potential lead sources likely contributed to the elevated blood lead levels seen in Hamtramck residents of and in residents of surrounding areas. To be effective in lowering blood lead levels, remediation of contaminated soil and remediation of home environments should occur concurrently.

U.S. EPA Update: U.S. EPA identified this site as "Commodity Metals," CERCLIS number MIN000510097. In September 2006, U.S. EPA reported that

> Michigan Department of Environmental Quality tested soil in the area in 2003 and 2004 and found high lead levels. MDEQ asked for EPA's assistance in removing and replacing the contaminated soil. These current properties are expected to be finished this fall with additional work to be done next spring and summer.
>
> Before the additional work can be completed, however, EPA and MDEQ need help from residents within the project area *(see map back page).* Written permission is needed from the property owners before any tests or soil removal can be done. Samples are needed from around 150 yards in the area.

Available at: http://www.epa.gov/region5/sites/commodity-metals-fs-20060922.pdf [cited 2008 Nov 4]. See also Final Community Involvement Plan for the Commodity Metals Site, Hamtramck, Michigan, July, 2007. Available at: http://www.epa.gov/region5/sites/final_commoditymetals_cip_plan_20070726.pdf [cited 2008 Nov 4].

The Michigan Department of Community Health Update: In 2008, MDCH conducted a Program Assessment Rating Tool (PART) review for the site. Follow-up analysis of blood lead data indicated that fewer children were diagnosed as lead-poisoned but, due to multiple sources of lead, the site remained a *Public Health Hazard* (Category 2). The health consultation for the PART review is available at: http://www.atsdr.cdc.gov/HAC/pha/Grand%20HavenI75CaniffUpdate/GrandHaven%20HC%202-7-2008.pdf [cited 2008 Aug 22].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

3.8.1.8 Gratiot Trailer Park

The Gratiot Trailer Park was an abandoned 16-acre trailer park in northeast Detroit (Wayne County) MI, that devolved into a dumpsite. Together with three derelict buildings, 20 collapsed, overturned and burned trailers, a few vagrant cars and boats, deteriorated above-ground storage tanks, and illicitly dumped trash littered the grounds. The site was partially fenced, but access was not effectively restricted. Industrial properties, airport property, and a park adjoined the site. This information is from ATSDR's 1999 health consultation, conducted as part of a brownfields project.

ATSDR Conclusion: In 1999, ATSDR concluded that because of the physical hazards from the trash, trailers, tanks, and other debris, and the lack of effectively restricted access, this site was a *Public Health Hazard* (Category 2). Also, some contaminants in soil were present at concentrations high enough to be of concern. The abandoned buildings definitely contained asbestos in amounts that required removal, and likely contained lead paint. Exposure to soil containing antimony, arsenic, benzo(a)pyrene, copper, dibenz(a,h)anthracene, lead, manganese, or PCBs was also possible.

In general, trespassers were considered unlikely to be exposed to doses that would cause adverse health effects. If, however, the site were developed for residential use, exposure to these contaminants might pose health risks.

U.S. EPA Update: The Gratiot Trailer Park site is not a federal site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: The area around Gratiot Trailer Park is being redeveloped commercially. A new bank is on the northeast corner of the site. See http://www.maps.live.com [cited 2008 August 21]. The rest of the site has yet to be addressed. MDEQ lists the site as "Airport Trailer Park, Former." Available at: http://www.deq.state.mi.us/part201ss/sites.jsp?county=82&qby=city&city=detroit&pollutant=null&source=null&submit=Submit [cited 2008 August 28].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, lead, and B(a)P, were identified at this site.

3.8.1.9 Joy Road Dump/Holiday Park/Holiday Nature Preserve

The Joy Road/Holiday Park Dump is in the City of Westland (Wayne County) MI. Over time, this site was the recipient of unauthorized and undocumented household waste. Rainwater runoff flowed from the property into Tonquish Creek, which in turn emptied into the Middle Branch of the Rouge River, approximately 1 mile from the property. The site itself is an area within a park where unauthorized dumping of household waste occurred. The information on this site is from ATSDR's 2000 health consultation conducted as part of a brownfields project.

ATSDR Conclusions: Because of the physical hazards evinced by the rubbish and waste strewn about the site, as well as the lack of monitoring data, ATSDR categorized this site as a *Public Health Hazard* (Category 2).

U.S. EPA Update: The Joy Road Dump/Holiday Park/Holiday Nature Preserve site is not a federal site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: As of March 2008, remediation was complete (Southeast Michigan District office, MDEQ Remediation and Redevelopment Division, personal communication, March 2008).

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutant lead was detected onsite.

3.8.1.10 Lower Ecorse Creek Dump

This site was originally Ecorse River wetlands that drained into the Detroit River. Before development, the wetlands were filled with construction debris and other material. The site originally consisted of 11 residential lots, covering approximately 2.25 acres. Groundwater below the lots was shallow and, due to cyanide contamination, the soil was blue. Ferric ferrocyanide or Prussian blue dye was tentatively identified as the source of the unusual soil color. Eventually, the number of lots on the site grew to about 16. This information is from ATSDR's 1990 health consultation, 1993 public health advisory, and 1995 public health assessment, and from the 2008 EPA NPL site Fact Sheet.

ATSDR Conclusions: In the 1990 health consultation, ATSDR concluded that the levels of cyanide found in the onsite soils posed an *Urgent Public Health Hazard* (Category 1). In the 1993 public health advisory, because of cyanide levels found in the site's surface and subsurface soils, ATSDR again characterized this site as an *Urgent Public Health Hazard* (Category 1). A pair of ATSDR health consultations issued in 1994 advised U.S. EPA on specific issues, but did not identify any health hazard categories. In the 1995 public health assessment, however, ATSDR concluded that remedial actions had been completed, and at that time the site posed *No Apparent Public Health Hazard* (Category 4).

U.S. EPA Update: In its April 2008 Fact Sheet for the Lower Ecorse Creek Site, U.S. EPA stated in part that

> In late 1989, United States Environmental Protection Agency (U.S. EPA) covered the stained soil with clean top soil. In August 1993, Agency for Toxic Substances and Disease Registry (ATSDR) issued a Public Health Advisory on the hazards at the site, after the capping proved to be ineffective. In late 1993, U.S. EPA excavated about 100 cubic yards of the stained soil for disposal offsite and applied a sealant to the basement walls of the house where the contamination was originally found. U.S. EPA also made structural repairs to the walls, due to damage which may have been

caused by the acidic nature of the waste. The same excavation and repairs were performed at a residence across the street from the originally identified property. In 1993, U.S. EPA temporarily relocated the residents of one home while the basement was being waterproofed. The residents returned to the home, and the properties were restored to their original conditions. Following the emergency cleanup actions, ATSDR determined that the site no longer poses a health threat.

In March 1994, U.S. EPA began a Remedial Investigation and Feasibility Study (RI/FS) for the four-block area, surrounding the lots addressed in the removal. The studies were completed in July 1996 when a Record of Decision (ROD) was issued, calling for the excavation and offsite disposal of approximately 300 cubic yards of soil, contaminated with cyanide, arsenic and PAHs. This involved approximately 16 residential lots, including areas of contamination remaining on the lots addressed in the emergency cleanup actions. After two potentially responsible parties refused to comply with a Unilateral Administrative Order (UAO), issued in September 1996, U.S. EPA initiated a fund-financed Remedial Design and Remedial Action. The design was completed in August 1997.

On-site construction began in April 1998. In September 2000, all excavation and site restoration was complete. A total of approximately 3,000 cubic yards of contaminated soil were excavated and disposed of offsite. On July 13, 2001, U.S. EPA signed a ROD Amendment to address a layer of general refuse found in a park at the site. The ROD Amendment called for implementation of deed restrictions on the park property to prevent exposure of the waste material. The waste is located beneath three feet of clean soil.

In February 2002, U.S. EPA issued a UAO to the city of Wyandotte, requiring the city to implement the deed restrictions and maintenance of the soil cover in the park. The city has complied with the UAO. In May 2002, additional cyanide contamination was found beneath the porch of one home where work has previously been performed. In October 2002, U.S. EPA's contractor mobilized to the site, excavated the contamination, and waterproofed the basement wall. Drainage tile repair at the home was completed in February 2003.

The Superfund Final Close Out Report was signed on January 28, 2005. The site was deleted from the National Priorities List in July, 2005.

On June 1, 2006, U.S. EPA completed the first Five-Year Review for the site. The review specially addressed only the Park area of the site. The selected remedy for the Park area, institutional controls and monitoring and maintenance of the clean fill cover, was evaluated in the review. Institutional controls are legal or administrative controls which, in this case, protect the remedy and control the use of the Park area. U.S. EPA has a legal agreement with the City of Wyandotte, Michigan to implement the institutional controls and to maintain the clean cover.

As part of the Five-Year Review, U.S. EPA met with City of Wyandotte officials and performed an inspection of the site on March 23, 2006. U.S.

> EPA also performed a title commitment to determine if the institutional controls (restrictive covenants) are in place. Based on a review of all relevant documents, the results of the title commitment and the results of the site inspection, the remedy is functioning as intended by the 2001 Record of Decision Amendment #1. There are no changes in the physical conditions, standards or exposure pathways. Therefore, U.S. EPA considers the remedy to be protective because all remedial actions are protective of human health and the environment. The cover on the Park area remains in place and prevents exposure to underlying contamination.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID985574227.htm [cited 2008 Aug 20].

IJC-critical Pollutants Identified within ATSDR Document: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PAHs were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.11 Master Metals Inc. #2

From 1965 to 1983, the now-abandoned Master Metals property was used as a lead smelter. In the late 1980s, ferrous sulfate heptahydrate was produced on the property. The site (size not reported) is surrounded by industrial/commercial properties, a correctional facility, and a residential development. The information on this site is from ATSDR's 1997 health consultation conducted as part of a brownfields project.

ATSDR Conclusions: In 1997, ATSDR concluded that because of very high concentrations of lead (10,000–100,000 ppm) in surface soil on the property, this site was categorized as a *Public Health Hazard* (Category 2). Also, abandoned buildings on the property posed physical hazards from deterioration and partial collapse and from containers of laboratory chemicals, including but not limited to those labeled as sodium hydroxide pellets, hydrofluorosilic acid, carbon tetrachloride, nitric acid, and formaldehyde. Throughout the property high lead concentrations were found in soil. Trespassers and workers from the neighboring trucking operation who accessed the area for materials storage could, if they spent a major potion of the day on the property, incidentally ingest enough lead from soil to pose a health hazard. Also, cadmium levels in soil were sufficiently high that anyone who spent a major portion of the day on the property might incidentally ingest cadmium at doses of health concern.

As of 1997, the highly contaminated soil had not been cleaned up. Containers of hazardous chemicals were inside the deteriorating onsite buildings, which were not secure from trespassers. An adjacent firm used a portion of the site for materials storage. Nevertheless, in 2005, because of no human exposure and because of remediation of the offsite lead contamination, the site category was updated to *No Apparent Public Health Hazard* (Category 4).

U.S. EPA Update: The Master Metals #2 site is a non-NPL site for which no further remedial action is planned. Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 29]. See also Region Enters into CERCLA 106, 107 and 122 Administrative Order on Consent for Removal at Master Metals Site, Detroit, MI. Available at: http://www.epa.gov/reg5oorc/enfactions/enfactions2003/law-cercla.htm#masters. 2007 Sep 25. [cited 2008 Oct 29].

IJC-critical Pollutants Identified within ATSDR Documents. During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

3.8.1.12 Michigan Industrial Finishes (MIF)

Located at 9045 Vincent Street in the City of Hamtramck (Wayne County) MI, Michigan Industrial Finishes (MIF) manufactured industrial paint finishes in a mixed residential and light industrial area. In October, 2004, ATSDR determined that hazardous wastes stored on the MIF property presented an urgent public health hazard. Approximately 4,000 deteriorating or leaking drums containing paint and solvent wastes were stored onsite without protection from weather or fire. Tests showed that the waste material in these drums was ignitable, corrosive, or both. Information on this site is taken from ATSDR's 2005 health consultation.

ATSDR Conclusions: In 2005, ATSDR concluded that because of onsite physical hazards, the MIF site posed an *Urgent Public Health Hazard* (Category 1) in the past and a then-present *Public Health Hazard* (Category 2). Access to the site was not adequately restricted; the condition of the northeast gate and the west fence suggested that trespassers—particularly children—were in fact entering the site. These trespassers could have vandalized the barrels, which could have led lead to a fire or explosion. Additionally, contact with corrosive materials in drums stored outside the building could have posed a hazard. Consequently, at the time of the Department of Community Health site visit, VOC air contaminants emanating from the MIF property posed an *Indeterminate Public Health Hazard* (Category 3). Since production ceased at the MIF site, however, this pathway currently poses *No Public Health Hazard* (Category 5).

A removal action to address chemical drum disposal and contamination clean up was completed in June 2005.

U.S. EPA Update: In the (undated) Onscene Coordinator Site File for Michigan Industrial Finishes, U.S. EPA states that

> The U.S. EPA initiated a removal action at the MIF Site on December 6, 2004 to address the immediate threat to human health and the environment posed by the presence of the numerous 55-gallon drums, 250-gallon totes, mixing tanks, vessels, above ground storage tanks, and small containers on site. The removal action will involve the inventorying, characterization, removal, and disposal at approved disposal facilities of all identified hazardous materials from the site.

Available at: http://epaosc.net/site_profile.asp?site_id=B58W%20. [cited 2008 Jul 29]. See also U.S. EPA's January 2005 MIG Fact Sheet at http://www.epa.gov/region5/sites/mi-industrial-finishes200501.pdf [cited 2008 Oct 15].

IJC-critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants were identified at this site during ATSDR's assessment of exposure-related issues.

3.8.1.13 Mill St. Plant Brownfields Redevelopment

The Mill Street Plant Brownfields Redevelopment in Ecorse (Wayne County) MI, is a former 58-acre steel mill built in 1923. It remained in operation until the 1960s. The City of Ecorse planned to redevelop the site into an office complex and subdivision, with up to 30 new homes. In April 2004, the Michigan Department of Environmental Quality conducted a property reconnaissance to gather information for a redevelopment assessment sampling plan. During that reconnaissance MDEQ identified as physical hazards old buildings, storage tanks, a pump house, electrical transformers and a scale house. Information on this site is from ATSDR's 2005 health consultation.

ATSDR Conclusions: In 2005, ATSDR concluded that because of physical hazards present at the time, this site posed a *Public Health Hazard* (Category 2). As evidenced by the refuse and the graffiti, site access was not restricted. Still, people who did access the site were unlikely to remain there long enough to experience adverse health effects from exposure to elevated chemical concentrations. In July, 2004, the City of Ecorse began processes to improve the environmental safety of the site. The city agreed to follow through with MDEQ oversight to complete work as needed.

Although at the time of the assessment, the onsite environmental contamination—as opposed to the physical hazards—posed no apparent public health hazard, construction workers and future residents could be exposed to concentrations of chemicals in the soils. Such exposure could result in adverse health effects. Additionally, possible soil contamination under the buildings awaits assessment, and buried drums might remain on the property. Thus until the property is further characterized, onsite environmental contamination poses a future *Indeterminate Public Health Hazard* (Category 3).

U.S. EPA Update: The Mill St. Plant/Brownfields Redevelopment site is a state brownfields site and is not included in the CERCLIS database.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment the IJC-critical pollutants lead**,** PAHs**,** and mercury were identified at this site.

3.8.1.14 Old World Trade Center

The approximately 10-acre Old World Trade Center (a/k/a Kelsey-Hayes) property is a former industrial plant site in Detroit (Wayne County) MI. From 1955 to 1977, the Kelsey-Hayes Company machined cast-iron brake components in an onsite factory. After 1977 the remaining machinery and stock were removed and the factory buildings vacated. Parts of the buildings and property became flea markets, storage areas, and warehouses. Many thousands of drums, however, remained on the property. These drums contained corrosive, volatile, or flammable chemicals. Despite a substantial 1996 removal effort, many drums remained onsite—many were open, tipped over, or both. Spills and leaks were clearly evident. Information regarding this site is from ATSDR's 1997 health consultation conducted as part of a brownfields project.

ATSDR Conclusions: In 1997, ATSDR concluded that due to the physical hazards posed by the collapsing building, broken glass, and other debris, this site was a *Public Health Hazard* (Category 2). In addition, although soil concentrations of contaminants did not present an imminent health hazard, they were considered a potential long-term health hazard. Although area groundwater was not tested, it was not used for drinking water.

U.S. EPA Update: The Old World Trade Center site is a targeted brownfields assessment site. Available at: http://oaspub.epa.gov/enviro/fii_query_dtl.disp_program_facility?pgm_sys_id_in=MI0001094465&pgm_sys_acrnm_in=CERCLIS. [cited 2008 Nov 18].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment, the IJC-critical pollutants lead and B[a]P were identified at this site.

3.8.1.15 Packard Plant

The Packard Plant property was a complex of buildings in Detroit (Wayne County) MI, where from 1907 to 1956 automobiles and trucks were manufactured. Beginning in 1960, the property was transformed into an industrial park. But large sections remained vacant and subject to

continued deterioration and trash accumulation. The information regarding this site is from the ATSDR's 1998 health consultation, conducted as part of a brownfields project.

ATSDR Conclusions: In 1998, ATSDR concluded that because of the physical hazards from the waste materials (including old tires and bundled plastic) and the decay of the buildings, this site was a *Public Health Hazard* (Category 2).

The old factory buildings were saturated with lead-based paint and asbestos-based insulation. Proper handling of these materials was necessary to prevent exposure to workers or nearby residents. Concentrations of lead in soil were within the range typically found in urban areas near buildings the age of the Packard buildings. Paint chips collected within the complex during a July, 1997, site inspection visit contained lead.

U.S. EPA Update: The Packard Plant site is an inactive RCRA site for which no further remedial action is planned.

The Michigan Department of Community Health Update: The Michigan Department of Environmental Quality (MDEQ) began an interim remedial response in 1998, however legal issues with the City of Detroit halted the activities in 1999. Following court litigation, the land reverted back to City of Detroit ownership. The city requested that funding for the site be redirected to another remedial project of higher priority. The MDEQ granted the request, informing the city that a new application for funding would be required when the city chose to continue the remedial work at the Packard Plant. At least 32 buildings remain onsite, with abatable quantities of asbestos, lead paint, capacitors, and flooring impacted with PCBs. A large tank battery occupies the northwestern end of the site (Patricia Thornton, MDEQ Remediation and Redevelopment Division, 2008 Aug 13 email).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues the IJC-critical pollutants PCBs and lead were identified at this site.

3.8.1.16 Proposed Beard Street School/New Beard Elementary School

The New Beard Elementary School site was a 6.45-acre property in Detroit (Wayne County) MI, with a long history of industrial use. Not surprisingly, this industrial use resulted in soil contamination. The information on this site is from ATSDR's 2001 and 2002 health consultations conducted as part of a brownfields redevelopment assessment.

ATSDR Conclusions: In 2001, because subsurface soil samples contained contaminants at levels potentially of health concern and because adequate data on surface soil were unavailable, ATSDR concluded that this site was an *Indeterminate Public Health Hazard* (Category 3). But after a review of the additional soil data obtained subsequent to the original assessment and after taking into account the physical barriers to exposure, ATSDR concluded in 2002 that the property posed *No Public Health Hazard* (Category 5).

During ATSDR's assessment, PCBs, B(a)P, and lead, as well as other contaminants including arsenic, were identified at this site. Site remediation included removal of the existing surface soil, removal of remaining PCB-contaminated soil, and installation of a site cap on all areas of the site not covered by pavement or by the school's slab foundation. The contaminants remaining in the soil under the cap/pavement/slab at concentrations exceeding health-based screening values were arsenic, B(a)P, and cyanide. ATSDR determined that because extensive barriers had been installed that would prevent human exposure now and in the foreseeable future, no exposure pathway had been completed.

U.S. EPA Update: The Proposed Beard Street School site is a state brownfields site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: The school has been renamed as the Roberto Clemente Learning Center. Under a Due Care Plan approved by the Michigan Department of Environmental Quality, the Detroit Public Schools must conduct monthly inspections of the site cap, paved areas, the concrete building floor, and other exposure barriers to ensure that these barriers remain effective. Repairs to the exposure barriers are completed as necessary. Monthly, annual, and site repair reports are submitted to the Michigan Department of Environmental Quality for continued oversight (Patricia Thornton, Michigan Department of Environmental Quality, personal communication, 2008 August 19). See also Environmental Justice Case Study: Beard Elementary School Sitting on Contaminated Property. Available at: http://www.umich.edu/~snre492/Jones/beard.htm [cited 2008 Oct 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B[a]P, PCBs, and lead were identified at this site.

3.8.1.17 Wholesale Russell/Mack

The Wholesale Russell/Mack property is a former industrial and residential block in Detroit, (Wayne County) MI. All buildings have been removed; the surrounding area was primarily industrial and commercial, but one block contained condominiums. The information on this site is from ATSDR's 1997 health consultation conducted as part of a brownfields project.

ATSDR Conclusions: In 1997, ATSDR concluded, primarily because of the health risks from decay and from disease-carrying insects and rodents attracted to food waste dumped on the property, that this site was a *Public Health Hazard* (Category 2). Chemical contamination in one area of the property was also of concern.

U.S. EPA Update: The Wholesale Russell/Mack site is a state brownfields site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: The site has subsequently been redeveloped for commercial use and no longer presents a health hazard (Patricia Thornton, MDEQ Remediation and Redevelopment Division, personal communication; 2008 Aug 19).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B[a]P, DDT, lead, mercury, and PCBs were identified at this site.

3.8.1.18 Worldmed Mercury Spill Site

In June 2005, the Detroit, MI-based nonprofit World Medical Relief (WMR) discovered mercury in its office building. The beads and pools of mercury had originated from past breakages of medical devices. WMR hired an environmental contractor to remove the visible mercury beads, and the Michigan Department of Community Health (MDCH) offered to screen the cleaned-up area.

The first measurements revealed a breathing zone average mercury concentration 10 feet outside a closed door of 22,000 ng/m^3. Inside the room, the levels rose to 50,000 ng/m^3 and continued to climb. The floor of the building had very few windows. After MDCH sealed the room, it contacted the U.S. EPA and mobilized a team to screen the building. Mercury vapor concentrations inside the room ranged from 20,000 to 200,000 ng/m^3. U.S. EPA determined that

removal was necessary. After completion of removal operations, the reported breathing zone levels ranged from 1000 to 3200 ng/m^3 in the equipment room and from 1,800 to 24,000 ng/m^3 in the adjacent areas. WMR was advised to seal the floor to suppress residual mercury vapor sources and, in the winter, to do follow-up screening. WMR offered free mercury urine testing for its employees; of the 22 persons tested, 3 had detectable levels. Information on this site is from ATSDR's 2006 health consultation.

ATSDR Conclusions: In 2006, ATSDR concluded that the mercury vapor levels measured in the WMR equipment storage and repair room posed a *Public Health Hazard* (Category 2). In addition, the vapors emanating from the room could result in unacceptable air concentrations at a distance therefrom, especially when one or both doors were open. The scarcity of windows and the lack of other outside, fresh-air sources exacerbated the indoor air quality. A February, 2006, follow-up sampling indicated an average concentration in the breathing zone was still about 1000 ng/m^3, with floor level readings of from 1000 ng/m^3 to 24,000 ng/m^3. As of March, 2006, the room was not actively used—but to prevent track-out, anyone who entered had to wear shoe covering.

U.S. EPA Update: In the Onscene Coordinator Site File for the World Med Mercury Spill site, U.S. EPA states that

> At the request of the Michigan Department of Community Health, U.S. EPA responded to a mercury spill at the World Medical Relief building in Detroit. The removal was completed on July 22, 2005.

Available at: http://epaosc.net/site_profile.asp?site_id=1777%20. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant mercury was identified at this site.

3.8.1.19 Zonolite Co/WR Grace

The site was the former W.R. Grace (WRG) plant in Dearborn (Wayne County) MI. The 2.72-acre site at 14300 Henn Street consisted of a single 16,000-square foot building in which vermiculite was processed into attic insulation and into lightweight concrete and aggregate. The original site included a railroad spur where vermiculite was off-loaded, as well as two storage silos, exfoliation furnaces, and bagging/processing space. This plant probably began processing vermiculite in the early 1950s and continued until its 1989 closure. Die, Mold & Automation Components, Inc. (DMACI) currently owns the site, at which it produces N-Forcer nitrogen gas springs and wear plates. DMACI began operations in a light industrial facility west of WRG, but in 1992 expanded onto the former WRG property. The storage silos and exfoliation furnaces formerly on the site have been dismantled, and the railroad spur is no longer used. A walk-through revealed no evidence of the exfoliation process anywhere on the property. As of 2005, because of the high volume of vermiculite processed there and the high levels of Libby asbestos (LA) fibers likely released during the exfoliation process, the WRG Dearborn plant was under study as a part of the National Asbestos Exposure Review (NAER) Phase I investigation. Information from this site is taken from ATSDR's 2005 health consultation.

ATSDR Conclusions: In 2005, ATSDR concluded that this site posed a *Public Health Hazard* (Category 2). The Michigan Department of Community Health (MDCH) concluded that former workers at the WRG Dearborn plant were exposed to airborne levels of Libby asbestos (LA) above then-current occupational standards. Consistent and repeated exposure to airborne LA at these elevated levels would increase the risk of asbestos-related diseases and therefore also posed a public health hazard to former employees. If former workers did not shower or change clothes

before leaving work, they might have exposed household members to asbestos fibers. Although data are insufficient to assess household contact exposure, these contacts were likely exposed.

Thus without question this pathway posed a past public health hazard. Moreover, before ACM was removed in December 2003, its presence within the main building posed an indeterminate public health hazard to then-current workers there. Likewise, exposure of household contacts of DMACI workers before December 2003 posed an indeterminate public health hazard. This pathway has likely been eliminated and now represents no apparent health hazard to workers or their household contacts; efforts to verify this conclusion are, however, ongoing. Areas of residual LA contamination remain in the onsite soil of the former WRG facility. In 2005, exposure of workers, visitors, trespassers, and contractors to LA-contaminated soil posed an indeterminate public health hazard. Subsequent changes in the condition or use of the property may, however, exacerbate onsite exposure.

For the community surrounding the Dearborn site, ATSDR concluded that residents near the site during the time the plant processed Libby vermiculite could have been exposed to LA fibers by disturbing or playing in onsite soil or waste piles, by breathing in plant emissions, by handling waste rock brought home for personal use, or by breathing in from one or more outside sources indoor household dust that contained Libby asbestos. But insufficient information is available to determine whether these exposures occurred, how often they occurred, or what concentrations of airborne LA may have been present during potential exposures. Because critical information is lacking, these past exposure pathways for community members are considered an indeterminate public health hazard. As of 2005, plans to sample in the surrounding neighborhood were ongoing and could have led to a reevaluation of this hazard category as appropriate.

In any event, the Dearborn plant no longer processes vermiculite onsite. The pathways for current or future community exposure to airborne LA from facility emissions and to onsite piles have been eliminated, but an indeterminate public health hazard remains from onsite soil. Moreover, a small but potential risk still remains from residual vermiculite contamination in the onsite soil, either from offsite soil migration or from resident exposure to the DMACI property's unrestricted areas. As of 2005, plans to perform sampling in the surrounding neighborhood were ongoing and again, could have led to a reevaluation of this hazard category. As of the date of this report, however, no reevaluation had occurred.

For present and future community members, residential indoor exposure to LA fiber-laced household dust from past plant emissions or from waste rock brought home for personal use is classified as no apparent public health hazard. As stated, a small but potential risk remains that the residual vermiculite contamination in the onsite soil could migrate off-site. The planned sampling in the surrounding neighborhood could also have led to a reevaluation of this hazard category.

As of the 2005 health consultation, community residents could have been exposed to airborne LA from waste rock used as fill material, as a garden additive, or as driveway pavement. Because, however, insufficient information was available to determine the extent of the use of waste material in the community, this exposure pathway remains an indeterminate public health hazard. Still, As with the indeterminate public health hazards referenced earlier, ongoing interviews and data collection from the neighborhood could result in a reevaluation of this hazard category.

U.S. EPA Update: As of the date of this report U**.**S**.** EPA was conducting a removal action at the Zonolite Co/WR Grace site**.** Available at: http://epaosc.net/site_profile.asp?site_id=1498%20. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site.

Table 3.8-B. Hazardous Waste Sites in Oakland County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remediation Status*
Cemetery Dump, Rose Center MID980794663	HA HA	1988 1992	3 4	Deleted from NPL	Completed
Continental Aluminum Corp., New Hudson MI0001941699	HC HC	2003 2006	3 5	Non NPL	Active site; RCRA supervised
Hi-Mill Manufacturing Co., Highland MID005341714	HA	1991	3	NPL	Completed
J & L Landfill, Rochester Hills MID980609440	HA HA SRU	1989 1993 1996	3 4 5	NPL	Completed
Rose Township Dump, Rose Township MID980499842	HA	1988	3	NPL	Ongoing
Springfield Township Dump, Davisburg MID980499966	HA	1988	3	NPL	Completed

3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard, 5=No Public Health Hazard

HA=Public Health Assessment, HC=Health Consultation, SRU=Site Review and Update

3.8.1.20 Cemetery Dump

The 10-acre Cemetery Dump, located ½ mile south of Rose Center in Oakland County, MI, is a former sand and gravel pit where illegal activities included burial of an estimated 250 barrels of industrial hazardous wastes. In 1988, these drums and the surrounding contaminated soil were excavated and disposed of at a RCRA-approved landfill. Information regarding this site is taken from the ATSDR's 1992 public health assessment.

Demographic Data: 1990 census data cited in the health assessment showed that approximately 1,000 persons resided within 1 mile of the site.

ATSDR Conclusions: This site was originally categorized as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent 1992 health assessment concluded that the site posed *No Apparent Public Health Hazard* (Category 4). Several rounds of residential

and onsite well monitoring that began in 1981 and continued through 1989 (post-remediation), did not detect elevated contaminant levels. The IJC-critical pollutants PCBs and lead, as well as benzene, were detected in the contents of some of the deteriorated drums and contaminated soil. Still, concentrations were not exceptionally high, and those materials were removed during site remediation. In the sampled groundwater, no contaminants were detected. After remediation in April, 1995, the site was deleted from the National Priorities List (NPL).

U.S. EPA Update: In its September 2006 Fact Sheet the U.S. EPA stated that

> In 1985, the state selected a remedy to control the source of the contamination by excavating approximately 250 drums and drum fragments and 10,000 cubic yards of contaminated soils. These drums were disposed of at a federally-approved facility. A fence was installed in 1988, to limit public access. The state completed the cleanup activities in 1989.
>
> In 1989, the state, after extensive sampling and analysis, determined that the removal of the source of contamination had corrected the soil and groundwater contamination; therefore, "No Further Actions" were required. The state monitored the groundwater for five years after completion of the cleanup activities to ensure there were no further health threats to the public or the environment. No contaminants were detected in the groundwater sampled. The site was deleted from the National Priorities List on April 19, 1995.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980794663.htm. 2006 Sep [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, 4,4' –DDE,, and polychlorinated biphenyls (PCBs – including Aroclors 1242, 1248, 1254, and 1260) were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.21 Continental Aluminum Company

The Continental Aluminum Corporation (CAC) is an active New Hudson (Oakland County) MI, aluminum recycling foundry. As such, it reports its releases through TRI—its 2001 TRI data are included in this report. Residential communities are north, northeast, and southwest of the plant, and an elementary school is ½ mile northeast. Information regarding this site is from ATSDR's 2003 and 2005 health consultations.

ATSDR Conclusions: As of the dates of the health consultations, levels of chemical emission during possible high release events (i.e., odor events) had not been determined. But a potentially exposed population was present, and a plausible relationship was established between community health concerns and the chemicals released by the facility. Consequently, in 2003 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In 2005 the site was reclassified as *No Public Health Hazard* (Category 5).

The Michigan Department of Environmental Quality's (MDEQ) stack testing and air dispersion modeling indicated that emission of chlorine, hydrogen chloride, and hydrogen fluoride were below health-based screening levels for air. But these data were determined inadequate—during odor events, concentrations could have been higher. In addition, at the time the modeling

occurred, emissions data for other chemicals had not been provided for evaluation, including the IJC-critical pollutants PCDDs and PCDFs.

But health effects reported by community members appeared episodic; they could, for example, have occurred during breaches of CAC's pollution control devices. Reported health effects included mucous membrane irritation, nose bleed, sore throat, coughing, breathing difficulty, burning eyes, headache, and nausea. During odor events, a metallic or varnish taste and burnt plastic odor was also reported.

In 2005, ATSDR concluded that although CAC had emitted aluminum, barium, beryllium, cadmium, chromium, copper, lead, manganese, and selenium into ambient air, the levels were not of health concern. Consequently, the site posed *No Apparent Public Health Hazard* (Category 4).

U.S. EPA Update: Continental Aluminum is an ATSDR petition site that does not appear in the CERCLIS database. U.S. EPA has taken no regulatory action at this site.

The Michigan Department of Community Health Update: Following the health consultation conducted in 2006, which concluded in a finding of *No Apparent Public Health Hazard* (Category 4), there has been no further state health department involvement at this site.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and mercury were identified at this site.

3.8.1.22 Hi-Mill Manufacturing Company

On a 4½-acre site west of Highland Township (Oakland County) MI, Hi-Mill Manufacturing Company has since 1946 fabricated tubular aluminum, copper, and brass components for the air conditioning and refrigeration industries since 1946. The Hi-Mill site borders on a state recreation area and is adjacent to a pond and wetlands that may connect to Waterbury Lake. Before 1983, the company used spray evaporation to dispose of some pickling wastewater, but also deposited quantities of that wastewater in an onsite seepage lagoon. After October 1983, however, Hi-Mill's waste disposal methods shifted to recycled rinse water and—after neutralization and storage in underground tanks—offsite disposal in a RCRA-approved hazardous waste facility.

Elevated levels of chromium, aluminum, copper, nickel, and zinc were detected in the onsite seepage lagoon water and sludge. The contaminated water, sludge, and adjacent soil were thereafter removed. The lagoon was filled with sand, and in 1988 the pickling operation was eliminated. The information regarding this site was taken from ATSDR's 1991 health assessment.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	138
Females aged 15–44	292
Adults 65 and older	167

ATSDR Conclusions: In 1991, ATSDR concluded that due to 1) the potential human health threat from exposure to contaminants, and 2) the inadequate contaminant-level and exposure-duration data, this site posed an *Indeterminate Public Health Hazard* (Category 3). Trichloroethylene at concentrations above the U.S. EPA drinking water standard was found in

onsite wells used for the plant's drinking water and manufacturing processes. Because of complaints about the quality of the well water before the trichloroethylene discovery, the employees received bottled water. Well water was, however, still used for other purposes until the end of 1988, at which time all the wells were sealed. Thus before 1988, inhalation and dermal exposures to trichloroethylene were possible. Onsite monitoring of the shallow groundwater aquifer showed that groundwater concentrations of trichloroethylene and chromium did exceed U.S. EPA drinking water standards, but the shallow aquifer was never used for drinking water. Moreover, area residential drinking water wells were never contaminated.

In November 1983, Hi-Mill removed from its site 142 cubic yards of contaminated soil; 34,400 gallons of contaminated sludge; and 63,300 gallons of contaminated water. The lagoons were backfilled with clean sand. In 1989, a new well was installed to provide Hi-Mill employees with safe drinking water. Nevertheless, on February 21, 1990, the site was placed on the U.S. EPA's National Priorities List. Between 1989 and 1992, Hi-Mill conducted a remedial investigation (RI) and feasibility study (FS) under an earlier, 1988 Administrative Order on Consent. On September 28, 1993, U.S. EPA issued a ROD, which, to prevent use of the shallow groundwater beneath the Hi-Mill property, required 30 years of groundwater monitoring and institutional controls. A Consent Decree was entered on December 7, 1994, and institutional controls put in place on December 22, 1994. Quarterly monitoring of groundwater began in October 1995. In July, 2000, U.S. EPA approved the PRP's request for a monitoring reduction.

U.S. EPA Update: In its April 2008 Fact Sheet for the Hi-Mill Manufacturing site, the U.S. EPA stated that

> In September 2005, U.S. EPA evaluated site conditions and reviewed the 1993 cleanup decision to make sure the decision continued to be effective. The conclusions of this review were that the cleanup decision continues to be protective of human health and the environment in the short-term. To be protective in the long term, use restrictions to prohibit the use of contaminated groundwater that has migrated beyond the Hi-Mill property boundaries will need to be implemented. In addition, additional monitoring wells in the intermediate aquifer will be installed to ensure that the groundwater is being adequately monitored.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID005341714.htm. 2008 Apr [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Document: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and mercury were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.23 J & L Landfill

The J & L Landfill in Avon Township (Oakland County) MI, is one of several landfills interspersed through that area of the county. Two landfills are adjacent to the site, and at least seven others are within ½ mile. The 17-acre J & L site was originally mined for sand and gravel. Beginning in 1951, however, the pits became disposal sites for slag from steel manufacturing and for other wastes, then and later for dust from electric arc furnace operations. By 1980, the site had been filled to grade, and the landfill was closed. This landfill holds an estimated 455,000 cubic yards of material. Drainage ditches from the site eventually flow into the Clinton River, 1 mile northeast.

As of 1993, the landfill had no liner and had an inadequate clay cap. Subsequent remediation included an improved cap, new fences, and restriction of groundwater use. The information regarding this site is from ATSDR's 1989 and 1993 public health assessments, a 1996 ATSDR Site Review and Update, and the 2003 U.S. EPA NPL Fact Sheet and Record of Decision (ROD).

Demographic Data: The 2000 U.S. Census reports the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	489
Females aged 15–44	997
Adults 65 and older	346

ATSDR Conclusions: In 1989, metals were found in waste piles, but no data were available to evaluate possible exposures. Consequently, ATSDR categorized the J & L Landfill site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). After site access was restricted and institutional controls implemented for groundwater use in the site area, ATSDR concluded in 1993 that the site posed *No Apparent Public Health Hazard* (Category 4). Site contaminants included alpha-chlordane, arsenic, benzene, lindane, manganese, and thallium. A subsequent 1995 ATSDR Site Review and Update concluded that although trespassers could contact contaminants in soil, exposures were not likely to exceed health concerns. Vegetation on the contaminated areas should help to decrease exposure as well. Through adequate landfill caps and fences and through groundwater use restrictions, the site has been remediated.

U.S. EPA Update: The November 2007 U.S. EPA Fact Sheet for the J & L Landfill states in part that

> Construction activities to address the soil contamination issues were completed in summer 1997. A "No Action" Record of Decision was signed on September 30, 1997, documenting that no action was required to address the groundwater. A water supply survey was completed during 2000 to locate potential candidates for public water hook-up. A five-year review was signed on September 10, 2001, and found that the remedy remains protective of human health and the environment. A public water supply extension was completed in August 2002. LTV Steel, the only PRP at the J&L Landfill Site, completed bankruptcy court procedures in August 2003. Based on the bankruptcy, USEPA received a cash settlement to continue work on the Site operation and maintenance program. A second five-year review was completed in August 2006.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980609440.htm. 2007 Nov [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Document: During ATSDR's assessments, the IJC-critical pollutants DDT and PAHs were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.24 Rose Township Dump

The Rose Township Dump (Rose Township/Demode Road site) is another 110-acre landfill, this one in the northwest corner of Oakland County, MI. From 1966 to 1968, paint sludges and other wastes from Detroit area industries were discharged onto surface soil and into shallow lagoons.

Some waste-filled drums were buried onsite, others simply left on the surface. In 1988, ATSDR conducted a public health assessment, the source of much of the information presented here.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	66
Females aged 15–44	138
Adults 65 and older	41

ATSDR Conclusions: In 1988, because of limited offsite monitoring, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). Soil and water were contaminated with metals, PCBs, VOCs, ketones, phthalate esters, and pesticides. And because the area depended on groundwater for its potable water needs, future exposure was possible.

U.S. EPA Update: In its February 2008 Fact Sheet regarding the Rose City Dump site, the U.S. EPA stated in part

> The Agency, in consultation with MDEQ, completed the first five-year review of the cleanup in September 1997, the second five-year review in June 2002, and a third five year review in June 2007. Based on the data review between 2002 and 2007, the Agency and MDEQ determined that additional monitoring wells were necessary to evaluate migration of the contaminant plume and possibly reconfigure the groundwater extraction system. Specifically, in 2006, an independent EPA capture zone analysis, along with data from wells at the edge of the plume, showed that complete capture is not occurring.
>
> Steps have been taken to optimize the pumping capacity of the groundwater extraction system to achieve complete hydraulic capture. Extraction wells were fitted with larger pumps and pumping rates were increased. Data and subsequent capture zone analysis is underway to determine if the optimization of the groundwater extraction system, noted above, is successful in achieving complete capture. This analysis is expected to be completed by June 2008.
>
> To date, the groundwater extraction system has treated over 441 pounds of VOCs.
>
> Vinyl chloride had been consistently detected in one residential well and to mitigate this problem, a treatment system was installed at that residence in April 2005. The treatment system has been successful in treating the vinyl chloride concentration to non-detectable levels.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980499842.htm. 2008 Feb [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Document: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and mercury were identified at this site. For a more complete listing of the hazardous substances found at this site**,** please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.1.25 Springfield Township Dump

Another in a series of Oakland County, MI, industrial waste repositories, this 4-acre site is approximately 35 miles northwest of Detroit. During a 2-year period between 1966 and 1968, dumpsite patrons poured liquid wastes and sludges into a site pit and left some 1,500 drums on the site grounds. Drum contents included paint sludges, solvents, PCBs, oils, and grease. In 1979–1980, the drums were removed and disposed of offsite. In 1983, another 711 tons of contaminated soil were removed for offsite disposal. Fences restricted public access to the site, and no signs of trespass were evident. The information on this site is from ATSDR's 1988 public health assessment and from the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this NPL site:

Children 6 years and younger	149
Females aged 15–44	278
Adults 65 and older	65

ATSDR Conclusions: In 1988, ATSDR concluded that because of the lack of monitoring data for a potential exposure pathway and because consumption of potentially contaminated wildlife posed a possible health risk, this site was an *Indeterminate Public Health Hazard* (Category 3). Onsite soil was contaminated with the IJC-critical pollutants PCBs and lead, as well as other contaminants, including VOCs and cadmium. Still, no exposure pathway was completed for soil and sludges, and offsite monitoring indicated no significant migration to adjacent wetlands. Moreover, although trichloroethene and 1,1-dichloroethene contaminated onsite groundwater in the former disposal pit area, no site-related chemicals appeared in offsite monitoring and domestic wells. But given the apparent direction of groundwater flow toward a cluster of residences northeast of the site, future migration to residential wells was possible, and . Because of the potential for some of the site contaminants to bioaccumulate (e.g., PCBs), ATSDR was concerned about the lack of data regarding contaminant levels in game animal tissues.

U.S. EPA Update: In its October 2006 Fact Sheet for the Springfield Dump site, U.S. EPA stated in part that

> The PRPs began installation of the ISVE [in-situ soil vapor extraction] equipment in May 2000. In addition, the PRPs decided to construct and operate an air sparging system to augment the groundwater pump and treat system in an effort to speed up the restoration of the groundwater at the site. The ISVE and air sparging equipment installation was completed in early August 2000 and the PRPs began operating the systems shortly thereafter. U.S. EPA conducted an inspection of the SVE and air sparging systems on August 22, 2000, and determined that the systems were operating as designed, thus the Springfield site remedial action qualifies as construction complete.
>
> In October 2003 the PRPs submitted a supplemental remedial action workplan outlining a proposal to use in-situ chemical oxidation (ISCO) to accelerate the breakdown of VOCs in the groundwater. ISCO has emerged as a cost-effective and viable remediation technology for the treatment of VOCs in groundwater, soils, and sediments. Complete decomposition to carbon dioxide and water is the desired endpoint of an ISCO process. The ISCO process was completed in 2005.

A five-year review for the Springfield site was completed in 2004 and can be found at: http://www.epa.gov/region5/superfund/fiveyear/fyr_index.html. Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980499966.htm. 2006 Oct [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, dieldrin, polychlorinated biphenyls (PCBs— including Aroclor 1242, 1250, and 1254) and polyaromatic hydrocarbon (PAH)-fluoranthene were identified. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.8.2. Summary and Conclusions for the Rouge River AOC

Two Michigan counties, Wayne County and Oakland County, are relevant to this AOC. Oakland County also includes the Clinton River AOC (Section 3.9).

3.8.2.1 Hazardous Waste Sites

Wayne County: ATSDR assessed 19 waste sites in Wayne County. Remedial activities have been completed at 10 of these sites. At eight of the sites, remediation is ongoing. The remaining site is an active site under RCRA oversight.

Oakland County: Of the six Oakland County sites, four have undergone remediation. No evidence indicates that humans were exposed to site-related contaminants at levels of concern. Groundwater at one site is, however, still undergoing extraction and treatment.

3.8.2.2 TRI Data

In 2001, onsite TRI releases in Wayne and Oakland Counties (combined) totaled 24,621,119 pounds, primarily to air and land. Wayne County accounted for 89% and Oakland County accounted for 11% of the total onsite releases. See Table 3.8-C.

Of the total onsite releases, 1,693,551 pounds (6.9%) were IJC-critical pollutants, mainly PCBs and lead compounds. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to air), and PCBs, lead and lead compounds, mercury and mercury compounds, toxaphene, and hexachlorobenzene (primarily to land).

The major releases (≥ 500,000 pounds) of non-IJC-critical chemicals were of hydrochloric acid aerosols, xylenes, certain glycol ethers, n-butyl alcohol, and toluene (primarily to air); and nickel compounds, selenium, and arsenic compounds (primarily to land). Facilities that released these pollutants are listed in Table 3.8-D.

3.8.2.3 NPDES Data

The NPDES permitted discharges for Wayne and Oakland Counties, MI are summarized in Table 3.8-E. The average annual permitted discharges in 2004 totaled 4,665,607 pounds, mostly phosphorus. Ammonia nitrogen also was permitted to be discharged in substantial amounts (approximately 602,000 pounds).

The IJC-critical pollutants PCBs (0.08 pound), lead (approximately 5530 pounds), and mercury (102 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 3.8-E.

3.8.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired beneficial uses. PCB contamination has resulted in fish advisories in portions of all branches of the Rouge River. Lakes and impoundments also have advisories for mercury contamination, reported to be a region-wide problem. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

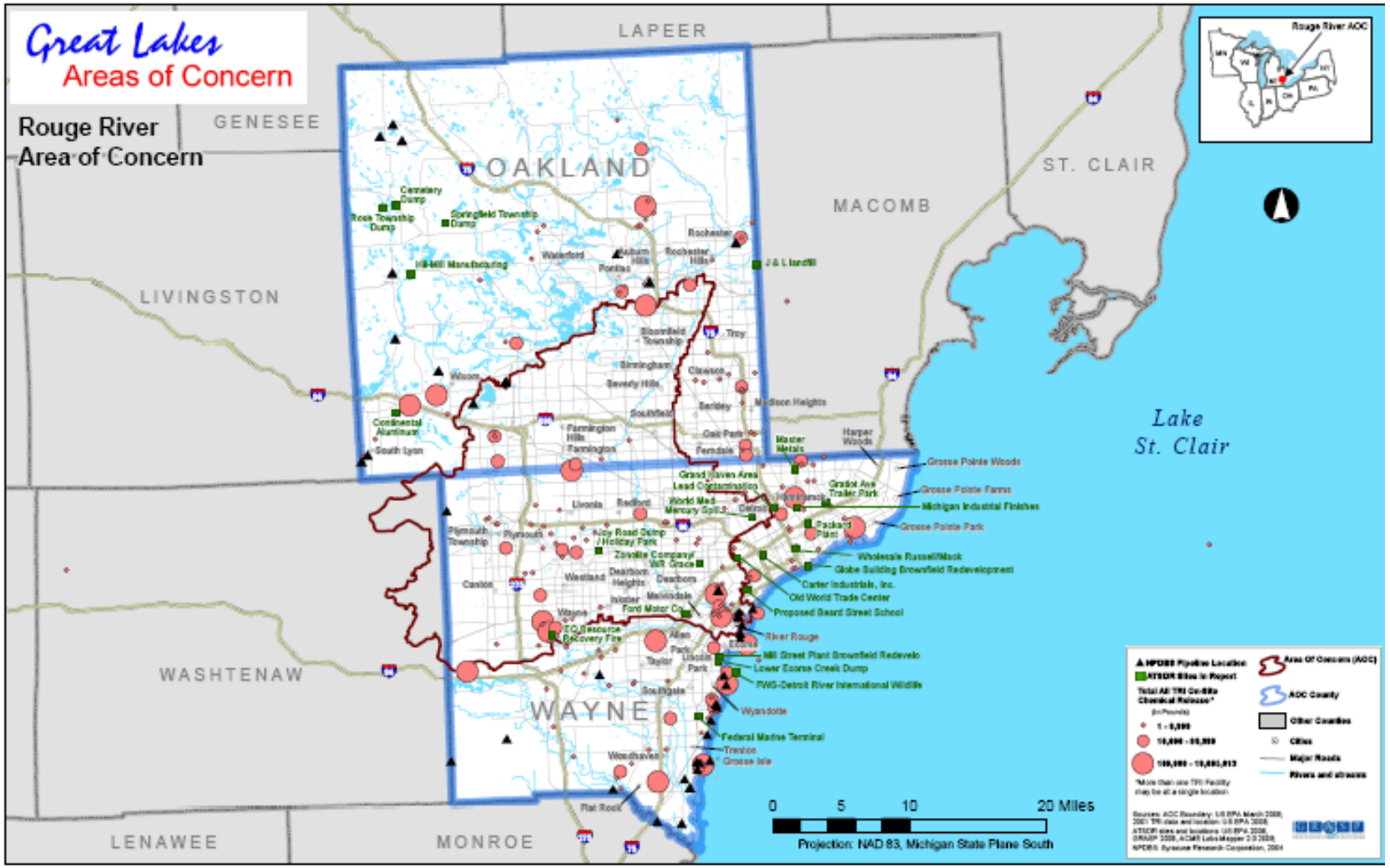

Great Lakes
Areas of Concern
Rouge River
Area of Concern
LAPEER
GENESEE
OAKLAND
MACOMB
ST. CLAIR
LIVINGSTON
Lake
St. Clair
WASHTENAW
WAYNE
LENAWEE
MONROE
Rouge River AOC
0 5 10 20 Miles
Projection: NAD 83, Michigan State Plane South

Table 3.8-C. TRI Releases (in pounds, 2001) for the Rouge River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
POLYCHLORINATED BIPHENYLS	1	95	0	0	1247638	1247733	1974	1249707
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.003542994	0	0	0.0001764	0.003719394	0.0001764	0.003895794
(PCDDs and PCDFs)	3							
LEAD	8	490.28628	1	0	6	497.28628	26664.5571	27161.84338
LEAD COMPOUNDS	8	18281.872	1036.8	0	405710.3	425028.972	961000.165	1386029.137
MERCURY	9	354.9	0	0	0	354.9	877.4	1232.3
MERCURY COMPOUNDS	9	428.633	0.003	0	13492.8	13921.436	6163.2	20084.636
TOXAPHENE	10	39	0	0	1690	1729	825	2554
HEXACHLOROBENZENE	11	98	0	0	4189	4287	2467	6754
	Total IJC	**19787.6948**	**1037.803**	**0**	**1672726.1**	**1693551.598**	**999971.3223**	**2693522.92**
1,1-DICHLORO-1-FLUOROETHANE	3491		0	0	0	3491	250	3741
1,2,3-TRICHLOROPROPANE		282	0	0	12084	12366	5887	18253
1,2,4-TRICHLOROBENZENE		180	0	0	7710	7890	3757	11647
1,2,4-TRIMETHYLBENZENE		430903	0	0	0	430903	296	431199
1,2-DIBROMOETHANE		50	0	0	0	50	0	50
1,2-DICHLOROETHANE		250	0	0	0	250	0	250

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
1,2-DICHLOROPROPANE		144	0	0	6529	6673	3180	9853
1,3-BUTADIENE		1390	0	0	0	1390	0	1390
1,4-DIOXANE		1469	0	0	60633	62102	29549	91651
2,4-DINITROPHENOL		1566	0	0	65046	66612	31712	98324
2,4-DINITROTOLUENE		1381	0	0	57203	58584	27871	86455
2,6-DINITROTOLUENE		229	0	0	9959	10188	4850	15038
2-ACETYLAMINO-FLUORENE	1195		0	0	49468	50663	29128	79791
2-CHLORO-1,1,1,2-TETRAFLUOROETHANE	28416		0	0	0	28416	0	28416
4,6-DINITRO-O-CRESOL		1359	0	0	56960	58319	33291	91610
4-NITROPHENOL		273	0	0	11712	11985	5704	17689
5-NITRO-O-TOLUIDINE		229	0	0	9959	10188	4850	15038
ACRYLAMIDE		212	0	0	9035	9247	4402	13649
ACRYLONITRILE		1342	5	0	34014	35361	19976	55337
ALUMINUM (FUME OR DUST)	2765		5	0	0	2770	18211	20981
ALUMINUM OXIDE (FIBROUS FORMS)	0		0	0	11515	11515	2803	14318
AMMONIA		211276	9433	0	0	220709	9358	230067
ANTHRACENE		4317	0	0	0	4317	0	4317
ANTIMONY		88	7200	0	0	7288	327150	334438

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
ANTIMONY COMPOUNDS		0	0	0	35010	35010	10994	46004
ARSENIC COMPOUNDS		0	0	0	2339396	2339396	1156116	3495512
ASBESTOS (FRIABLE)		0	0	0	137504	137504	21683	159187
BARIUM		0	0	0	0	0	96500	96500
BARIUM COMPOUNDS		112907	2283	0	90151	205341	1136062	1341403
BENZENE		87323	120	0	11829	99272	5826	105098
BENZO(G,H,I)PERYLENE		639.655761	0	0	1089	1728.655761	636.1001	2364.755861
BERYLLIUM COMPOUNDS		0	0	0	14185	14185	391	14576
BIPHENYL		1229	0	0	0	1229	0	1229
BROMOMETHANE		141	0	0	6036	6177	2941	9118
BUTYRALDEHYDE		7808	0	0	0	7808	37	7845
CADMIUM COMPOUNDS		750	0	0	72994	73744	351920	425664
CERTAIN GLYCOL ETHERS		957900	0	0	0	957900	41613	999513
CHLORDANE		5	0	0	277	282	219	501
CHLORINE		1934	328	0	0	2262	0	2262
CHLOROMETHANE		283	0	0	12120	12403	5905	18308
CHLOROPHENOLS		151	0	0	6364	6515	3097	9612
CHROMIUM		256	33	0	0	289	30133	30422
CHROMIUM	1780		264	0	325546	327590	556647	884237

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)								
COBALT COMPOUNDS		250	5	0	0	255	5	260
COPPER		5884	260	0	8	6152	37276	43428
COPPER COMPOUNDS		961	2292	0	56804	60057	215557	275614
CREOSOTE		5787	0	0	0	5787	0	5787
CRESOL (MIXED ISOMERS)		1312	0	0	0	1312	0	1312
CUMENE		6666	0	0	0	6666	5	6671
CYANIDE COMPOUNDS		505	0	0	8045	8550	3405	11955
CYCLOHEXANE		52195	0	0	0	52195	0	52195
DI(2-ETHYLHEXYL) PHTHALATE	374	0	0		14950	15324	7553	22877
DIAMINOTOLUENE (MIXED ISOMERS)	8	90	0		5	103	0	103
DIBENZOFURAN		6022	0	0	0	6022	0	6022
DIBUTYL PHTHALATE		372	0	0	15711	16083	7662	23745
DICHLOROMETHANE		26866	0	0	13652	40518	6650	47168
DIETHANOLAMINE		4123	0	0	0	4123	0	4123
DIISOCYANATES		1576	0	0	33275	34851	52956	87807
DIMETHYL PHTHALATE		291	0	0	12366	12657	6027	18684

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
DIMETHYLAMINE		1135	128	0	0	1263	0	1263
ETHYLBENZENE		337881	2	50	13003	350936	6599	357535
ETHYLENE		82199	0	0	0	82199	0	82199
ETHYLENE GLYCOL		13893	23200	0	119538	156631	292823	449454
ETHYLENE OXIDE		7083	240	0	11	7334	0	7334
FORMALDEHYDE		300	0	0	0	300	0	300
FREON 113		349	0	0	15165	15514	7384	22898
HEPTACHLOR		0	0	0	23	23	0	23
HEXACHLOROETHANE		542	0	0	12560	13102	6120	19222
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	3871400		0	0	0	3871400	0	3871400
HYDROGEN FLUORIDE		237010	0	0	0	237010	0	237010
ISODRIN		0	0	0	19	19	15	34
ISOPROPYL ALCOHOL (MANUFACTURING, STRONG-ACID PROCESS ONLY,NO SUPPLIER)	250		0	0	0	250	3559	3809
MALEIC ANHYDRIDE		19	0	0	0	19	0	19
MANGANESE		2027	33	0	0	2060	15529	17589
MANGANESE COMPOUNDS		15399	1588	0	112364	129351	3497278	3626629

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
METHACRYLONITRILE		50	0	0	0	50	0	50
METHANOL		213913	5	0	5	213923	104	214027
METHYL ETHYL KETONE		175935	0	0	22559	198494	18968	217462
METHYL IODIDE		532	0	0	23136	23668	11267	34935
METHYL ISOBUTYL KETONE		266696	0	0	17568	284264	9322	293586
METHYL METHACRYLATE		1559	0	0	64735	66294	31535	97829
METHYL TERT-BUTYL ETHER	147376		0	0	0	147376	10	147386
NAPHTHALENE		29917	0	0	17710	47627	4560	52187
N-BUTYL ALCOHOL		751522	18828	0	0	770350	10	770360
N-HEXANE		88473	0	0	0	88473	51	88524
NICKEL		7262	36	0	0	7298	32019	39317
NICKEL COMPOUNDS		5883	443	0	3959913	3966239	2151900	6118139
NITRATE COMPOUNDS		267	110000	0	0	110267	639367	749634
NITRIC ACID		3767	0	0	9947	13714	58031	71745
NITROBENZENE		152	0	0	6469	6621	3151	9772
N-METHYL-2-PYRROLIDONE		306052	5	0	14361	320418	25222	345640
N-NITROSODIETHYLAMINE		229	0	0	9959	10188	0	10188
N-NITROSOPIPERIDINE		286	0	0	12453	12739	6065	18804

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
P-CHLOROANILINE		203	0	0	17425	17628	8513	26141
PHENANTHRENE		1941	0	0	0	1941	0	1941
PHENOL		3134	0	0	12243	15377	26056	41433
PHTHALIC ANHYDRIDE		453	0	0	27546	27999	13447	41446
P-NITROANILINE		229	0	0	9959	10188	4850	15038
POLYCHLORINATED ALKANES		0	0	0	0	0	740	740
POLYCYCLIC AROMATIC COMPOUNDS		18539.30174	0	0	15169.8	33709.10174	11485.5	45194.60174
PROPYLENE		73880	0	0	0	73880	0	73880
PROPYLENE OXIDE		311	240	0	51	602	0	602
PYRIDINE		187	0	0	8274	8461	4032	12493
QUINOLINE		1674	0	0	0	1674	0	1674
SAFROLE		180	0	0	7821	8001	3809	11810
SEC-BUTYL ALCOHOL		480	5	0	1	486	0	486
SELENIUM		0	0	0	2552938	2552938	1247917	3800855
SILVER		0	0	0	64523	64523	31529	96052
SODIUM DICAMBA		1	0	0	0	1	0	1
SODIUM DIMETHYLDITHIO-CARBAMATE		203	0	0	17425	17628	8513	26141
SODIUM NITRITE		1262	0	0	5	1267	322	1589
STYRENE		15913	240	0	5	16158	870	17028
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		309917	0	0	0	309917	0	309917

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
TERT-BUTYL ALCOHOL		307	0	0	0	307	0	307
TETRACHLORO-ETHYLENE		382	0	0	0	382	0	382
TOLUENE		535035	9	0	13384	548428	12353	560781
TOLUENE DIISOCYANATE (MIXED ISOMERS)		338.5	0	0	18	356.5	0	356.5
TOLUENE-2,4-DIISOCYANATE		10	0	0	0	10	0	10
TRANS-1,3-DICHLOROPROPENE		147	0	0	6372	6519	3115	9634
TRICHLORFON		235	0	0	8313	8548	5251	13799
TRICHLOROETHYLENE		11611	0	0	11949	23560	6254	29814
TRICHLOROFLUORO-METHANE		365	0	0	15568	15933	7571	23504
TRIETHYLAMINE		27855	3104	0	0	30959	1500	32459
URETHANE		1000	0	0	0	1000	24018	25018
VANADIUM (EXCEPT WHEN CONTAINED IN AN ALLOY)		58	0	0	0	58	10095	10153
VANADIUM COMPOUNDS		235	157	0	2968	3360	78003	81363
VINYL ACETATE		27569	0	0	0	27569	0	27569
VINYLIDENE CHLORIDE		250	0	0	0	250	0	250
XYLENE (MIXED ISOMERS)		1874810	0	50	44538	1919398	22257	1941655
ZINC (FUME OR DUST)		757	0	0	249242	249999	33827	283826
ZINC COMPOUNDS		139458	8491	0	14622	162571	26293044	26455615

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
	Total Non-IJC	**11597393.46**	**189072**	**100**	**11141001.8**	**22927567.26**	**39000301.6**	**61927868.86**
	Total	**11617181.15**	**190109.80**	**100**	**12813727.9**	**24621118.86**	**40000272.92**	**64621391.78**

Table 3.8-D. TRI Facilities Releasing IJC-critical Pollutants Onsite

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Polychlorinated biphenyls	1			
Wayne County, MI	1	WAYNE DISPOSAL INC.	48111WYNDS49350	BELLEVILLE
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	6			
Wayne County, MI	6	CARMEUSE LIME	48218DTRTL25MAR	RIVER ROUGE
		CARMEUSE LIME INC.	48217DTRTL310FO	DETROIT
		DETROIT EDISON RIVER ROUGE POWER PLANT	48218DTRTD1BELA	RIVER ROUGE
		DETROIT EDISON-TRENTON CHANNEL POWER PLANT	48183DTRTD4695W	TRENTON
		GMC MLCG HAMTRAMCK ASSEMBLY	48211CDLLC2500E	DETROIT
		MARATHON ASHLAND PETROLEUM L.L.C.	48217MRTHN1300S	DETROIT
Lead and lead compounds	31			
Oakland County, MI	7	AKZO NOBEL COATINGS INC.	48053KZCTN30BRU	PONTIAC
		AKZO NOBEL COATINGS INC. CAR REFINISHES & DECORATIVE COAT.	48341KZCTN2527B	PONTIAC
		CONTINENTAL ALUMINUM	48165CNTNN29201	NEW HUDSON
		DEBRON INDL. ELECTRONICS INC.	48083DBRNN591EX	TROY
		EATON CORP.	48308TNCRP1400S	ROCHESTER HILLS
		GM MCG ORION ASSEMBLY	48055GNRLM4555G	ORION
		GM PONTIAC ASSEMBLY CENTER	48058GMCTR820OP	PONTIAC
Wayne County, MI	24	AUTOALLIANCE INTL. INC.	48134MZDMT1MAZD	FLAT ROCK
		CARMEUSE LIME	48218DTRTL25MAR	RIVER ROUGE
		CARMEUSE LIME INC.	48217DTRTL310FO	DETROIT
		DCI AEROTECH	48238DCRTC7515L	DETROIT

IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
		DETROIT EDISON RIVER ROUGE POWER PLANT	48218DTRTD1BELA	RIVER ROUGE
		DETROIT EDISON-TRENTON CHANNEL POWER PLANT	48183DTRTD4695W	TRENTON
		FORD MOTOR CO. DEARBORN ASSEMBLY PLANT	48121FRDM23001M	DEARBORN
		FORD MOTOR CO. LIVONIA TRANSMISSION PLANT	48150FRDMT36200	LIVONIA
		FORD MOTOR CO. MICHIGAN TRUCK PLANT	48184FRDMT38303	WAYNE
		FORD MOTOR CO. WAYNE ASSEMBLY	48184FRDMT37625	WAYNE
		FORD MOTOR CO. WAYNE INTEGRAL STAMPING	48184FRDMT37500	WAYNE
		GM PT ROMULUS ENGINE	48174GMCCP36880	ROMULUS
		GMC MLCG HAMTRAMCK ASSEMBLY	48211CDLLC2500E	DETROIT
		MARATHON ASHLAND PETROLEUM L.L.C.	48217MRTHN1300S	DETROIT
		MCLAREN PERFORMANCE TECHS.	48152MCLRN32233	LIVONIA
		NATIONAL STEEL CORP. GREATLAKES OPS.	48229GRTLKNO1QU	ECORSE
		PERMA-FIX OF MICHIGAN INC.	48192PRMFX18550	BROWNSTOWN
		ROUGE STEEL CO.	48121RGSTL3001M	DEARBORN
		TOWER AUTOMOTIVE PRODS. CO. INC.	48170TWRTM43955	PLYMOUTH
		UNISTRUT CORP.	48184NSTRT35660	WAYNE
		UNITED STATES GYPSUM CO. DETROIT PLANT	48218NTDST2DIVI	RIVER ROUGE
		VOIGHT & SCHWEITZER GALVANIZERS INC.	48239GLVNZ25425	REDFORD
		WAYNE DISPOSAL INC.	48111WYNDS49350	BELLEVILLE
		WYANDOTTE DEPARTMENT OF MUNICIPAL SERVICES	48192WYNDT2555V	WYANDOTTE
Mercury and mercury compounds	12			

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Oakland County, MI	1	GM MCG ORION ASSEMBLY	48055GNRLM4555G	ORION
Wayne County, MI	11	CARMEUSE LIME	48218DTRTL25MAR	RIVER ROUGE
		CARMEUSE LIME INC.	48217DTRTL310FO	DETROIT
		DETROIT EDISON RIVER ROUGE POWER PLANT	48218DTRTD1BELA	RIVER ROUGE
		DETROIT EDISON-TRENTON CHANNEL POWER PLANT	48183DTRTD4695W	TRENTON
		MARATHON ASHLAND PETROLEUM L.L.C.	48217MRTHN1300S	DETROIT
		NATIONAL STEEL CORP. GREATLAKES OPS.	48229GRTLKNO1QU	ECORSE
		PERMA-FIX OF MICHIGAN INC.	48192PRMFX18550	BROWNSTOWN
		ROUGE STEEL CO.	48121RGSTL3001M	DEARBORN
		UNITED STATES GYPSUM CO. DETROIT PLANT	48218NTDST2DIVI	RIVER ROUGE
		WAYNE DISPOSAL INC.	48111WYNDS49350	BELLEVILLE
		WYANDOTTE DEPARTMENT OF MUNICIPAL SERVICES	48192WYNDT2555V	WYANDOTTE
Toxaphene	1			
Wayne County, MI	1	WAYNE DISPOSAL INC.	48111WYNDS49350	BELLEVILLE
Hexachlorobenzene	1			
Wayne County, MI	1	WAYNE DISPOSAL INC.	48111WYNDS49350	BELLEVILLE

Table 3.8-E. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Rouge River AOC

Chemical	*IJC Tracking Number*	*Discharge*
POLYCHLORINATED BIPHENYLS (PCBS)	1	0.08
LEAD, TOTAL (AS PB)	8	5530.46
MERCURY, TOTAL (AS HG)	9	102.36
	Total IJC	**5632.90**
BARIUM, TOTAL (AS BA)		1237.35
BENZOIC ACIDS-TOTAL		3.65
BORON, TOTAL (AS B)		80300
CADMIUM, TOTAL (AS CD)		292
COPPER, TOTAL (AS CU)		7169.70
CYANIDE, TOTAL (AS CN)		9490
CYANIDE, FREE (AMEN. TO CHLORINATION)		266.45
HYDROGEN SULFIDE		0.62
NITROGEN, AMMONIA TOTAL (AS N)		601759.68
OCTYLPHENOL		73
P-CRESOL		1.10
PHENOLS		1388.10
PHOSPHORUS, TOTAL (AS P)		3945760.72
SELENIUM, TOTAL (AS SE)		146
SILVER, TOTAL (AS AG)		10.59
STRONTIUM,TOTAL (AS SR)		4653.75
TERPINEOL-ALPHA		1.10
THALLIUM, TOTAL (AS TL)		18.25
ZINC, TOTAL (AS ZN)		7403.01
	Total Non-IJC	**4659975.07**
	Total	**4665607.97**

Table 3.8-F. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Rouge River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Polychlorinated Biphenyls (PCBs)	2			
Wayne County, MI	1	DETROIT WWTP	MI0022802	DETROIT
Oakland County, MI	1	GM-PONTIAC NORTH CAMPUS	MI0056031	PONTIAC
Lead	5			
Wayne County, MI	5	DSC LTD-GIBRALTAR	MI0004227	GIBRALTAR
		DSC-TRENTON PLANT	MI0002399	TRENTON
		ROUGE STEEL CO	MI0043524	DEARBORN
		UNITED STATES STEEL-ECORSE	MI0002313	ECORSE
		UNITED STATES STEEL-ZUG ISLAND	MI0026786	RIVER ROUGE
Mercury	9			
Wayne County, MI	9	BASF-WYANDOTTE	MI0000540	WYANDOTTE
		DECO-RIVER ROUGE PLT	MI0001724	RIVER ROUGE
		DECO-SIBLEY QUARRY	MI0001953	TRENTON
		DETROIT WWTP	MI0022802	DETROIT
		GROSSE ILE TWP WWTP	MI0026191	GROSSE ILE
		S HURON VALLEY UA WWTP	MI0043800	ROCKWOOD
		TRENTON WWTP	MI0021164	TRENTON
		WAYNE CO-WYANDOTTE WWTP	MI0021156	WYANDOTTE
		WYANDOTTE ELECTRIC PLANT & WFP	MI0038105	WYANDOTTE

3.9. Clinton River AOC, Oakland and Macomb Counties, MI

The Clinton River is in southeastern Michigan, just north of Detroit. The river enters Lake St. Clair near the City of Mt. Clemens. Lake St. Clair and the Detroit River link Lake Huron and Lake Erie. The Clinton River AOC includes the Clinton River watershed, which is primarily in Oakland and Macomb Counties. The Clinton River flows toward Lake Erie. About half of that flow is treated wastewater from six municipal wastewater treatment plants.

3.9.1. Hazardous Waste Sites Relevant to the Clinton River AOC

ATSDR has evaluated the data for selected hazardous waste sites in Oakland and Macomb Counties, MI, and reached conclusions regarding any public health threat they might pose or might have posed. Oakland County is relevant to both the Rouge River AOC and the Clinton River AOC. For Clinton River AOC sites that at some point during their assessment history were categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard, conclusions are summarized above in Tables 3.8-B (Oakland County) and below in Table 3.9-A (Macomb County). Included is information regarding the type and location of the site and the date and type of the relevant assessment document.

Table 3.9–A. Hazardous Waste Sites in Macomb County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
G & H Landfill, Utica MID980410823	HA HA	1989 1992	3 3	NPL	Ongoing
Liquid Disposal, Inc., Utica MID67340711	HA SRU	1987 1992	3 3	NPL	Ongoing
South Macomb Disposal Authority, Macomb Township MID069826170	HA HA	1989 1995	3 2	NPL	Ongoing
Ten Mile/Lange/Revere Drainage System Site, St. Clair Shores, MI	HC HC	2003 2007	3 4	Non-NPL	Ongoing

2=Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard, HA=Public Health Assessment, HC=Health Consultation, SRU=Site Review and Update

ATSDR conducted further data evaluation for urgent public health hazard, public health hazard, or indeterminate public health hazard sites in the public health assessments and other health-related documents listed in the table. The evaluations for Oakland County, MI, were already discussed in Sections 3.8.1.20 through 3.8.1.25. The evaluations for Macomb County waste sites are discussed in the following subsections.

3.9.1.1 G & H Landfill

The G & H Landfill is an approximately 70-acre site in Shelby Township (Macomb County) MI, between the cities of Utica and Rochester. The Clinton River borders the site, and groundwater flow is toward the river. From 1955 to 1967, the landfill was a waste oil recovery facility; from 1955 to 1974 it also became an industrial and municipal landfill. PCB-laden waste oil was dumped into unlined ponds, and waste solvents, paint sludges, and municipal waste were landfilled. The information regarding this site is from ATSDR's 1989 and 1992 public health assessments and from the 2006 U.S. EPA NPL Fact Sheet for this site.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	594
Females aged 15-44	1,455
Adults 65 and older	564

Public Health Outcome Data: A 1982 health outcome data review collected infant mortality, low birth weight, and age-adjusted death rates for cancer, heart disease, stroke, and accidents in Shelby Township—where the G & H Landfill is located—and compared them with state and county rates. The health outcome data review found that Shelby Township rates were either comparable to or lower than comparison populations.

ATSDR Conclusions: In a 1989 public health assessment, ATSDR concluded that the potential human health threat from contaminant exposure at adverse-health-effect concentrations rendered G & H Landfill an *Indeterminate Public Health Hazard* (Category 3). The 1992 public health assessment confirmed this conclusion. In the past, this site may have contributed to the environmental burden of the IJC-critical pollutants PCBs and lead as well as other contaminants, including VOCs. Because the site was fenced, onsite exposure was, except for remediation workers, considered unlikely. The 1989 health assessment also raised concerns that contaminated groundwater and consumption of fish and game from the Clinton River might expose nearby residents and businesses. Of note, however, is that although fish (i.e., principally carp) in the Clinton River had high PCB levels, sources other than the G & H Landfill contributed to that pollution.

U.S. EPA Update: In its September 2006 Fact Sheet regarding the G & L Landfill site, U.S. EPA stated in part

> In 1993, U.S. EPA reached a cleanup agreement (Consent Decree) with 14 Detroit area companies under which the 14 companies began to construct the cleanup remedy in September 1996. In 1993 through 1994, the 14 companies arranged to have approximately 30 residences and four small businesses adjacent to the site attached to the municipal water supply as a precaution. The cleanup consists of a containment remedy, which includes construction of a landfill cover (cap), an impermeable underground slurry wall, and a groundwater extraction and treatment system to physically and hydraulically contain the contaminants onsite. Groundwater extracted from within the site is treated to remove the organic compounds. Construction was completed in September 1999. The groundwater

> extraction system will be operated for at least 30 years. The 14 companies taking responsibility for the site have also agreed to create and maintain new wetland areas to replace wetlands that were degraded by the contaminants, or that were destroyed in developing the cleanup remedy. The wetlands restoration work was completed in September 1999. The site is now in the Operations and Maintenance phase. A second Five-Year Review of the site was completed in September 2006 and determined that the remedy remained protective of human health and the environment.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980410823.htm. 2006 Sept [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: Contaminants of concern included the IJC-critical pollutants PCBs, lead, and PAHs. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.9.1.2 Liquid Disposal, Inc.

Liquid Disposal, Inc. is a former sand and gravel pit in Shelby Township (Macomb County) MI. From 1964 to 1968, a landfill operated on the site, which was surrounded by wetlands, the Clinton River, and an auto junkyard surrounds the site on which, from 1964 to 1968, a landfill operated. From 1968 through 1982, the landfill became a liquid waste incineration facility for volatile and semi-volatile chemicals including paint thinners, sludges, contaminated oils, and greases. Before incineration, wastes were stored in a lagoon, in below- and above-ground tanks, and in drums. As of 1987, the contents of the lagoons had been removed or stabilized, and the storage tanks and other containers had also been removed from the site. A crude sump-pump leachate collection system directed leachate back into the incinerator pit. Information regarding this site is from ATSDR's 1987 public health assessment, 1992 site review and update, and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reports the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	364
Females aged 15–44	856
Adults 65 and older	477

ATSDR Conclusions: Because of inadequate information to assess in recreation areas near the site and because of the threat to human health from potential exposure to soil and leachate contaminants in soils, ATSDR's 1987 health assessment categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent 1992 site review and update reached the same conclusion. In the past, this site probably contributed to the environmental burden of the IJC-critical pollutants PCBs, aldrin, and lead, as well as other contaminants including VOCs. Fences prevented onsite exposure, but the potential for offsite contaminant migration remained, and ATSDR remained concerned about exposure of those who used nearby recreational areas.

U.S. EPA Update: In its April 2008 Fact Sheet regarding the Liquid Disposal, Inc. site, U.S. EPA stated in part that

> A Five-year Review report was issued on February 23, 1998 and concluded that the remedy selected remains protective of human health and the environment. A second Five-year Review was completed in 2003 and concluded that the remedy is expected to be fully protective of long term human health and the environment upon attainment of groundwater cleanup goals. Although the CD requirement of a specific inward gradient from the extraction wells has not been achieved, natural processes are occurring with only two contaminants exceeding cleanup standards in water tested side and downgradient of the site. Natural processes and groundwater extraction as well as continued groundwater monitoring and clay cap maintenance will continue to provide protectiveness to human health and the environment until the cleanup goals are met. Changes to the O & M plan have been formulated to better monitor the contamination within the slurry wall. The next Five-year Review is scheduled to be completed by September, 2008.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID067340711.htm. 2008 Apr [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: Contaminants in onsite soil included the IJC-critical pollutants PCBs and lead. Onsite groundwater contained the IJC-critical pollutant aldrin at concentrations above the health-based screening values**.** For a more complete list of hazardous substances found at this site**,** please refer to www.epa.gov/superfund/sites/npl/npl.htm**.**

3.9.1.3 South Macomb Disposal Authority

This 159-acre site in Macomb Township (Macomb County) MI, consists of two adjacent, former municipal landfills. In one landfill, approximately 680,000 cubic yards of municipal wastes were disposed of; the other landfill received approximately 1,200,000 cubic yards of wastes. Onsite groundwater and leachate became contaminated with organic and inorganic chemicals. Initially, the leachate discharged from the landfill to McBride Drain, which flowed into the North Branch of the Clinton River. Information on this site is from ATSDR's 1989 and 1995 public health assessments and from the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reports the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	301
Females aged 15–44	477
Adults 65 and older	89

Public Health Outcome Data: An ATSDR physician evaluated a "death survey" conducted by area residents. Lack of information on the geographic boundaries of the survey, the types of cancers, and important risk factors rendered the data insufficient. In any event, the survey did not provide any clear connection between reported adverse health effects—hepatitis and skin rash in one person and cirrhosis in another—and possible exposure to landfill contamination.

ATSDR Conclusions: In the 1989 health assessment, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In the 1995 health assessment, ATSDR found that exposures to contaminated environmental media had occurred, could then be occurring, and could occur in the future. ATSDR thus recategorized the site as a *Public Health Hazard* (Category 2). This site possibly contributed to the environmental burden of the IJC-critical pollutant lead, as well as other contaminants including VOCs, ammonia, cadmium, and nitrates. These contaminants appeared in residential wells at levels exceeding health-based screening values—arsenic was even at a level associated with an increased cancer risk. Completed exposure pathways (i.e., ingestion, inhalation, and dermal exposure to residential well water) have occurred in the past.

Site remediation began in the late 70s and early 80s, when leachate controls were installed, and a north side slurry wall began to contain and collect contaminated groundwater. Still, as late as 1983–1988, local authorities were distributing bottled water to 12 residences. By 1988, municipal water was extended to some of these residences. Through 1995, monitoring data showed that the remaining residential wells were uncontaminated. But future contamination concerns persisted, given that the leachate collection system reportedly had not captured the entire plume.

U.S. EPA Update: In its September 2006 Fact Sheet regarding the South Macomb Disposal Authority site, U.S. EPA stated in part that

> The Remedial Design and Remedial Action were completed in the summer of 2005, and documented in U.S. EPA's preliminary close-out report dated October 31, 2005. Five Year Reviews for the Site will be on-going since the remedy does not allow for unlimited use and unrestricted exposure. By 2010, U.S. EPA shall prepare the first five year [review] to determine the ongoing short-term and long-term protectiveness of the Site remedy.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID069826170.htm. 2006 Sep [cited 2008 Jul 11].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC pollutant lead was identified. For a more complete listing of hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

3.9.1.4 Ten Mile/Lange/Revere Drainage System Site, St. Clair Shores, MI

The site comprises a sanitary and storm water sewer system and a canal that connects to the Ten Mile/Lange/Revere Drainage System (a/k/a Ten Mile Drainage System) in St. Clair Shores, (Macomb County) Michigan. A sediment analysis precedent to a St. Clair Shores canal-dredging project revealed high levels of polychlorinated biphenyls (PCBs). The storm water sewer of the Ten Mile/Lange/Revere Drainage System, which discharged to the tested canal, had been contaminated by what was likely an unpermitted chemical release into a storm drain. Water and sediment samples from the storm sewers, catch basins, sanitary sewers, and the Lange/Revere Canal contained PCBs and lead at levels of concern. Water sampled from a pond that occasionally received canal water also had a high PCB concentration. But the highest lead-in-sediment concentrations were at the canal's westernmost boundary.

ATSDR Conclusions: In 2003, ATSDR concluded that because of the potential for future exposures to site-related PCB and lead, this site posed an *Indeterminate Public Health Hazard* (Category 3). In 2003, no completed exposure pathways were known. The main chemicals of concern in water and sediments from the Ten Mile Drainage System and the Canal were PCBs and lead. The other chemicals evaluated did not pose a public health hazard—they were present only in the sewers, where exposure was unlikely. Air concentrations of PCBs similarly posed no apparent public health hazard. Yet levels of arsenic found in soil samples of a residential yard adjacent to the canal did pose an indeterminate health hazard.

In 2003, U.S. EPA completed remediation for PCBs. By spring 2004, the Macomb County Drainage Commission completed its remedial action (i.e., cleaning PCBs out of the storm sewers). In 2007, ATSDR concluded that the site posed *No Apparent Public Health Hazard* (Category 4).

U.S. EPA Update: In the (undated) Onscene Coordinator Site File for the Ten Mile/Lange/Revere Drainage System site, U.S. EPA states that

> Some PCBs have been found in surface areas of the site and will be addressed during the removal action. U.S. EPA previously conducted work in this area at the 10 Mile Drain Site. U.S. EPA conducted a removal of PCBs from sediments in two canals and cleaned the storm sewer system as part of this cleanup. At the time of the original cleanup, U.S. EPA assumed the PCBs were from an illegal dump into the sewer system. Subsequent re-contamination of the sewer suggested that a PCB source may be present and causing re-contamination of the areas previously cleaned by U.S. EPA.

Available at: http://epaosc.net/site_profile.asp?site_id=2082%20. [cited 2008 Jul 29].

Michigan Department of Community Health Update: Continued site monitoring led to the discovery of PCB-contaminated soils in residential soils near the beginning of the drain system. U.S. EPA conducted an emergency removal action of soils of concern (* * *). The Michigan Department of Environmental Quality (MDEQ) planned to collect additional data in 2008 to work toward proposing the site for the NPL (email from Joseph Walczak, MDEQ Remediation and Redevelopment Division; 2008 Jan 17).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and lead were identified at this site.

3.9.2. Summary and Conclusions for the Clinton River AOC

3.9.2.1 Hazardous Waste Sites

Two Michigan counties, Oakland and Macomb, are relevant to this AOC. A part of Oakland County is also in the Rouge River AOC (see Section 3.8).

3.9.2.2 Hazardous Waste Sites in Oakland and Macomb Counties

Oakland County: Of the six Oakland County sites, four have undergone remediation. No evidence indicates that humans were exposed to site-related contaminants at levels of concern. Groundwater at one site is, however, still undergoing extraction and treatment.

Macomb County: The four Macomb County hazardous waste sites are undergoing remediation. Because the leachate plume (to groundwater) was not contained, the South Macomb Disposal Authority may still be releasing contaminants.

3.9.2.3 TRI Data

The TRI onsite chemical releases for Oakland and Macomb Counties (combined) in 2001 totaled 3,580,901 pounds, primarily released to air; little was released to surface water or land. Oakland County accounted for 76% and Macomb County accounted for 24% of the total onsite releases. See Table 3.9-B.

IJC-critical pollutants accounted for as few as 298.7 pounds (0.008 %) of the total onsite releases. The IJC-critical pollutants released were lead and lead compounds (primarily to air and land), and mercury and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 3.9-C.

The major release of non-IJC chemicals (≥ 500,000 pounds) was of xylenes (to air).

3.9.2.4 NPDES Data

The NPDES permitted discharges for Wayne and Oakland Counties, MI are summarized in Table 3.9-D. The average annual permitted discharges in 2004 totaled 1,170,862 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants PCBs (0.01 pound), lead (1,022 pounds) and mercury (2.95 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 3.9-E.

3.9.2.5 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are affected. Because of contaminated sediments, a PCB advisory specific to carp was issued. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

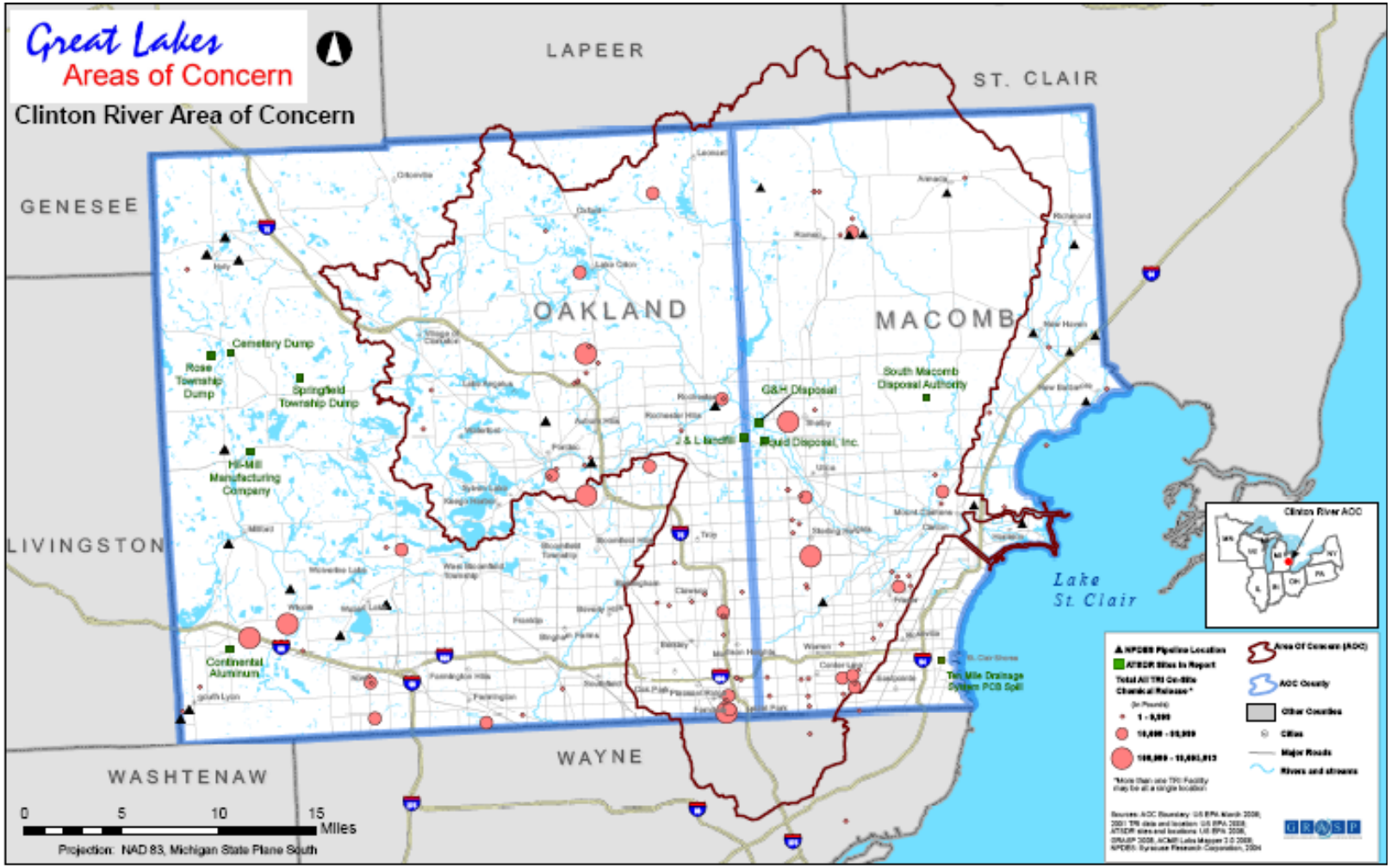

Great Lakes
Areas of Concern
Clinton River Area of Concern
LAPEER
ST. CLAIR
GENESEE
OAKLAND
MACOMB
LIVINGSTON
WAYNE
WASHTENAW
Cemetery Dump
Rose Township Dump
Springfield Township Dump
Hi-Mill Manufacturing Company
Continental Aluminum
G&H Disposal
J & L landfill
Liquid Disposal, Inc.
South Macomb Disposal Authority
Ten Mile Drainage System PCB Spill
Lake St. Clair
Clinton River AOC
0 5 10 15 Miles
Projection: NAD 83, Michigan State Plane South

Table 3.9-B. TRI Releases (in pounds, 2001) for the Clinton River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
LEAD	8	22.59128	0	0	1	23.59128	386.5	410.09128
LEAD COMPOUNDS	8	263.102	0	0	0	263.102	4993.931	5257.033
MERCURY	9	0	0	0	0	0	0.1	0.1
MERCURY COMPOUNDS	9	12	0	0	0	12	0	12
	Total IJC	**297.69328**	**0**	**0**	**1**	**298.69328**	**5380.531**	**5679.22428**
XYLENE (MIXED ISOMERS)		1341515	0	0	0	1341515	0	1341515
CERTAIN GLYCOL ETHERS		392474	0	0	0	392474	1117	393591
N-BUTYL ALCOHOL		383820	0	0	0	383820	0	383820
TOLUENE		265481	0	0	0	265481	5728	271209
ETHYLBENZENE		246208	0	0	0	246208	250	246458
METHYL ISOBUTYL KETONE		206587	0	0	0	206587	750	207337
N-METHYL-2-PYRROLIDONE		143360	0	0	0	143360	8800	152160
1,2,4-TRIMETHYLBENZENE		132910	0	0	0	132910	0	132910
METHYL ETHYL KETONE		128487	0	0	0	128487	6250	134737
METHANOL		124179	0	0	0	124179	0	124179
TRICHLOROETHYLENE		40553	0	0	0	40553	0	40553

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		34000	0	0	0	34000	0	34000
AMMONIA		33772	0	0	0	33772	0	33772
2-CHLORO-1,1,1,2-TETRAFLUOROETHANE		28416	0	0	0	28416	0	28416
N-HEXANE		18038	0	0	0	18038	0	18038
STYRENE		14121	0	0	0	14121	0	14121
TRIETHYLAMINE		6629	0	0	0	6629	1500	8129
NICKEL		5314	36	0	0	5350	1810	7160
DICHLOROMETHANE		4464	0	0	0	4464	0	4464
NICKEL COMPOUNDS		3572	262	0	0	3834	112920	116754
NITRIC ACID		3683	0	0	0	3683	0	3683
ETHYLENE GLYCOL		3482	0	0	0	3482	0	3482
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		2994	0	0	0	2994	0	2994
CYANIDE COMPOUNDS		2771	5	0	0	2776	250	3026
MANGANESE COMPOUNDS		1696	70	0	0	1766	49793	51559
ZINC COMPOUNDS		1484	152	0	8	1644	289202	290846
METHYL TERT-BUTYL ETHER		1444	0	0	0	1444	0	1444
1,1-DICHLORO-1-FLUOROETHANE		1020	0	0	0	1020	250	1270

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
SODIUM NITRITE		962	0	0	5	967	316	1283
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		943	5	0	0	948	76607	77555
MANGANESE		790	33	0	0	823	3965	4788
ALUMINUM (FUME OR DUST)		750	5	0	0	755	18211	18966
CHLORINE		505	0	0	0	505	0	505
DIISOCYANATES		350	0	0	0	350	14301	14651
CUMENE		301	0	0	0	301	0	301
NITRATE COMPOUNDS		299	0	0	0	299	156184	156483
FORMALDEHYDE		298	0	0	0	298	0	298
TERT-BUTYL ALCOHOL		295	0	0	0	295	0	295
COPPER COMPOUNDS		270	10	0	0	280	7465	7745
COBALT COMPOUNDS		250	5	0	0	255	5	260
DIETHANOLAMINE		255	0	0	0	255	0	255
PROPYLENE		250	0	0	0	250	0	250
COPPER		181	0	0	8	189	5011	5200
CHROMIUM		120	33	0	0	153	3968	4121
1,2-BUTYLENE OXIDE		149	0	0	0	149	0	149
NAPHTHALENE		106	0	0	0	106	0	106

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
CYCLOHEXANE		91	0	0	0	91	0	91
BUTYL ACRYLATE		78	0	0	0	78	0	78
BENZENE		77	0	0	0	77	0	77
TOLUENE-2,4-DIISOCYANATE		76	0	0	0	76	0	76
DICYCLOPENTADIENE		33	0	0	0	33	0	33
BARIUM COMPOUNDS		22	0	0	0	22	85718	85740
METHYL METHACRYLATE		16	0	0	0	16	0	16
TOLUENE-2,6-DIISOCYANATE		16	0	0	0	16	0	16
HYDROGEN FLUORIDE		5	0	0	0	5	0	5
ZINC (FUME OR DUST)		2	0	0	0	2	2298	2300
VANADIUM COMPOUNDS		1	0	0	0	1	22	23
BENZO(G,H,I)PERYLENE		0.22	0	0	0	0.22	0	0.22
POLYCYCLIC AROMATIC COMPOUNDS		0.2	0	0	0	0.2	0	0.2
BARIUM		0	0	0	0	0	96500	96500
CADMIUM		0	0	0	0	0	14	14
SODIUM DIMETHYLDITHIO-CARBAMATE		0	0	0	0	0	10560	10560
	Total Non-IJC	**3579965.42**	**616**	**0**	**21**	**3580602.42**	**959765**	**4540367.42**
	Total	**3580263.113**	**616**	**0**	**22**	**3580901.113**	**965145.531**	**4546046.644**

Table 3.9-C. TRI Facilities Releasing IJC-critical Pollutants Onsite

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Lead and lead compounds	11			
Macomb County, MI	3	TOWER AUTOMOTIVE TOOL INC.	48036TWRTM44850	CLINTON TOWNSHIP
		DU PONT MT. CLEMENS PLANT	48043DPNTM400GR	MOUNT CLEMENS
		TI GROUP AUTOMOTIVE SYSTEM	48090BNDYT12345	WARREN
Oakland County, MI	8	AKZO NOBEL COATINGS INC.	48053KZCTN30BRU	PONTIAC
		AKZO NOBEL COATINGS INC. CAR REFINISHES & DECORATIVE COAT.	48341KZCTN2527B	PONTIAC
		CONTINENTAL ALUMINUM	48165CNTNN29201	NEW HUDSON
		DEBRON INDL. ELECTRONICS INC.	48083DBRNN591EX	TROY
		EATON CORP.	48308TNCRP1400S	ROCHESTER HILLS
		GM MCG ORION ASSEMBLY	48055GNRLM4555G	ORION
		GM PONTIAC ASSEMBLY CENTER	48058GMCTR820OP	PONTIAC
		MOLEX AUTOMOTIVE	48326CRDLL2025T	AUBURN HILLS
Mercury and mercury compounds	1			
Oakland County, MI	1	GM MCG ORION ASSEMBLY	48055GNRLM4555G	ORION

Table 3.9-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Clinton River AOC

Chemical	*IJC Tracking Number*	*Discharge*
POLYCHLORINATED BIPHENYLS (PCBS)	1	0.01
LEAD, TOTAL (AS PB)	8	1022
MERCURY, TOTAL (AS HG)	9	2.95
	Total IJC	**1024.96**
BARIUM, TOTAL (AS BA)		1168
COPPER, TOTAL (AS CU)		594.95
CYANIDE, FREE (AMEN. TO CHLORINATION)		52.93
NITROGEN, AMMONIA TOTAL (AS N)		716664.73
PHOSPHORUS, TOTAL (AS P)		446449.75
SILVER, TOTAL (AS AG)		12.05
STRONTIUM,TOTAL (AS SR)		4653.75
ZINC, TOTAL (AS ZN)		240.90
	Total Non-IJC	**1169837.06**
	Total	**1170862.02**

Table 3.9-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants

IJC-critical Pollutant	*No. of Facilities*	*Facility Name*	*NPDES*	*City*
Polychlorinated Biphenyls (PCBs)	1			
Oakland County, MI	1	GM-PONTIAC NORTH CAMPUS	MI0056031	PONTIAC
Lead	2			
Oakland County, MI	2	COMMERCE TWP WWTP	MI0025071	COMMERCE
		MICH SEAMLESS TUBE LLC	MI0001902	SOUTH LYON
Mercury	5			
Macomb County, MI	1	NEW BALTIMORE WWTP	MI0023680	NEW BALTIMORE
Oakland County, MI	4	HOLLY WWTP	MI0020184	HOLLY
		OAKLAND CO WALLED LK/NOVI WWTP	MI0024287	NOVI
		PONTIAC WWTP	MI0023825	PONTIAC
		WIXOM WWTP	MI0024384	WIXOM

Chapter 4. Lake Huron

Chapter 4. Lake Huron

4.1. Saginaw River and Bay AOC

The Saginaw River and Bay AOC is Lake Huron's only U.S. Great Lakes AOC, comprising the following Michigan counties:

Arenac, Bay, Clare, Genesee, Gladwin, Gratiot, Huron, Iosco, Isabella, Lapeer, Livingston, Mecosta, Midland, Montcalm, Ogemaw, Osceola, Roscommon, Saginaw, Sanilac, Shiawassee, and Tuscola.

The Saginaw River and Bay AOC also includes all of Saginaw Bay to Lake Huron at an imaginary line drawn between up to Au Sable Point and Point Aux Barques, as well as the entire 35-km length of the Saginaw River, which flows into Saginaw Bay (see AOC map at end of chapter and in Appendix 2).

4.1.1. Hazardous Waste Sites Relevant to the Saginaw River and Bay AOC

ATSDR has evaluated the data for hazardous waste sites in the 21 counties relevant to this AOC and reached conclusions regarding any public health threat these sites might pose. For the 18 sites that either posed an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some point during their assessment history, Table 4.1A summarizes ATSDR's site conclusions, the site type and location, and the date and type of assessment document. Not all counties had waste sites in these health hazard categories.

Further evaluations of the site data are discussed in the following sections.

Table 4.1-A. Hazardous Waste Sites in Counties Relevant to the Saginaw River and Bay AOC

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Bay City Middlegrounds, Bay City MID98102935	HA	1996	2	Proposed to the NPL	Ongoing
Berlin and Farro, Genesee, Swartz Creek MID000605717	HA HA	1985 1992	3 2	Deleted from NPL	Completed
Clare Water Supply, Clare, Clare MID980002273	HA SRU	1989 1993	3 3	NPL	Ongoing
Dow Chemical Co., MI Div., Midland Loc, Midland, Midland MID0007247242002	HC HC	2002 2004	3 3	Non NPL	Active site; RCRA supervised
Forest Waste Products, Genesee, Otisville MID980410740	HA HA	1988 1994	3 3	NPL	Completed
Gratiot County Landfill, Gratiot, St. Louis MID980506281	HA SRU	1982 1994	3 4	NPL	Completed
Hedblum Industries, Iosco, Oscoda MID980794408	HA	1989	3	NPL	Ongoing
Keit Property, Bay, Bay City MISFN0507867	HC	1998	3	Non NPL	Completed
Laingsburg, Shiawassee, Laingsburg MISFN0507944	HC	2000	3	Non NPL	Ongoing
Lufkin Rule, Saginaw, Saginaw MID985584598	HC	1997	2	Non NPL	Completed

Site Name, City, and CERCLIS ID	ATSDR Document Type	Document Year	ATSDR Hazard Category	Site Type	Remedial Status
Metamora Landfill, Lapeer, Metamora MID980506562	HA HA SRU	1989 1992 1995	3 3 4	NPL	Completed
Peet Packing MIN000508068	HC	2001	2	Non NPL	To be Determined
Shiawassee River, Livingston, Howell MID980794473	HA SRU HC	1989 1993 2006	3 3 3	NPL	Completed
Spiegelberg and Rasmussen Dump Sites, Livingston, Brighton MID980794481, MID95702210	HA HA	1989 1992	3 2	NPL	Ongoing
Tittabawassee River, Saginaw, Midland MID980994354	HC HC HC EI	2004 2005 2005 2007	3 2 2 N.S.	Non-NPL	Ongoing
Velsicol Chemical Corp., Gratiot, St. Louis MID000722439	HA SRU	1988 1993	3 3	NPL	Ongoing
Wurtsmith Air Force Base, Iosco MI5570024278	HA	2001	3	Proposed to the NPL	Ongoing

2=Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard, N.S.= Not Stated.

HA=Public Health Assessment, HC=Health Consultation, SRU=Site Review and Update, EI = Exposure Investigation

4.1.1.1 Bay City Middlegrounds

From 1956 to 1984, the 40-acre Bay City Middlegrounds site was an active landfill on Middleground Island, situated in the Saginaw River in southwestern Bay City (Bay County) MI. Today, Bay City Middlegrounds is abandoned. The landfill was partially capped and had a leachate collection system. Nevertheless, the cap and the lower cap were not fully sealed, thus leachate seeped out into ditches along the nearby roads. This site was proposed for the NPL in 1995. At the time of the 1996 ATSDR health assessment, the site was fenced on three sides but not on the fourth, the side that bordered the river.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	793
Females aged 15-44	1,662
Adults 65 and older	1,000

Public Health Outcome Data: In response to community health concerns, the Michigan Department of Community Health evaluated cancer incidence data for the area. Data for 1990–1992 showed no statistically significant difference in cancer incidence or mortality between Bay County and Michigan as a whole. The study collected 1990–1993 cancer incidence data for the ZIP code area that included the Middlegrounds site, for that part of Bay City west of the Saginaw River (48706), and for the ZIP code area that included Bay City east of the Saginaw River (48708). For the entire 1990–1993 period in ZIP code 48706, the data indicated a slight, statistically significant elevation in the cancer incidence rate, as compared with age- and sex-specific cancer incidence rates for Michigan as a whole. None of the cancer incidences or rates for ZIP code 48708 reached statistically significant levels compared with Michigan as a whole.

ATSDR Conclusions: In 1996, ATSDR found surface soil, groundwater, and river sediment at or near the site were contaminated with metals and trace levels of pesticides. ATSDR further found volatile and semi-volatile organic chemicals at concentrations potentially of human health concern, incidental but recurring trespass incidents, and PCB-laden discharges from the landfill that contributed to PCB bioaccumulation in Saginaw River fish. For all of these reasons, ATSDR concluded this site posed a *Public Health Hazard* (Category 2).

In 1996, many organic and inorganic chemicals, including several IJC-critical pollutants, were found in onsite soil, in groundwater, and in sediment at concentrations exceeding health-based screening values. Actual exposure doses, however, were not judged likely to be of health concern for trespassers on the site—except upon frequent or prolonged exposure, which was not likely to occur. Soil and sediment PAH concentrations, including B(a)P, were typical of urban soils. Lead concentrations in soil were well above background, but lower than 400 ppm.

Groundwater contaminated with PCBs discharged from the site into the Saginaw River. Downstream of the site, PCBs were found in the river water and in sediment at higher concentrations than upstream. But methylene chloride, detected in ambient air—including upwind of the site—at concentrations of human health concern, may not be site-related.

ATSDR found that this site contributed and continued to contribute to the environmental burden of the IJC-critical pollutant PCBs that migrate from the landfill into the Saginaw River. PCBs were the major concern. PCB bioaccumulation through the food chain into fish ingested by humans was a pathway of considerable concern. Although this site was not the sole source of PCBs discharged to the river, it contributed to the contaminant burden, and the PCB levels in fish were high enough to pose a risk of adverse health effects.

U.S. EPA Update: In its August 2006 Fact Sheet regarding the Bay City Middlegrounds site, U.S. EPA stated in part

> In order to protect human health and the environment the PRP has to address exceedances of PCBs and zinc that are above GSI [Groundwater Surface water Interface] criteria followed by long term monitoring to demonstrate GSI compliance. The PRP with their consultant met with MDEQ, and sampled the treatability study for Ammonia Evaluation Work

Plan of west channel of Saginaw River, and sampled the temperature and pH at the GSI well locations. In March 2006, on request of Michigan Department of Environment Quality (MDEQ), Conestoga-Rovers (consultants for Potential Responsible Parties) finished the treatability study for ammonia "Ammonia Work Plan" and awaiting response from MDEQ. In July 2006, Conestoga-Rovers provided results for the semi-annual monitoring event and the quarterly monitoring of the West Channel of the Saginaw River (River) for ammonia; collected additional pH and temperature data from the River; and met with the MDEQ to discuss the ammonia matter.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID981092935.htm. 2008 Aug [cited 2008 14 Jul].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessments of exposure-related issues, the IJC-critical pollutants PCBs, B(a)P, aldrin, dieldrin, hexachlorobenzene, lead, and mercury, were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.1.2 Berlin and Farro

From 1971 to 1978, Berlin and Farro (B & F), a licensed waste incineration facility, occupied this 40-acre site in Gaines Township near Swartz Creek (Genesee County) MI. Not long after commencing operations, the incoming volume of liquid industrial wastes overwhelmed the facility, and B & F owners and employees fell into violation of state and federal operating regulations. Waste liquids were stored in makeshift, unlined, and unlicensed lagoons and in unpermitted underground storage tanks. Some liquid waste-filled drums were simply buried. Onsite chemicals included organochlorine intermediates (hexachlorobenzene, hexachlorcyclopentadienes, and octachlorocyclopentene) used in the production of certain pesticides, as well as PCBs, benzene, and ethylbenzene.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	54
Females aged 15-44	148
Adults 65 and older	55

Public Health Outcome Data: In 1981, household health surveys were conducted within the approximate 2-square mile area surrounding the site. Surveys of a random sampling of the population, followed by a survey of all 122 households (418 persons), found that respiratory symptoms were statistically, significantly higher among those who reported exposure to incinerator smoke as compared with those who reported no incinerator smoke exposure. Although these findings may have suggested a potential link between incineration of hazardous wastes at the site and health problems, they did not provide insight into the potential health hazard from exposure to site-related contaminants.

Indeed, laboratory analyses of blood samples from 52 local residents revealed the presence of PCBs, DDT, and DDE at concentrations within the ranges generally found in Michigan residents, and thus did not indicate a specific effect from the B & F incinerator site.

ATSDR Conclusions: In 1985, ATSDR released a public health assessment that classified the site as an *Indeterminate Public Health Hazard* (Category 3). After additional information became available in 1992, a subsequent public health assessment elevated that classification to *Public Health Hazard* (Category 2). The new information indicated that the risks to human health from exposure to contaminants included pesticides, PCBs, and other semivolatile VOCs—any or all of which could have caused adverse health effects. Heavy metals, including arsenic, were also found in residential well water. Onsite soil and sediment contained high levels of the IJC-critical pollutant hexachlorobenzene; onsite surface water was also contaminated. Offsite sediment in the Slocum Drain, a stream draining the site, was contaminated with high levels of hexachlorobenzene. Offsite garden soil also contained hexachlorobenzene, but at much lower concentrations. Comparisons with health-based screening values, were, however, not available for hexachlorobenzene. Additionally, onsite soil and groundwater were contaminated with VOCs, including vinyl chloride and benzene. But as reported in ATSDR's 1992 health assessment, PCBs found in drums removed from the site were not detected in site media sampling. In fact, none of the offsite residential wells were contaminated with any of these compounds.

U.S. EPA Update: In its April 2008 Fact Sheet for the Berlin & Farro site, U.S. EPA stated in part that

> Final cleanup at the site, including excavation of soils, sediments, and aquifer materials commenced on December 15, 1995, and was completed on April 12, 1996. Excavated volume from all areas was approximately 69,000 cubic yards. Excavated areas were backfilled and regraded, using uncontaminated site materials. All excavated material was transported to offsite facilities for disposal. The landfill meets the Resource Conservation and Recovery Act Subtitle D and Michigan Act 451 Part 115 requirements for solid waste landfills. The site, which has been graded to enhance development of a wetland, meets standards for unrestricted use. All soil and groundwater cleanup standards have been met at the site. No contamination was found in any off-site ground water. The Close Out Report was issued on September 18, 1996. This site was deleted from the National Priorities List on June 24, 1998 and no further cleanup activity or operation and maintenance is planned at the Site.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID000605717.htm. 2008 Apr [cited 2008 14 Jul].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessments of exposure-related issues, the IJC-critical pollutants hexachlorobenzene and PCBs were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www. epa.gov/superfund/sites/npl.htm.

4.1.1.3 Clare Water Supply

Clare County Water supply is a municipal water supply wellfield in Clare (Clare County) MI. Information regarding this site is taken from the 1989 ATSDR public health assessment, the 1993 site review and update, and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	323

Females aged 15-44	718
Adults 65 and older	640

ATSDR Conclusions: In 1985, VOCs, including trichloroethylene and other chlorinated compounds, as well as benzene and xylenes at concentrations of public health concern, were present in the groundwater used as the municipal water supply. Past completed exposure pathways included ingestion, inhalation, and dermal contact with the water. Contaminated soil from industrial sites—the suspected contamination sources northwest of the wellfield—was removed, but at the time of the 1989 health assessment, updated monitoring data were not available.

Thus in 1989, ATSDR concluded that because VOCs, including TCE and PCE, were found in groundwater and because the status of area residential wells was unknown, this site presented an *Indeterminate Public Health Hazard* (Category 3). In its 1993 site review and update, ATSDR again concluded that this site presented an *Indeterminate Public Health Hazard* (Category 3). The site review conceded that a recently installed treatment system precluded any new exposures, and in-place institutional controls prevented construction of new private wells. Nevertheless, the extent of the contaminant plume had not been fully determined, and downgradient of the site operating private wells remained potentially vulnerable.

U.S. EPA Update: In its February 2007 Fact Sheet for the Clare Water Supply site, the U.S. EPA stated in part

> In September 2004, U.S. EPA, after appropriate consultation with MDEQ has determined that an ESD [Explanation of Significant Differences] is appropriate to explain and document modifications made to the 3 aspects of the remedy mentioned above. Modification of the remedy has been implemented to include a permeable reactive barrier (PRB) wall on the Mitchell facility that will intercept contaminated groundwater moving away from the Mitchell facility, replacement of municipal well #2 and adoption of new GSI criteria for ethylbenzene and toluene. The PRB was installed in December 2004 and the new municipal well was completed and turned on in September 2006.
>
> In April 2005 a site meeting was held among all of the PRPs, MDEQ, U.S. EPA and the City of Clare officials. The U.S. EPA explained U.S. EPA's objective of removing barriers created by Superfund to reuse and redevelop and how this might be worked into the agency's next five-year review. The City of Clare officials asked how parts of the Site, specifically that parcel that houses the soil treatment cell, might be re-used.
>
> The region, with the help of Headquarter's Re-use contractor, E-squared, completed a detailed Re-Use report for the Clare site and with the help of headquarters and the Army Corps of Engineers completed a Long Term Monitoring and Optimization (LTMO) analysis which included both temporal and spatial statistical analysis to determine the optimum sampling frequency and monitoring well locations. This is very key to implementing the recommendations of the September 2006 five year review which found the remedy to be protective but it identified areas of uncertainty that could be used to develop the sitewide O&M [Operations and Maintenance] Plan.

Available at: http://www.epa.gov/region5/superfund/npl/michigan/MID980002273.htm. 2007 Feb [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site. For a more complete listing of hazardous substances that were found at this site, please refer to www.usepa.gov/superfund/sites/npl/npl.htm.

4.1.1.4 Dow Chemical Co., Michigan Division, Midland Location

The Dow Chemical Company plant in the City of Midland (Midland County) MI was the subject of an ATSDR health consultation triggered by community concerns regarding high levels of PCDDs in Midland soil and in fish in the nearby Tittabawassee River, downstream of Midland. The Dow plant encompasses approximately 1,900 acres on the southern perimeter of the city. The Tittabawassee River forms the plant site southern boundary and flows southeast to join with the Saginaw River in the vicinity of the City of Saginaw.

In the late 1800s, the Dow plant began production of chlorine from brine using an electrolytic cell process. PCDDs, PCDFs, and octachlorostyrene are known byproducts. A variety of chemicals have been produced at this Dow plant, including Agent Orange [which contains 2,4,5-trichlorophenoxyacetic acid (2,4,5-T)], and 2,4,5-trichlorophenol. In some chlorinated phenolic chemicals— such as 2,4,5-trichlorophenol and 2,4,5-T— PCDDs and PCDFs are known impurities. Chlorophenol production began in 1915. Wastes generated from this process were initially transferred to 600 acres of onsite waste ponds. During high flow periods in the early 1900s, wastes from these ponds were intentionally released to the Tittabawassee River. Some site waste was trucked from the Dow plant to local landfills. More recently, Dow constructed its own onsite wastewater treatment plant, but a 1986 flood overwhelmed the plant. Runoff flooded adjoining areas, contaminating soils with PCDDs. The runoff and untreated or partially treated chemical wastes then entered the Tittabawassee River. Today, Dow operates two incinerators for treatment of liquid and solid hazardous and nonhazardous wastes generated from onsite manufacturing processes. Incineration of chlorine-containing wastes, however, also produces PCDDs and PCDFs.

Information regarding this site is taken from the ATSDR's 2002 and 2004 health consultations. These consultations focused on soil contamination. Separate health consultations addressed contamination in the Tittabawassee River floodplain near the City of Saginaw, in Saginaw County.

Public Health Outcome Data: In 2006, U.S. EPA reported that for 1960–1969 and 1970–1978, respectively, mortality rates from soft and connective tissue cancers among white females from Midland County were confirmed to be 3.8 and 4.0 times the national average. While the statistically significant excess cancer rates may have occurred by chance alone, that outcome was considered unlikely, thus suggesting involvement of other exposure factors.

An analysis of cancer incidence data for ZIP codes 48640 (southwest area of Midland including the Dow plant site) and 48642 (area northeast of the Dow plant) as compared with Midland County, Bay County, and the state of Michigan showed no elevated incidences of specific cancer types in these two ZIP code areas. A higher-than-expected incidence of all cancers combined in 48640 (but not 48642), as compared with Midland County, Bay County, and the state of Michigan, did occur for years 1994 through 1998 and for all years combined. A higher-than-expected incidence of all cancers combined was seen in this ZIP code area upwind of the site. But a similar increase was not seen in the ZIP code area downwind of the site, which, from the

Dow Chemical Company's onsite incineration of chemical wastes, was considered more highly contaminated with PCDDs and PCDFs. An interpretation of this data is problematic. For the same two ZIP code areas computed, age-adjusted incidence rates for thyroid cancer were considered statistically unreliable. The Michigan Department of Community Health documented this conclusion in a June 5, 2001, table, but did not include any supporting numeric values.

An analysis of birth defects data for 1992 through 1996 from the Michigan Birth Defects Registry did not show any consistent pattern of excesses in any particular category or for birth defects overall for Midland County (about 1,000 births/year). No excess was seen for types of birth defects, such as anencephaly, spina bifida, and cleft lip, all of which had been reported as related to dioxin exposure.

In addition, In 2006, U.S. EPA reported that the Michigan Department of Public Health evaluation of congenital malformation rates and soft and connective tissue cancer mortality rates found higher than expected birth defects and cancer in Midland. Specifically, data from birth and fetal death records showed significantly higher rates in Midland County for four anomalies when the number of these anomalies was compared with those documented for the entire State of Michigan. The data were for grouped years 1970 to 1975. The defects included cleft lip with or without cleft palate, cleft palate without cleft lip, hypospadias, and hip dislocation without CNS defects.

ATSDR Conclusions: Because the necessary data are not available to determine whether dioxin-contaminated soil in the Midland area poses a public health risk, this site was categorized as an *Indeterminate Public Health Hazard* (Category 3). ATSDR and the U.S. EPA concluded that the dioxin contamination (as PCDDs and PCDFs) found in some Midland residential soils and in fish presents an unacceptable public health risk. The IJC-critical pollutants PCDDs and PCDFs were found in soil concentrations (expressed as total toxic equivalent, TEQ) at the Dow plant. The residential areas to the northeast are expected to have the highest impact from past incinerator emissions, but no data are available concerning dioxin concentrations in these areas of Midland. Most of the TEQ concentration data for the community fall within the range (>50 but <1000 ppt TEQs). Those levels trigger additional ATSDR evaluation, including consideration of background and bioavailability data to evaluate the incremental contribution of soil exposure, but the necessary information was not available. An initial investigation for contaminants other than PCDDs and PCDFs was scheduled for 2007. Fish contamination by PCDDs and PCDFs that have resulted in fish consumption advisories represent a completed exposure pathway

U.S. EPA Update: U.S. EPA reports that the remedial investigation is ongoing. Some source area removals have been conducted and other interim measures to limit human exposures are underway. Dow-funded sampling has been conducted in support of a risk assessment.

Available at: http://www.epa.gov/region5/sites/dowchemical/background.htm. [cited 2008 Jul 29]. See also http://www.michigan.gov/deq/0,1607,7-135-3311_4109_9846_9847-43808--,00.html. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCDDs and PCDFs were identified at this site.

4.1.1.5 Forest Waste Products

Forest Waste Products occupies 112 acres 2 miles northwest of Otisville (Genesee County) MI. The site includes an 11-acre landfill, which from 1972 to 1978 accepted general refuse and

industrial and liquid waste. Nine lagoons covering about 1 acre also held industrial waste. Wastes included sludge and residues from a chemical warehouse fire, PCB-contaminated roofing material, and PBB-contaminated cattle feed. In 1978, the landfill was covered with soil. An estimated 3,000 waste drums may have been buried in the landfill. As of ATSDR's 1994 public health assessment, the site had been fenced, the lagoon waste material excavated and removed, and some of the drums removed and disposed of offsite. Site information is from the 1994 ATSDR public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	34
Females aged 15-44	81
Adults 65 and older	48

ATSDR Conclusions: ATSDR's 1988 health assessment and its subsequent 1994 health assessment both categorized this site as an *Indeterminate Public Health Hazard* (Category 3). The 1994 assessment found that human exposure did not rise to levels of concern. But concerns remained regarding the large number of drums reportedly buried in the landfill and the unguarded lagoons. Drum contents—chromium, TCE and PCE, among others—could release into the environment and possibly into residential wells. Children could fall into the lagoons.

Yet the one completed exposure pathway involved arsenic—the one chemical found at levels of human health concern. Arsenic was found in residential wells near the site, but thought to be of natural origin rather than site-related.

Whether this site contributed to environmental contamination with IJC-critical pollutant PCBs in the past is uncertain. Indeed, no known, current exposure of humans to site-related contaminants at levels of concern was identified. Moreover, additional remediation activities, as described in the U.S. EPA NPL site Fact Sheet, resulted in excavation and removal of buried drums and associated contaminated soil, and installation of a landfill cap. Monitoring of groundwater continues; in particular, U.S. EPA is watching a VOC plume known to have migrated northward off the property.

U.S. EPA Update: In its November 2007 Fact Sheet for the Forest Waste Products site, U.S. EPA stated in part that

> The private parties initiated evaluation of groundwater treatment technologies to treat the groundwater north of the landfill in 2001. From 2003 - 2007, the private parties conducted sampling and testing for two cleanup technologies. In September 2005, U.S. EPA decided that the cleanup of the contamination north of the landfill should include: expanding the site to include the additional 80-acre parcel; applying the cleanup standards to the boundaries of the expanded site and using natural dilution and biodegradation to help achieve the cleanup standards; treatment of deep and shallow groundwater contamination near and beyond the expanded site boundaries by injecting chemicals; treatment of shallow groundwater near the landfill by injecting oxygen or by digging a trench through the shallow groundwater and injecting air to remove the contamination; shut-down criteria for the groundwater

treatment; and restricting installation of new monitoring wells near the site using the Genesee County Health Regulations.

From 2005 - 2006, U.S. EPA worked with the private parties, and Genesee County to better define the groundwater pumping restriction areas, and construction requirements for new wells in these areas. In September 2007, the private parties initiated the chemical injections in accordance with approved plans, but injections near a lake are being delayed because of concern about the chemicals entering the lake. After review of the most recent data, and modeling results, in November 2007 U.S. EPA decided that groundwater treatment near the landfill is not required at this time because VOC concentrations have significantly reduced near the landfill, and are at very low concentrations a short distance farther from the landfill.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980410740.htm. 2007 Nov [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the following IJC-critical pollutants were identified: lead, dioxins, furans, mercury, 4,4'-DDE, polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs—including acenaphthylene, chrysene, dibenz[a,h] anthracene, phenanthrene, benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene). For a more complete listing of the hazardous substances found at this site, please refer to http://www.epa.gov/superfund/sites/npl/npl.htm.

4.1.1.6 Gratiot County Landfill

The Gratiot County landfill is on a 40-acre parcel southeast of St. Louis, MI. The landfill accepted general refuse, but its owner, Michigan Chemical Company, also used the landfill to dispose of chemical wastes. Before 1977, Michigan Chemical dumped some 269,000 pounds of PBBs. The information regarding this site is from the 1982 ATSDR health assessment and the 2008 U.S. EPA NPL site Fact Sheet.

Because PBBs had been detected in groundwater at concentrations above health-based screening values, ATSDR's 1982 health assessment was primarily a review of a technical report regarding potential control strategies for onsite PBB contamination. No IJC-critical pollutants were mentioned in the health assessment or in the NPL Fact Sheet, but apparently, VOCs were nonetheless released from the site.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	170
Females aged 15-44	390
Adults 65 and older	252

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants and because of the poor quality of the monitoring data in the support documents, the 1982 health assessment focused on PBBs. The assessment categorized the site as an *Indeterminate Public Health Hazard* (Category 3). Because subsequent remedial activities

apparently mitigated the hazard, a 1994 ATSDR site review and update found the site was *No Apparent Health Hazard* (Category 4).

U.S. EPA Update: In its April 2008 Fact Sheet for the Gratiot County Landfill site, U.S. EPA stated in part that

> In 1996, as part of a second five-year review, an investigation to determine the extent of contamination outside the slurry wall/landfill began. Based on the investigation's results, the state of Michigan installed a groundwater extraction and treatment system (GETS) to contain contaminated groundwater southwest of the site. Construction of the GETS was completed in 1998. The GETS utilized air stripping as a form of groundwater treatment prior to discharge.
>
> Following the third five-year review in September 2001, the following actions occurred: (1) the state of Michigan evaluated the GETS system and analytical data, determined that the GETS system contained the plume and lowered contaminant levels in the groundwater, and shut down the GETS system in 2005. If 2006 analytical results are consistent, the system will be shut down permanently; (2) five methane vents and 22 monitoring points were installed, (3) the landfill cap was evaluated and repaired, (4) the slurry wall was evaluated and monitoring wells have not indicated contamination leaching from the landfill.
>
> The fourth five-year review in 2006 concluded that remedy is complete and is protective of human health and the environment at this time, and exposure pathways that could result in unacceptable risks are being controlled. However, in order for the remedy to remain protective in the long-term, the landfill cap must be maintained and effective institutional controls must be implemented, maintained, and monitored. Continued groundwater and methane monitoring is also necessary to ensure that the remedy remains protective.
>
> The fifth five-year review is scheduled to be completed in September 2011.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980506281.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, PAHs, DDT, aldrin, and dieldrin were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.usepa.gov/superfund/sites/npl/npl.htm

4.1.1.7 Hedblum Industries

Occupying a 10-acre parcel in Oscoda (Iosco County) MI, the Hedblum Industries site is 1.2 miles west of Lake Huron. A series of leases to auto industry parts manufacturers resulted in the disposal of waste chemicals—including an estimated 4,000 gallons of spent trichloroethylene from a degreasing operation—into a pit near the main building. During 1973–1977, a number of residential wells in the area became contaminated, the result of a rupture in a connecter pipe for an underground trichloroethylene storage tank. Although as an emergency measure in 1978 most of the affected residences were supplied with municipal water, a number were not.

Trichloroethylene also was found in the bayou into which groundwater from the site discharged and which fed into the Au Sable River.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	135
Females aged 15-44	331
Adults 65 and older	349

ATSDR Conclusions: Because of the potential threat to human health from exposure to trichloroethylene and other VOCs, in 1989 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). TCE was identified in residential well water, and up to eight households used contaminated well water for an indeterminate time before the homes were connected to municipal water. Data to measure the risks were, however, inadequate.

U.S. EPA Update: In its December 2007 Fact Sheet for the Hedblum Industries site, U.S. EPA stated in part that

> The VAS [Vertical Aquifer Sampling] investigation and studies to optimize the groundwater extraction system were performed by MDEQ during summer 2005. In coordination with U.S. EPA, an investigation report was released in November 2005 indicating that the existing RA was not capturing the plume effectively, and that the groundwater extraction and treatment system must be expanded and operated more effectively. Additional data collection was independently performed in 2005 and 2006 by MDEQ and the PRPs. The sampling included the private wells of those residents still using the wells for drinking water or other purposes. To date, only one resident voluntarily uses a private well for drinking and other household needs. A few residents use a private well solely for outdoor activities. All residents have been notified and advised to discontinue use of these wells.
>
> The U.S. EPA and MDEQ are currently reviewing a proposal by the PRPs to improve the groundwater cleanup. Their proposal is to install a large recirculation well system in the plume area that would operate in addition to the existing groundwater extraction and treatment system. The proposal also includes actions to improve the operation and maintenance of the current plume capture system. The goal of the PRPs, using the proposed system, is to clean up the groundwater contamination plume by the next five-year review in 2009.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980794408.htm. 2007 Dec [cited 2008 Apr 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessments of exposure-related issues, no IJC-critical pollutants were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.1.8 Keit Property

The Keit property comprises 18 acres of wetlands, grasslands, and woods in southwest Bay City (Bay County) MI. The property had been farmed since 1886, but during a 1980s sewer project a large part of it was filled in with waste material, including asbestos panels. In 1998, because the property was under consideration for brownfields redevelopment as a public park, ATSDR conducted a health consultation.

ATSDR Conclusions: ATSDR concluded that if the asbestos panels were not removed from the property before its rehabilitation as a public park, the potential exposure threat was an *Indeterminate Public Health Hazard* (Category 3). Soil concentrations of the IJC-critical pollutant B(a)P exceeded health based screening values in a few locations, but that was typical for urban soils. Although subsurface soil in one location contained PCBs above health-based screening values, this was not a generalized finding—surface soil PCBs concentrations were not of concern. The primary hazard was a pile of Transite panels that contained 40% chrysotile asbestos. Were the panels allowed to weather, or if they were not handled properly, they could release asbestos fibers.

On balance, however, this site did not appear to have contributed significantly to the environmental burden of IJC-critical pollutants or other chemicals, or to direct human exposure at levels that might currently pose a health risk.

U.S. EPA Update: The Keit Property site is a state brownfields site and is not included in the CERCLIS database.

Michigan Department of Community Health Update: In 1998, the Michigan Department of Environmental Quality determined that the limited detections of PCBs and B(a)P would not present unacceptable risks to people using the property after it was redeveloped for recreational use. The asbestos panels were removed from the Keit Property and all physical hazards were addressed. This area has been redeveloped and is now the Euclid Linear Park (Rhonda Klann, Michigan Department of Environmental Quality, personal communication; 2008 Aug 19).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants aldrin, dieldrin, PAHs, DDT, PCBs, lead, and mercury were identified at this site.

4.1.1.9 Laingsburg

The Laingsburg property is a former gasoline and automotive service station in the City of Laingsburg (Shiawassee County) MI. The service station ceased operations in 1984; since then, the building had been used for automotive repair and body shop work. Records indicated that three underground fuel storage tanks may have been on the property, but whether the tanks were ever removed was unclear. ATSDR's 2000 health consultation completed as part of a brownfields project is the source of information regarding this site.

ATSDR Conclusions: This was a brownfields site where no data were available except for some VOC-contaminated soil samples collected from outside the perimeter fence. Access to the site was denied, thus no onsite monitoring data are available. Subsurface soil sampled around the site perimeter contained trimethylbenzene and xylenes above screening values for industrial or commercial use. Shallow groundwater at the site perimeter was similarly contaminated—one monitoring well had a floating oily layer liquid containing trimethylbenzenes and other VOCs. Concentrations exceeded drinking water standards or screening levels. The contamination was consistent with gasoline leaking from the underground storage tanks.

Because of the potential threat to human health from exposure to contaminants and because of the lack of adequate monitoring data, in 2000 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3).

U.S. EPA Update: Laingsburg is a state brownfields site and is not included in the CERCLIS database.

The Michigan Department of Community Health Update: This site may have released gasoline from underground storage tanks, but because of the denial of site access any available monitoring data were inadequate to assess the potential threat to public health. Michigan Department of Environmental Quality plans to remove underground storage tanks in 2008, monitor groundwater, and perform any interim response as needed (Superfund Section, Remediation and Redevelopment Division, Michigan Department of Environmental Quality, personal communication; 2008 Aug 21).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants aldrin, lead, mercury, and furans were identified at this site.

4.1.1.10 Lufkin Rule

The 14-acre Lufkin Rule site is a large, abandoned industrial property in a mostly residential area of Saginaw (Saginaw County) MI. After Lufkin sold the property, a number of tenants successively occupied it. In 1994, a dry cleaning establishment on the property burned, and the remnants were later demolished. Since that time no one has rented the property; it remained strewn with drums full of dry-cleaning solvents, and with PCB-laden transformers, capacitors, and other electrical equipment. The site contained 55 dangerous buildings, three USTs, six ASTs, and two large smokestacks. Some of the equipment had been scavenged, and the PCB-saturated fluids spilled on the ground. In 1995, the PCB-contaminated fluids and soil, the drummed solvents, and other waste materials were removed for disposal at an approved facility. Information regarding this site is from ATSDR's 1997 health consultation.

ATSDR Conclusions: Because of the physical hazards in the abandoned and decrepit buildings on the property, and because contaminants in soil would pose health hazards to anyone working on the property for long periods, in 1997 ATSDR categorized this site as a *Public Health Hazard* (Category 2). The site was not secured from trespassers, and evidence indicated extensive trespassing. Soil-contamination hot spots permeated with the IJC-critical pollutant PCBs and also with bis(2,3 ethylhexyl) phthalate. This contamination could have posed inadvertent ingestion hazards to anyone working in those areas for long periods or visiting those areas daily over a long period of time. Such a scenario was, however, considered unlikely. Levels of the IJC-critical pollutants B(a)P and lead in soil and storm sewer sediment were within ranges typically found in urban areas. Groundwater was contaminated with trichloroethylene, but was not a drinking water source. Nevertheless, levels of trichloroethylene and other VOCs in storm sewer water were above drinking water standards. Trichloroethylene's in the groundwater pointed to its release from the site through runoff.

Some 10 years ago, this site was redeveloped as part of the tax-free City of Saginaw and Saginaw County Renaissance Zone. See http://www.egr.msu.edu/tosc/saginaw/saginawoverview.shtml. [cited 2008 Oct 20].

U.S. EPA Update: Lufkin Rule is a state brownfields site and is not included in the CERCLIS database.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, furans, DDT, lead, PAHs, aldrin, dieldrin, and mercury were identified at this site.

4.1.1.11 Metamora Landfill

This 160-acre site near the village of Metamora (Lapeer County) MI, contained a 25-acre landfill and two drum disposal areas. This site may have received many thousands of drums mostly filled with paint and solvents. Testing of the drum wastes revealed that they in fact did contain VOCs, SVOCs, PAHs, and metals at concentrations as high as 15% and PCBs at as high as 1,200,000 ppb.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	98
Females aged 15-44	205
Adults 65 and older	93

ATSDR Conclusions: Although at the time of ATSDR's involvement with the site no exposures at levels of concern had been documented, the potential remained for future exposure through domestic groundwater use. Consequently, a 1992 health assessment categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent 1995 ATSDR site review and update concluded, however, that the site posed *No Apparent Public Health Hazard* (Category 4).

In 1992, ATSDR was concerned that if in the future the shallow groundwater plume extended as far as the private wells that tapped the shallow aquifer, people could be exposed to VOCs and metals—particularly arsenic—at concentrations that could result in adverse health effects. Although the IJC-critical pollutant PCBs was found at high concentrations in drums at the site, no further mention was made of this pollutant in the health assessment—an implication that PCBs had not significantly contaminated the environment. Remediation included incineration of approximately 35,000 drums and 10,000 tons of soil offsite, and covering minimally contaminated soil under a landfill cap onsite. Groundwater studies in 1997, 1999, and 2000 indicated the VOC groundwater plume had been stabilized. Monitored natural attenuation thus emerged as the preferred groundwater remedy. This site may have contributed to the environmental burden of VOCs, but it has been remediated. Extensive remediation of the site, including onsite incineration of wastes and disposal of the resulting ash in the landfill, capping, vegetating, and installing a runoff treatment system, and installing a groundwater extraction system, largely eliminated any contaminant releases from the site.

U.S. EPA Update: In its October 2006 Fact Sheet for the Metamora site, U.S. EPA stated in part that

> The U.S. EPA has completed three Five-Year Reviews of the remedies selected for the Metamora Landfill Site. These reviews were completed in August 1993, September 1999, and September 2004. The latest Five-Year Review completed in 2004 determined that the selected remedies remained protective of human health and the environment. The next Five Year Review at the Metamora Landfill Site will begin in June 2009.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980506562.htm. 2006 Oct [cited 2009 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, mercury, TCDD, PAHs, and PCBs, were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.1.12 Peet Packing Company Property

The Peet Packing property was a former meat-packing plant at the north village limits of Chesaning, Michigan. The plant operated from the late 1800s until the company declared bankruptcy in 1995, after which the plant was abandoned. In 1992, the company had remediated a leaking underground storage tank under its building. In 2000, the U.S. EPA removed the hazardous wastes, hazardous chemicals, and friable asbestos insulation from the onsite buildings.

ATSDR Conclusions: In 2001, ATSDR concluded that under then-current site conditions the site posed no apparent health hazard due to chemical contaminants, but did pose a *Public Health Hazard* (Category 2) for future use. Although the site was proposed for future commercial or industrial use, if it were so redeveloped it could, because of high levels of lead in the soil, pose a public health hazard for workers. In addition, levels of aluminum, antimony, arsenic, lead, manganese, thallium, and vanadium that exceeded both state and federal drinking water standards were detected in groundwater. While in 2001, the groundwater was not a drinking water source, if drinking water wells were installed in the future, the contaminants would present a public health hazard. Finally, inside the remaining onsite buildings, asbestos material could release asbestos fibers into the air if the materials were exposed to ambient weather conditions or otherwise allowed to deteriorate.

U.S. EPA Update: Peet Packing Company is not a U.S. EPA site and does not appear in the CERCLIS database.

The Michigan Department of Community Health Update: To date, no additional regulatory actions have been taken (Patricia Williams, Michigan Department of Environmental Quality, personal communication; 2008 August 15).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, polychlorinated biphenyls (PCBs), and polyaromatic hydrocarbons (PAHs) including, phenanthrene, benzo[a]pyrene, and fluoranthene were identified.

4.1.1.13 Shiawassee River

From 1969 to 1973, the Cast Forge Company discharged PCB-contaminated hydraulic fluid wastewater into the South Branch of the Shiawassee River. The Livingston County, MI, river became contaminated with PCBs and thereby became a public health problem. From 1973 to 1977, Cast Forge also discharged wastewater into a 400,000-gallon onsite lagoon. These discharges and overflows from the lagoon contaminated not only the Shiawassee River, but nearby wetlands as well. Beginning in 1982, the company removed the lagoon, cleaned up the PCB-contaminated soil and sediment from its property, and provided funds for restoration of the river. Dredging of the South Branch began in 1982, resulting in the removal of some 2,600 pounds of PCBs in the first mile downstream from the plant. As of ATSDR's 1989 health assessment, 1993 ATSDR site review and update, and 2006 health consultation—from which information on this site is taken—both the company property and the river remained contaminated. Additional and updated information is from the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	397
Females aged 15-44	885
Adults 65 and older	615

ATSDR Conclusions: Because of the risk to human health from potential exposure to PCBs at levels that could result in adverse health effects, ATSDR's 1989 health assessment categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent 1993 ATSDR site review and update reiterated that health hazard category. The 1993 site review and update found that potentially, people could potentially still come into contact with PCB-contaminated soil, sediment, or food. More recently, in 2006, ATSDR determined that data were insufficient to recategorize the site, although PCBs in some river sediment and floodplain soil samples exceeded Michigan's "action levels." The concern was for such exposure pathways as direct contact with PCB-contaminated river sediments or eating PCB-contaminated fish or wildlife. PCB levels in fish tissue downstream from Cast Forge were high; indeed, the State of Michigan in 1979 issued advisories against consumptions of contaminated-zone fish.

U.S. EPA Update: In its April 2008 Fact Sheet for the Shiawassee River site, U.S. EPA stated in part that

> The RI [Remedial Investigation] report was finalized in January 1992. The final study of cleanup alternatives was submitted in December 1997, and a proposed plan was released to the public in August 1998. Because the data, used to develop cost estimates, were obtained as long ago as 1986, it was determined that additional data should be obtained to develop more accurate cost estimates for the site.
>
> Additional sampling of the site began in November 1999 and was completed in April 2000. These sample data were released to the public in the data evaluation report in May 2000. The supplemental FS report was released in early 2001, and a Record of Decision (ROD) was signed on September 28, 2001. The ROD selected the floodplain and contaminated areas near the Cast Forge facility to be remediated to less than 10 ppm PCBs. The river was to be remediated to less than 5ppm PCBs for the first mile downstream of the facility. Remediation was completed in 2005, meeting all ROD requirements.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980794473.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants dioxin PCBs, furans, TCDD, DDT, and PAHs were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.1.14 Spiegelberg and Rasmussen Dump Sites

The 115-acre Spiegelberg Site and the 33-acre Rasmussen Dump are two separate Livingston County, MI sites that share a common property line. In ATSDR health assessments they are considered together. Both sites were used for the disposal of municipal and industrial wastes.

Paint wastes were disposed on the Spiegelberg Site, and drummed industrial wastes were disposed on the Rasmussen site. In 1984, many of the drums were removed, together with contaminated soil. Both sites contain a few residences. Information regarding these sites is taken from ATSDR's 1989 public health assessment, from the 1992 public health assessment addendum, and from the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of these sites:

	Spiegelberg	*Rassmussen*
Children 6 years and younger	119	59
Females aged 15–44	223	21
Adults 65 years and older	73	54

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants at levels that may result in adverse health effects and because of incomplete monitoring data, in 1989 ATSDR categorized these sites as an *Indeterminate Public Health Hazard* (Category 3). In, because of the threat of exposure to contaminated groundwater that was likely to occur unless the remedial actions indicated for this site were carried out, the 1992 health assessment recategorized the sites as *Public Health Hazards* (Category 2).

In 1989, chemicals of concern in potential exposure pathways at the sites included the IJC-critical pollutants PCBs (groundwater and soil) and lead (groundwater and soil). Other contaminants of concern in potential exposure pathways were VOCs in groundwater, including vinyl chloride and methylene chloride. In 1992, additional testing supported the findings from the 1989 health assessment. Remedial actions included the removal of additional drums and contaminated soil with disposal offsite, installation of a landfill cap, and installation of groundwater treatment. These actions were found to be protective of public health and the environment.

U.S. EPA Update: In its October 2006 Fact Sheet for the Spiegelberg site, U.S. EPA stated in part

> The second five-year review report was issued on January 28, 2005. The review found that the confirmation monitoring period (post intermittent pumping monitoring) consisted of twelve monitoring events from September 1998 to December 2004. The monitoring results have demonstrated continued compliance with the 1998 Cleanup Standards, and has established that the Site has achieved groundwater cleanup goals. No contaminants of concern have been found above Maximum Contaminant Limits since 1998. In addition, no other Hazardous Substance List (HSL) compounds were detected above risk based levels for the final December 2004 monitoring event. The HSL analysis included all chemicals found during the Remedial Investigation (RI). Conducting the HSL analysis insured that all chemicals found during the RI were below health based values. The second five-year review concluded that the remedy remains protective of human health and the environment.
>
> U.S. EPA will be ensuring that the PRPs have completed all response actions so that site conditions remain protective of human health and the

environment. Once this review is completed and all work is completed, U.S. EPA will begin the deletion process from the NPL.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980794481.htm. 2006 Oct [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants dioxin (TCDD), furans, lead, and PCBs were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.usepa.gov/superfund/sites/npl/npl.htm.

4.1.1.15 Tittabawassee River

This site is so named because the ATSDR health consultation focused on the Tittabawassee River floodplain. The Tittabawassee flows through the City of Midland (Midland County) MI—home of the Dow Chemical Company. It continues southeast to the City of Saginaw, MI, where it joins the Saginaw River, which flows northeast through the cities of Saginaw and Bay City, ultimately emptying into Lake Huron. From Midland to Lake Huron, the Tittabawassee and Saginaw Rivers cover some 50 miles and pass through at least three major metropolitan areas.

Community concerns triggered the ATSDR health consultation. High levels of PCDDs had been detected in Midland city soil and in Tittabawassee River fish downstream of Midland. An additional concern arose following the sampling of the Tittabawassee floodplain near the confluence of the Tittabawassee and Saginaw Rivers over 20 miles southeast of Midland. Samples revealed higher than background levels of dioxin contamination. The soil contamination issue was considered in the ATSDR health consultation on the Dow Chemical Co. site, discussed in Section 4.1.1.4, where plant location and releases to the environment are described. Contamination of the Tittabawassee River floodplain is considered in a separate 2004 ATSDR health consultation, summarized below.

The Tittabawassee floodplain area potentially of concern extends from the City of Midland in Midland County to the City of Saginaw in Saginaw County. The sampling sites were within Saginaw County. In 2005, ATSDR also conducted two health consultations that examined consumption of fish and wild game from the Tittabawassee River and flood plain areas. In 2004 and 2005, Michigan Department of Community Health, in cooperation with the Michigan Department of Environmental Quality and ATSDR, conducted a Pilot Exposure Investigation (PEI) in the Tittabawassee River flood plain. The report was released in 2007. The PEI tested exposure investigation methods and provided information about levels of DLC in soil, indoor dust, and human blood samples.

Public Health Exposure Data: In 2006, Dow Chemical Company funded a University of Michigan dioxin exposure study. Some key findings were

- Residents living in regions with expected dioxin contamination (Midland/Saginaw) have higher concentrations of dioxins in their blood than do residents in a control area without dioxin contamination.
- Residents in areas with higher levels of dioxins in soil have a higher TEQ (total dioxin-like activity) in their blood.
- Populations consuming fish from the Tittabawassee River, Saginaw River, and Saginaw Bay waterways have higher concentrations of dioxins in their blood than do people who do not eat fish from these waterways.

- Populations participating in recreational activities in the Tittabawassee River, Saginaw River, and Saginaw Bay have higher concentrations of dioxins in their blood than do persons who do not participate.

ATSDR Conclusions: In 2004, ATSDR concluded that because the data were insufficient to determine whether the dioxin-like compounds then contaminating floodplain soil in the Tittabawassee River watershed posed a public health risk, the site was an *Indeterminate Public Health Hazard* (Category 3). But in 2005, ATSDR found that the consumption of dioxin-like compounds (DLCs) in the liver of white-tail deer and in turkey meat—with and without skin—harvested from the Tittabawassee River downstream of Midland presented a *Public Health Hazard* (Category 2). Moreover, consumption of DLCs in deer and squirrel muscle meat presented a public health hazard to women of childbearing age and to children under the age of 15. Finally, ATSDR determined in 2005 that past and current dioxin and dioxin-like chemical exposure from the consumption of certain fish diets of Tittabawassee River fish were and are a *Public Health Hazard* (Category 2).

U.S. EPA Update: Tittabawassee River is not a federal site—it has been deferred to RCRA. In 2004, however, the State of Michigan issued a Wild Game Advisory, advising that hunters and families should not eat deer liver or turkey meat harvested from the Tittabawassee River floodplain. The advisory further cautioned women of child-bearing age and children under the age of 15 to eat only one meal a week of deer or squirrel muscle meat. In its May, 2008, background discussion of the Tittabawassee River site, U.S. EPA stated

> The highest dioxin concentrations detected to date are 110,000 parts per trillion TEQ in the Tittabawassee River and 1,600,000 parts per trillion TEQ in the Saginaw River. These high levels led to Dow's cleanup of four hot spots in 2007, with EPA oversight. Fish and invertebrates within the Tittabawassee and Saginaw Rivers are contaminated. The Michigan Department of Community Health has issued fish and game consumption advisories.

In fact, since the 1970s the Michigan Department of Community Health has issued fish consumption advisories for the Tittabawassee River.

Available at: http://www.epa.gov/region5/sites/dowchemical/background.htm. [cited 2008 Jul 29]. See also http://www.michigan.gov/deq/0,1607,7-135-3311_4109_9846_9847-43808--,00.html. [cited 2008 Jul 29].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCDDs and PCDFs were identified at this site.

4.1.1.16 Velsicol Chemical

Velsicol Chemical Corporation was previously known as the Michigan Chemical Company. This 52-acre production facility is within the city limits of St. Louis (Gratiot County) MI. It is surrounded on three sides by the Pine River, a tributary of the Tittabawasse River, which joins the Saginaw River near the City of Saginaw. From 1936 to 1978, the Velsicol St. Louis facility produced a variety of chemicals, including PBBs and DDT. In 1985, Velsicol completed construction of an onsite containment system: a slurry wall around the entire site and a clay cap over it.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	365
Females aged 15-44	821
Adults 65 and older	676

Public Health Outcome Data: In 1976, the Michigan Department of Public Health recruited many Velsicol workers for a PBB health study. To observe the long-term effects of PBB exposure, workers and their families were placed in a registry. The study was conducted in cooperation with the CDC, FDA, and U.S. EPA, and was ongoing at the time of the 1988 health assessment. Study findings included some evidence of an association between high PBB exposure and an elevated risk of breast and digestive system cancers and lymphomas. Because of the small number of cases, these findings yielded no definitive conclusions. In addition, higher rates of neurological, immunologic, dermatologic, and musculoskeletal health effects were observed in the registry cohort. Yet again, no consistent pattern surfaced of an association between these health effects and serum PBB levels. The study results were drawn from a Fact Sheet of Frequently Asked Questions about PBBs in Michigan, published by the Michigan Department of Community Health available at http://www.michigan.gov/documents/mdch_PBB_FAQ_92051_7.pdf [cited 2006]

ATSDR Conclusions: Despite issuance of a fish consumption advisory, in the late 1980s exposure to PBBs through the food chain (fish and wildlife) was an ongoing public health threat. Thus in 1988, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent 1993 site review and update similarly categorized the site.

In 1982, Velsicol began construction of the containment system at the main plant site, which was completed in 1985. System water levels, however, continued to rise, and with them the potential exposure of PBB bioaccumulation in fish and wildlife. Although at the time ATSDR noted that PBB concentrations were declining in fish, river water, and sediment, subsequent developments threatened that observation. By 1994, the slurry wall had deteriorated, admitting water into the containment system. High levels of DDT and metabolites were discovered in the sediment of the Pine River/St. Louis impoundment, and dense nonaqueous phase liquids (DNAPL) had migrated from the containment area into the glacial till underlying the river sediments.

U.S. EPA Update: In its April 2008 Fact Sheet for the Velsicol Chemical site, U.S. EPA stated in part

> MDEQ released the RI Report for OU [Operable Unit] 1 in late November 2006 and held a public meeting to discuss the findings in early December 2006. A copy of the report is available at the St. Louis public library. The report includes the results of site investigation work at the main plant site, as well as at adjacent or nearby properties and at an area known as the "former burn area" on the Gratiot County Golf Course site located across the Pine River. The report concludes that soils and groundwater at the site are contaminated with a variety of chemicals. Soils are contaminated with volatile organic compounds, semi-volatile organic compounds, pesticides, specialty chemicals, and inorganics; the areas with the highest concentrations of contaminants and the most contaminant detections were in the shallow outwash unit soils on the former plant site. Groundwater is contaminated with volatile organic compounds, semi-volatile organic

compounds, pesticides, specialty chemicals, and inorganics. Volatile organic compounds are the predominant contaminants present in groundwater at the former plant site in terms of the frequency detected and the concentrations observed, with the highest concentrations detected in the northeast and western portions of the former plant site. The RI Report concluded that remedial activities will be needed to mitigate the soil and groundwater contamination at the site, and a feasibility study currently is underway to evaluate potential cleanup options for addressing the contamination at the site. The RI Report also recommended some additional investigational activities to more fully define the nature and extent of contamination at the site. MDEQ initiated additional RI fieldwork at the site in Fall 2007 and anticipates presenting the findings of the additional investigation in an addendum to the November 2006 RI Report.

Concurrently, MDEQ is conducting a feasibility study for OU1 of the Velsicol Chemical Corp. site to evaluate potential cleanup options. Based on the findings of the additional investigation activities at the "former burn area," the FS will also include an evaluation of cleanup options for the Golf Course Site.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID000722439.htm. 2008 Apr [cited 2008 Apr 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants DDT and lead were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.1.17 Wurtsmith Air Force Base, Oscoda

Wurtsmith Air Force Base (WAFB) is in Oscoda (Iosco County) Michigan, approximately 170 miles north of Detroit. In June 1993, the base closed after seven decades of service as an aviation support facility. While the base was operational, hazardous materials were released to the environment, resulting in environmental contamination at a number of locations. Some contaminants migrated beyond the base boundaries.

The U.S. Air Force (USAF) Installation Restoration Program evaluated 58 WAFB areas for potential contamination. At or about 1993, ATSDR analyzed all 58 of these areas to determine whether past, current, or future public health hazards were associated with them. The majority of areas fit one or more of the following categories:

- no site-related contaminants were present,
- detected contaminant concentrations were too low to pose a hazard,
- past, current, and future exposures to the contaminated media were very infrequent or conducted with personal protective gear, and
- land use restrictions will prevent future exposures.

Accordingly, ATSDR identified no public health hazards.

During subsequent site visits in 1995 and 1998, ATSDR did identify two pathways by which on-base residents and the surrounding community might have come into contact with contaminants originating at WAFB: 1) exposures to drinking water from on-base and off-base water supply wells, and 2) exposures to on-base and off-base surface water bodies. In its 2001 public health assessment, ATSDR evaluated these potential exposure pathways and addressed community health concerns.

Demographic Data: ATSDR estimated 8,000 persons lived and worked at WAFB while it was in operation. The 1990 U.S. Census reported that 7,700 persons resided in 2,961 households within 1 mile of WAFB.

ATSDR Conclusions: In 2001, ATSDR concluded that past TCE exposures in on-base and off-base water supplies posed an *Indeterminate Public Health Hazard* (Category 3) for people who before 1980 were exposed to the following potable water sources: 1) WAFB's main water supply wells and 2) the well located at 6504 West Shore Drive. Whether adverse health effects occurred, however, was unknown—many uncertainties surrounded the question of whether TCE was present for a sufficient time to pose past health hazards.

In any event, WAFB's contaminated groundwater plumes were not expected to pose a then-current or future public health hazard. The vast majority of on-base and off-base facilities, residences, and camps received their drinking water from the Huron Shores Regional Utility Authority, a source not located near WAFB and which met all federal and state drinking water quality standards. Although, in 2001, a few residential wells were still in service, exposure to this water was not expected to pose current or future health hazards. The wells did not contain high contaminant concentrations; they were rarely used, with only short exposure durations expected. Institutional controls were in place to ensure that in the future, new wells were not drilled in contaminated areas.

Similarly, exposures to surface water and sediment in Van Etten Lake, the Au Sable River, Duell Lake, and a wetland area in the southern portion of WAFB were not expected to pose health hazards to the populations who used these water bodies for recreational purposes. Again, contaminant concentrations were either too low, or exposures were too infrequent, or both.

ATSDR also concluded that exposures to volatilizing materials probably would not pose public health hazards. In the absence of actual indoor air measurements, indoor air contaminant levels were estimated using conservative mathematical models. The results suggested that indoor air levels were too low to be of health concern.

ATSDR further concluded that vinyl chloride concentrations had not been high enough to pose health hazards to people exposed to on-base drinking water wells during or after 1983, or to people exposed to Lake Van Etten during or after 1990. Community members used Van Etten Lake and the Au Sable River for recreational fishing. Even after a review of limited data, ATSDR did not believe that fish consumption from these water bodies would pose human health hazards.

WAFB representatives were unaware of whether radioactive materials had ever been stored at the base. If such materials had been stored there, they would have been secured in igloos in the Weapons Storage Area. After the base closed, a radiologic survey detected no radioactive contamination.

U.S. EPA Update: In its September 2006 Fact Sheet for the Wurtsmith AFB site, U.S. EPA stated in part that

Groundwater contaminated in the Northern Landfill Area discharges into Van Etten Lake at the YMCA property boundary. An 80-well barrier air sparging curtain was installed at the base boundary downgradient of the landfills and commenced full-time operations in May 2002. The primary intent of the system is to inject/add oxygen to the subsurface as a means to help restore groundwater table aquifer. In-situ stripping of VOCs is a secondary outcome of air sparging operations. A small groundwater and extraction treatment system was also installed at the base boundary north of the air sparging curtain to capture groundwater contaminated with chlorinated solvents in a narrow plume originating at the landfills that is traveling offsite. Monitoring is being conducted to measure the performance of the systems.

Groundwater from the Northern Landfill area discharging to Van Etten Lake at the YMCA beachfront has caused aesthetic impacts (iron staining) at the beach. Remedial actions performed at the YMCA beach include one sand removal/replacement (April 1999), and three sand placements (January 2001, January 2002, and January 2003). Oxygen Release Compound (ORC) was injected slightly upgradient of the beach to increase the dissolved oxygen levels in the aquifer so that staining would not occur. 4,770 pounds of ORC were injected through 97 points in February 2001 and 4,860 pounds of ORC were injected through 109 points near the beach in October 2001. Monitoring is being conducted to determine the impacts of the ORC application.

The bioventing and biosparging systems were installed at the Base Operational Apron in 2003 to treat soil and groundwater contaminated with petroleum constituents. The system became operational in 2004.

A base wide five-year review was completed in September 2004.

Studies of the nature and extent of contamination at a few sites are still underway. These investigations will result in the selection of remedies for final cleanup of the site. Cleanup actions, including the operation of groundwater pump and treat systems, the connection to the potable water supply, the operation of the hydrocarbon skimmer, and the ex-situ bioremediation of the soil, have reduced the threat to human health and the environment while site investigations are underway.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MI5570024278.htm. 2006 Sep [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to www.USEPA.gov/superfund/sites/npl/npl.htm.

4.1.2. Summary and Conclusions for the Saginaw River and Bay AOC

4.1.2.1 Hazardous Waste Sites

At some time during their assessment history, ATSDR categorized 18 sites in the counties relevant to the Saginaw River and Bay AOC as either a public health hazard or an indeterminate public health hazard.[3] Several of these sites had completed exposure pathways to the IJC-critical pollutants PCDDs, PCDFs, PCBs, or DDT and metabolites or had released these pollutants into rivers that ultimately flow into the Saginaw River.

A pathway of major concern for these chemicals is bioaccumulation through the food chain into fish ingested by humans. Incidental ingestion, direct dermal contact, and inhalation of soil and dust from PCDD- and PCDF-contaminated soil also were of concern. Seven of the sites have been remediated, and at nine sites remediation is ongoing. Dow Chemical is an active site, and as of the date of this report, remediation at Peet Packing was undetermined.

On June 25, 2008, Mr. Kory Groetsch of the State of Michigan Department of Community Health added

> The dioxin contamination is widespread throughout the Tittabawassee River and flood plain, Saginaw River, Saginaw Bay and the tissues of fish and wild game living in these areas. Completed exposure pathways are well known and area a public health hazard. Further studies would be beneficial to understand the relationship between human behaviors and the amount of dioxin in people's bodies.

Issues for Follow-Up

The sites listed as still possibly contributing to environmental contamination and human exposure may need follow-up to determine whether the potential hazards have been mitigated. Additional monitoring data and other data also were needed to more fully assess the hazard.

4.1.2.2 TRI Data

Onsite TRI releases in the 21 counties (combined) of the Saginaw River and Bay AOC totaled 7,831,200 pounds, the majority of which were released to air, followed by releases to soil. Considerably less was released to surface water. See Table 4.1-B.

The highest release counties, Midland and Saginaw Counties, accounted for 10.5 and 12.3%, respectively, of the total onsite releases. The lowest release counties, Arenac, Gladwin, and Roscommon, had zero reported releases.

The IJC-critical pollutants accounted for 92,142 pounds or 1.2% of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (primarily to land); lead and lead compounds (primarily to land); and mercury and mercury compounds (primarily to air and land). See Table 4.1-C.

The major releases (≥ 500,000 pounds) of non-IJC-critical chemicals were of hydrochloric acid aerosols, xylenes, certain glycol ethers, n-butyl alcohol, and toluene (primarily to air); and nickel compounds, selenium, and arsenic compounds (primarily to land).

---

[3] Although Spiegelberg and Rasmussen sites are listed here as one site, they are in fact two different sites.

4.1.2.3 NPDES Data

The NPDES permitted discharges for the counties that encompass and surround the Saginaw River and Bay AOC are summarized in Table 4.1-D. The average annual permitted discharges in 2004 totaled 3,973,206 pounds, the majority of which was ammonia nitrogen, and also phosphorus. See Table 4.1-D.

The IJC-critical pollutants PCBs (0.004 pounds), DDT (0.00007 pounds), lead (84 pounds), and mercury (2 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 4.1-E.

4.1.2.4 Beneficial Use Impairment (BUIs)

Restrictions on fish and wildlife consumption and drinking water are cited as impairments for this AOC.

Kory Goetsch of the Michigan Department of Community Health stated on June 28, 2008, that "The Saginaw River and Bay have some of the most restrictive fish consumption advisories in Michigan waters, because the fish are so abnormally highly contaminated."

In 2007, the U.S. EPA issued emergency response clean-up action orders for the Tittabawasee River. Fish consumption restrictions are likely to continue because of the slow degradation of these contaminants in the sediments and upland soils.

Taste and odor problems in drinking water are cited. The problem is attributed to blue-green algal blooms that have been caused unfavorable environmental conditions in Saginaw Bay.

This problem is reported as in resolution but requiring further monitoring. Further information is available at the U.S. EPA Web site (http://www.USEPA.gov/glnpo/aoc/).

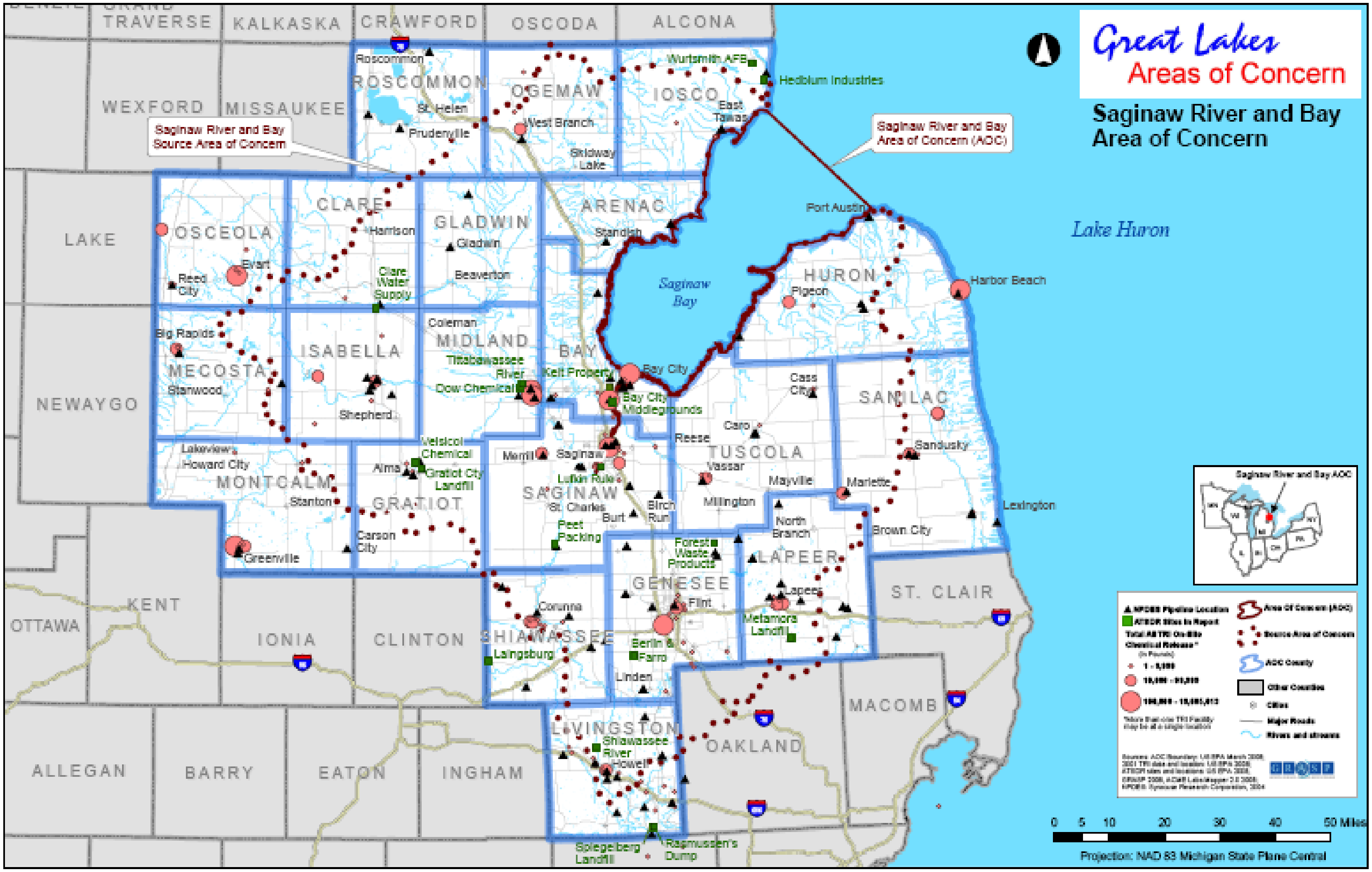

Great Lakes
Areas of Concern
Saginaw River and Bay
Area of Concern
Lake Huron
Saginaw Bay
Saginaw River and Bay
Area of Concern (AOC)
Saginaw River and Bay
Source Area of Concern
TRAVERSE
KALKASKA
CRAWFORD
OSCODA
ALCONA
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
HURON
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
BAY
TUSCOLA
SANILAC
MONTCALM
GRATIOT
SAGINAW
GENESEE
LAPEER
ST. CLAIR
OTTAWA
KENT
IONIA
CLINTON
SHIAWASSEE
LIVINGSTON
OAKLAND
MACOMB
ALLEGAN
BARRY
EATON
INGHAM
Roscommon
St. Helen
Prudenville
West Branch
Skidway Lake
Wurtsmith AFB
Hedblum Industries
East Tawas
Port Austin
Harbor Beach
Harrison
Gladwin
Standish
Beaverton
Clare Water Supply
Reed City
Evart
Big Rapids
Stanwood
Coleman
Tittabawassee River
Dow Chemical
Kelt Property
Bay City
Bay City Middlegrounds
Pigeon
Cass City
Caro
Reese
Sandusky
Shepherd
Lakeview
Howard City
Stanton
Alma
Velsicol Chemical
Gratiot Cty Landfill
Merrill
Saginaw
Lufkin Rule
Vassar
Mayville
Marlette
Lexington
Brown City
Millington
St. Charles
Birch Run
Burt
Peet Packing
Forest Waste Products
North Branch
Carson City
Greenville
Corunna
Flint
Lapeer
Metamora Landfill
Berlin & Farro
Laingsburg
Linden
Shiawassee River
Howell
Spiegelberg Landfill
Rasmussen's Dump
0 5 10 20 30 40 50 Miles
Projection: NAD 83 Michigan State Plane Central

Table 4.1-B. TRI Releases (in pounds, 2001) for the Saginaw River and Bay AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.013254255	0.005655825	0	1.6102674	1.62917748	0.05532345	1.68450093
(PCDDs and PCDFs)	3							
LEAD	8	243.18	15.2	0	0	258.38	20665.9	20924.28
LEAD COMPOUNDS	8	4521.6	1.1	0	86883.8	91406.5	6029.6	97436.1
MERCURY	9	10.2	0	0	44	54.2	0.8	55
MERCURY COMPOUNDS	9	270.6	1	0	150	421.6	3.7	425.3
	Total IJC	**5045.593254**	**17.30565583**	**0**	**87079.4103**	**92142.30918**	**26700.05532**	**118842.3645**
1,1,1,2-TETRACHLOROETHANE		588	0	0	0	588	0	588
1,1-DICHLORO-1-FLUOROETHANE		101906	0	0	0	101906	250	102156
1,2,4-TRIMETHYLBENZENE		97955	0	0	0	97955	0	97955
1,2-DICHLOROETHANE		472	0	0	0	472	0	472
1,2-DICHLOROPROPANE		7	0	0	0	7	0	7
1,3-BUTADIENE		2751	0	0	0	2751	0	2751
2,4,6-TRICHLOROPHENOL		41	64	0	1	106	0	106
2,4-D		167	0	0	0	167	0	167
2,4-D BUTYL ESTER		1	1	0	0	2	0	2
2,4-DICHLOROPHENOL		181	0	0	1	182	0	182
2-METHOXYETHANOL		4524	0	0	0	4524	0	4524

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
2-PHENYLPHENOL		1	0	0	0	1	0	1
3-CHLORO-2-METHYL-1-PROPENE		68	0	0	0	68	0	68
4,4'-ISOPROPYLIDENE-DIPHENOL		754	0	0	0	754	4215	4969
ACETONITRILE		40902	3252	0	7	44161	0	44161
ACROLEIN		1700	0	0	0	1700	0	1700
ACRYLAMIDE		18	7	0	0	25	0	25
ACRYLIC ACID		12018	2	0	0	12020	0	12020
ACRYLONITRILE		7453	0	0	0	7453	0	7453
ALLYL ALCOHOL		630	0	0	0	630	0	630
ALLYL CHLORIDE		2128	0	0	0	2128	0	2128
ALLYLAMINE		3	0	0	0	3	0	3
ALUMINUM (FUME OR DUST)		1060	5	0	0	1065	11497	12562
AMMONIA		168025	116434	0	60000	344459	0	344459
ANTIMONY		250	0	0	0	250	750	1000
ANTIMONY COMPOUNDS		568	0	0	11011	11579	0	11579
BARIUM COMPOUNDS		2494	249	0	947010	949753	41012	990765
BENZENE		37544	1	0	101	37646	0	37646
BENZO(G,H,I)PERYLENE		0.3898	0	0	0	0.3898	0	0.3898
BIPHENYL		146	0	0	0	146	0	146

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
BROMINE		388	0	0	0	388	0	388
BUTYL ACRYLATE		1	0	0	0	1	0	1
CARBON DISULFIDE		515	0	0	2	517	0	517
CERTAIN GLYCOL ETHERS		265755	3100	0	4000	272855	11670	284525
CHLORINE		33689	0	0	0	33689	0	33689
CHLOROACETIC ACID		34	0	0	0	34	0	34
CHLOROBENZENE		56	0	0	0	56	0	56
CHLORODIFLUORO-METHANE		75572	0	0	0	75572	0	75572
CHLOROETHANE		36655	0	0	0	36655	0	36655
CHLOROFORM		273	0	0	0	273	0	273
CHLOROMETHANE		10073	0	0	0	10073	0	10073
CHLOROMETHYL METHYL ETHER		1091	0	0	0	1091	0	1091
CHLOROPHENOLS		4	27	0	1	32	0	32
CHROMIUM		2777	1	0	6205	8983	110366	119349
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		4973	130	0	53452	58555	33085	91640
COBALT		750	5	0	0	755	11265	12020
COBALT COMPOUNDS		754	250	0	41700	42704	0	42704

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
COPPER		2249	270	0	5	2524	37338	39862
COPPER COMPOUNDS		2675	2400	0	68400	73475	351	73826
CUMENE		116	0	0	0	116	0	116
CUMENE HYDROPEROXIDE		800	0	0	0	800	560	1360
CYCLOHEXANE		2584	0	0	0	2584	0	2584
DECABROMODIPHENYL OXIDE		3741	0	0	23600	27341	0	27341
DICHLOROMETHANE		10667	1	0	0	10668	0	10668
DIISOCYANATES		1529	0	0	0	1529	12351	13880
DIMETHYLAMINE		2185	131	0	0	2316	0	2316
DINITROBUTYL PHENOL		36	0	0	0	36	0	36
EPICHLOROHYDRIN		6	0	0	0	6	0	6
ETHYL ACRYLATE		45	0	0	0	45	0	45
ETHYLBENZENE		54591	1	0	5	54597	0	54597
ETHYLENE		40179	0	0	0	40179	0	40179
ETHYLENE GLYCOL		4455	283	0	0	4738	51500	56238
ETHYLENE OXIDE		904	0	0	0	904	0	904
FORMALDEHYDE		28051	21	0	7000	35072	242	35314
FORMIC ACID		252	118	0	0	370	0	370
HYDROCHLORIC ACID (1995 AND		2755268	0	0	0	2755268	0	2755268

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
AFTER 'ACID AEROSOLS' ONLY)								
HYDROGEN FLUORIDE		200090	0	0	0	200090	0	200090
MANGANESE		1795	1	0	0	1796	108939	110735
MANGANESE COMPOUNDS		9347	9190	0	341800	360337	36335	396672
METHACRYLONITRILE		945	0	0	0	945	0	945
METHANOL		100222	0	0	2	100224	0	100224
METHYL ACRYLATE		759	0	0	0	759	0	759
METHYL ETHYL KETONE		102164	0	0	0	102164	0	102164
METHYL ISOBUTYL KETONE		24110	0	0	0	24110	0	24110
METHYL METHACRYLATE		1018	0	0	0	1018	0	1018
METHYL TERT-BUTYL ETHER		854	0	0	0	854	0	854
N,N-DIMETHYLFORMAMIDE		16	0	0	0	16	0	16
NAPHTHALENE		20055	0	0	191	20246	0	20246
N-BUTYL ALCOHOL		86571	1	0	0	86572	0	86572
N-HEXANE		2982	0	0	0	2982	0	2982
NICKEL		2974	266	0	1905	5145	168144	173289
NICKEL COMPOUNDS		11309	12	0	32000	43321	18922	62243
NITRATE COMPOUNDS		500	10000	0	0	10500	21	10521

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
NITRIC ACID		3331	5	0	5	3341	0	3341
N-METHYL-2-PYRROLIDONE		9766	0	0	0	9766	0	9766
PHENOL		105740	0	0	1903	107643	3935	111578
PHOSGENE		23	0	0	0	23	0	23
PICLORAM		1	257	0	0	258	0	258
POLYCHLORINATED ALKANES		0	0	0	0	0	63100	63100
POLYCYCLIC AROMATIC COMPOUNDS		2.81	0	0	53	55.81	0.8	56.61
PROPYLENE		240	0	0	0	240	0	240
PROPYLENE OXIDE		1234	0	0	0	1234	0	1234
PYRIDINE		201	0	0	0	201	0	201
QUINOLINE		3	0	0	0	3	0	3
SODIUM NITRITE		0	0	0	0	0	720	720
STYRENE		188607	23	0	38959	227589	498.2	228087.2
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		144005	0	0	0	144005	0	144005
TETRACHLORO-ETHYLENE		22458	0	0	1	22459	0	22459
TOLUENE		373364	2	0	32	373398	0	373398
TOLUENE-2,4-DIISOCYANATE		578	0	0	0	578	0	578

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
TRICHLOROETHYLENE		11319	0	0	0	11319	0	11319
TRIETHYLAMINE		18928	0	0	4	18932	0	18932
VANADIUM COMPOUNDS		12011	0	0	106700	118711	0	118711
VINYL ACETATE		92	0	0	0	92	0	92
VINYL CHLORIDE		969	0	0	1	970	0	970
VINYLIDENE CHLORIDE		21474	3	0	0	21477	0	21477
XYLENE (MIXED ISOMERS)		228329	33	0	0	228362	0	228362
ZINC (FUME OR DUST)		5400	0	0	0	5400	2900	8300
ZINC COMPOUNDS		15569	170	0	288880	304619	111490	416109
	Total Non-IJC	**5557404.2**	**146716**	**0**	**2034937**	**7739057.2**	**841457**	**8580514.2**
	Total	**5562449.793**	**146733.3057**	**0**	**2122016.41**	**7831199.509**	**868157.0553**	**8699356.564**

Table 4.1-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Saginaw River and Bay AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	4			
Bay County, MI	1	DE KARN - JC WEADOCK GENERATING PLANT	48732DKRNJNWEAD	ESSEXVILLE
Midland County, MI	1	DOW CHEMICAL CO. MIDLAND OPS.	48667THDWCMICHI	MIDLAND
Saginaw County, MI	2	ALCHEM ALUMINUM INC.	48601LCHML2600N	SAGINAW
		GMC SAGINAW METAL CASTING OPS.	48605SGNWG1629N	SAGINAW
Lead and lead compounds	27			
Bay County, MI	1	DE KARN - JC WEADOCK GENERATING PLANT	48732DKRNJNWEAD	ESSEXVILLE
Genesee County, MI	6	DELPHI ENERGY & CHASSIS SYS. FLINT WEST	48555CFLNT300NO	FLINT
		GMC GRAND BLANC METAL FAB	48439CDLLC10800	GRAND BLANC
		GMC MFD FLINT METAL CENTER	48553GMCTRG2238	FLINT
		GMC POWERTRAIN FLINT ENGINE SOUTH	48552GMPWR2100B	FLINT
		GMC POWERTRAIN FLINT NORTH	48550BCFLN902EH	FLINT
		GMVM - FLINT ASSEMBLY PLANT	48551GMCTRG3100	FLINT
Gratiot County, MI	1	CONTECH DIV. OF	48801CNTCH205NG	ALMA

IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
		SPX CORP.		
Huron County, MI	4	DETROIT EDISON CO. HARBOR BEACH POWER PLANT	48441DTRTD755NH	HARBOR BEACH
		MICHIGAN SUGAR CO. SEBEWAING PLANT	48759MCHGN763BE	SEBEWAING
		TOWER AUTOMOTIVE TECH. PRODS. INC.	48759TWRTM249NC	SEBEWAING
		TOWER AUTOMOTIVE TOOL L.L.C.	48731TWRTM81DRE	ELKTON
Iosco County, MI	2	ITT INDS. FHS	48750TTNDS4700N	OSCODA
		NEW NGC INC.	48748NTNLG2375N	NATIONAL CITY
Isabella County, MI	1	EP HILLSDALE TOOL DIVISION-MT. PLEASANT	48858PHLLS1799G	MOUNT PLEASANT
Livingston County MI	1	PROGRESSIVE METAL FORMING INC.	48139PRGRS10850	HAMBURG
Montcalm County, MI	1	FEDERAL MOGUL GREENVILLE	48838FDRLM510EG	GREENVILLE
Saginaw County, MI	3	GMC SAGINAW METAL CASTING OPS.	48605SGNWG1629N	SAGINAW
		GMPT SAGINAW MALLEABLE IRON	48605GMCSG77WCE	SAGINAW
		MICHIGAN SUGAR CO.	48724MCHGN341SU	CARROLLTON
Sanilac County, MI	2	MICHIGAN SUGAR CROSWELL FACTORY	48422MCHGN159SO	CROSWELL
		TRELLEBORG YSH INC. SANDUSKY PLANT	48471YLRBB180ND	SANDUSKY
Shiawassee County, MI	1	MOTOR PRODS. - OWOSSO CORP.	48867MTRPR201SD	OWOSSO

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Tuscola County, MI	4	GENERAL CABLE INDS.	48726GNRLC6285G	CASS CITY
		GREDE FOUNDRIES INC. VASSAR FNDY.	48768GRDVS700EH	VASSAR
		MICHIGAN SUGAR CO. - CAROFACTORY	48723MCHGN725AL	CARO
		WALBRO ENGINE MANAGEMENT	48726WLBRN6242G	CASS CITY
Mercury and mercury compounds	5			
Bay County, MI	1	DE KARN - JC WEADOCK GENERATING PLANT	48732DKRNJNWEAD	ESSEXVILLE
Genesee County, MI	2	DELPHI ENERGY & CHASSIS SYS. FLINT EAST	48556CSPRK1300N	FLINT
		GMC GRAND BLANC METAL FAB	48439CDLLC10800	GRAND BLANC
Huron County, MI	1	DETROIT EDISON CO. HARBOR BEACH POWER PLANT	48441DTRTD755NH	HARBOR BEACH
Saginaw County, MI	1	GMC SAGINAW METAL CASTING OPS.	48605SGNWG1629N	SAGINAW

Table 4.1-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Saginaw River AOC

Chemical	*IJC Tracking Number*	*Discharge*
POLYCHLORINATED BIPHENYLS (PCBS)	1	0.004
DDT	5	0.00007
LEAD, TOTAL (AS PB)	8	83.95
MERCURY, TOTAL (AS HG)	9	2.10
	Total IJC	**86.05**
CADMIUM, TOTAL (AS CD)		91.25
CHROMIUM, HEXAVALENT (AS CR)		21.90
CHROMIUM, TOTAL (AS CR)		109.50
COPPER, TOTAL (AS CU)		1142.45
CYANIDE, FREE (AMEN. TO CHLORINATION)		135.05
FLUORIDE, TOTAL (AS F)		6570
LINDANE		0.04
NICKEL, TOTAL (AS NI)		219
NITROGEN, AMMONIA TOTAL (AS N)		3159182.73
PHOSPHORUS, TOTAL (AS P)		798934
POLYBROMINATED BIPHENYLS		0.001
SELENIUM, TOTAL (AS SE)		167.90
SILVER, TOTAL (AS AG)		250.97
THALLIUM, TOTAL (AS TL)		1788.50
TIN, TOTAL (AS SN)		657
TOLUENE		12.05
XYLENE		3.10
ZINC, TOTAL (AS ZN)		3835.06
	Total Non-IJC	**3973120.50**
	Total	**3973206.55**

Table 4.1-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Saginaw River and Bay AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Polychlorinated Biphenyls (PCBs)	4			
Bay County, MI	2	GM-BAY CITY PLANT	MI0001121	BAY CITY
		BAY CITY WWTP	MI0022284	BAY CITY
Saginaw County, MI	2	SAGINAW TWP-CENTER ROAD LF	MI0054739	SAGINAW
		SAGINAW WWTP	MI0025577	SAGINAW
DDTs	1			
Gratiot County, MI	1	US USEPA-VELSICOL	MIU990020	ST LOUIS
Lead	1			
Montcalm County, MI	1	FEDERAL MOGUL CORP-GREENVILLE	MI0002836	GREENVILLE
Mercury	11			
Genesee County, MI	1	GENESSEE COUNTY #3 WWTP	MI0022993	LINDEN
Gratiot County, MI	2	ALMA WWTP	MI0020265	ALMA
		ST LOUIS WWTP	MI0021555	ST LOUIS
Livingston County, MI	1	NORTHFIELD TWP WWTP	MI0023710	WHITMORE LAKE
Mecosta County, MI	1	BIG RAPIDS WWTP	MI0022381	BIG RAPIDS
Montcalm County, MI	1	FEDERAL MOGUL CORP-GREENVILLE	MI0002836	GREENVILLE
Saginaw County, MI	2	FRANKENMUTH WWTP	MI0022942	FRANKENMUTH
		SAGINAW TWP WWTP	MI0023973	SAGINAW
Sanilac County, MI	1	CROSWELL WWTP	MI0021083	CROSWELL
Tuscola County,	2	CARO WWTP	MI0022551	CARO

MI		CASS CITY WWTP	MI0022594	CASS CITY

Chapter 5. Lake Michigan

Chapter 5. Lake Michigan

5.1. Muskegon Lake AOC and White Lake AOC, Muskegon County, MI

The Muskegon Lake AOC includes the entirety of Muskegon Lake, in Muskegon County, Michigan. Muskegon Lake is a 4,149-acre inland coastal lake. The Muskegon River flows through the lake before emptying into Lake Michigan (see AOC map at end of chapter and in Appendix 2).

The White Lake AOC includes White Lake and a ¼-mile wide zone around the lake, in Muskegon County MI. White Lake is a 2,570 acre coastal, downriver lake (see AOC map at end of Chapter and in Appendix 2).

5.1.1. Hazardous Waste Sites within the Muskegon Lake and White Lake AOCs

ATSDR has evaluated the data for 11 hazardous waste sites in Muskegon County, MI, and has reached conclusions regarding any health effects these sites might pose. The conclusions, together with information regarding the AOC near which a site is located, the type and location of the site, and the date and type of assessment document, are summarized in Table 5.1-A.

Table 5.1-A. Hazardous Waste Sites in Muskegon County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Bofors Nobel Inc., Muskegon MID006030373	HA HA HA	1990 1992 1996	3 3 4	NPL	Ongoing
Duell & Gardner Landfill, Dalton Township MID980504716	HA HC	1989 1994	3 4	NPL	Ongoing
E.I. Du Pont De Nemours & Co., Inc., Montague Plant, Montague MID000809640	HA SRU	1989 1993	3 3	Deleted from NPL	Ongoing
Hooker (Montague Plant), Montague MID006014906	HA SRU	1989 1993	3 3	Deleted from NPL	Completed
Muskegon Chemical Co., Whitehall MID072569510	HA SRU	1992 1995	3 4	NPL	Ongoing

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Ott/Story/Cordova Chemical Co., Dalton Township MID060174240	HA HA	1988 1993	3 2	NPL	Ongoing
Peerless Plating Co., Muskegon MID006031348	HA SRU HC	1992 1996 2006	3 3 3	NPL	Ongoing
Ruddiman Drain Area, Muskegon MID980608764	HC HC	2001 2003	3 3	Non NPL	Completed
SCA Independent Landfill, Muskegon Heights MID000724930	HA SRU	1989 1994	3 3	NPL	Ongoing
Thermo-Chem, Inc., Muskegon MID044567162	HA HC	1988 1996	3 3	NPL	Ongoing
Whitehall Municipal Wells, Whitehall MID980701254	HA HA	1989 1992	3 4	Deleted from NPL	Completed

2= Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard

HA=Public Assessment, HC=Health Consultation, SRU=Site Review and Update

5.1.1.1 Bofors Nobel Incorporated

Bofors Nobel, Inc. is a 120-acre site 6 miles east of downtown Muskegon (Muskegon County) MI. It extends to the south bank of Big Black Creek, which flows west-southwest across the site. Since 1960, various owners have operated chemical manufacturing facilities on the site. Before 1976, plant operators used several unlined lagoons and settling ponds for wastewater and sludge disposal. In 1965 and again in 1975, dikes around some of the lagoons failed, releasing wastewater into Big Black Creek. Beginning in 1976, the plant discharged its waste water to the Muskegon County wastewater treatment system. Purge wells were installed to collect and pump groundwater for treatment. The 35-acre plant area remains in operation, but the balance of the site, including the lagoon area, is fenced and is administered by the Michigan Department of Environmental Quality. Information regarding this site is from ATSDR's 1990 and 1992 public health assessments, its 1996 public health consultation, and U.S. EPA's NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	140
Females aged 15-44	283
Adults 65 and older	140

Public Health Outcome Data: This site manufactured at least two aromatic amine compounds, benzidine and dichlorobenzidine (DCB). In 1981, MDCH (then MDPH) conducted a track-out study of 11 Bofors workers involved with dichlorobenzidine production. DCB was found in the range of 0.006 to 0.281 ppm in the urine of Bofors employees and some of their family members. MDCH recommended a health study and follow-up activities.

Workers at Bofors-Nobel, their families, and community residents were invited to participate in a cross-sectional study of self-testing for hematuria. Two other communities were also included: Adrian and Kalamazoo, MI, where factories manufactured or used suspected bladder carcinogens.

Of the 2,492 persons contacted, 611 participated in a screening regimen that required daily testing of their urine for blood during a 2-week period over 6 months. Only one participant completed five testing periods. A high prevalence had hematuria (47.5%). More women than men tested positive (57.4% versus 35.2%). Thirteen diagnosed with bladder cancer were in the cohort, but all had been identified before the self-testing program began. Sixty percent of participants who tested positive for blood in urine had no identified etiology for their hematuria. Neither the number of days participants tested positive on self-testing, the degree of positivity, nor the extent of medical workup (inclusion of cytoscopy) were associated with determining the cause for the hematuria.

This study was limited by a low rate of participation—25% of those contacted tested their urine once. No participant follow-up occurred for those who had moved away from the communities. Therefore, no conclusion on the overall risk of bladder cancer among either workers, family members, or nearby residents was determined.

ATSDR Conclusions: Human exposure to 3,3' dichlorobenzidine, benzidine, VOCs and metals may have occurred in the past via worker track-out, surface water, air, soil and sediment pathways. Future exposure to the chemicals could occur via contaminated groundwater. Consequently, the 1990 and 1992 ATSDR health assessments categorized this site as an *Indeterminate Public Health Hazard* (Category 3). Although the site posed a past public health hazard and could pose a health hazard in the future if new water supply wells were installed before groundwater remediation was complete, ATSDR concluded in the 1996 health assessment that the site at that time posed *No Apparent Public Health Hazard* (Category 4).

That said, VOCs were present at levels of concern in groundwater. In the past, workers at the plant were exposed to benzidine, 3,3'-dichlorobenzidine, and VOCs—workers had used contaminated groundwater in the plant. Contaminants were transported offsite in groundwater and also by worker track-out. A barrier wall completed in 2005 should contain the onsite contaminants in soil and sediment. A groundwater treatment plant completed in 1998 was expected to operate for at least 43 years. It removes approximately 25, 0000 pounds of total organic contaminant from every 10.2 billion gallons of water it treats.

U.S. EPA Update: In its February 2007 Fact Sheet for Bofors Nobel, U.S. EPA stated in part that

> By entering into a Consent Decree on December 7, 1999, the PRPs have committed to Remedial Design and Remedial Action (RD/RA) of that barrier wall remedy. The GWTP [Groundwater Treatment Plant] was constructed with federal funds. The RD for the GWTP was complete on July 8, 1992. The GWTP was operational and functional on April 30, 1998, and is estimated to operate for at least 43 years and remove approximately 25,000 pounds of total organic contaminant from approximately 10,200,000,000 gallons. Under an agreement with the PRPs, the industries adjacent to the site are operating the GWTP. So far, the GWTP has removed approximately 4,500 pounds of contaminant from approximately 2,463,000,000 gallons. The barrier wall portion of the remedy was completed in December 2005, and the second phase of remedy construction started in March 2006. Construction completion is expected in 2007, and the long term RA planned completion is December 30, 2041. An interim containment action for the Operable Unit #2 (OU#2) is ongoing in conjunction with the OU #1 remedy.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID006030373.htm. 2007 Feb [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: At several limited areas within the restricted area of the site, the IJC-critical pollutant lead was detected in one onsite monitoring well at high concentrations in soil. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.2 Duell & Gardner Landfill

From the 1940s to 1973, this approximately 80-acre landfill in Dalton Township, (Muskegon County) MI, operated as an uncontrolled dump for industrial waste and general refuse. During 1986, about 500 deteriorating drums, hundreds of laboratory bottles, and piled waste were removed from the site. To reduce leaching of contaminants into groundwater, areas of heavily stained soil were covered with plastic. The groundwater flow was to the southeast, toward Bear Creek, about 1 mile southeast of the site. In 1994, the area was rural; residents used private wells for their domestic water supply. Information regarding this site is from the 1994 ATSDR public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	40
Females aged 15-44	96
Adults 65 and older	38

Public Health Outcome Data: Age-adjusted cancer mortality rates available from the Michigan Death Registry for Dalton Township (where the site is located), and Muskegon, and Fruitland Townships (adjacent to Dalton Township) for the period of 1983–1987 were compared with the 1985 statewide age-specific mortality rates. Because census data by sex for this area were unavailable, population estimates could not be sex-adjusted. The actual numbers of deaths observed in these townships were fewer (i.e., not statistically significantly) than expected based

on the statewide cancer mortality rate. Thus no evidence links the site with cancer death rates. (This study was also cited in the public health assessment for the Ott/Story/Cordova Chemical site, reviewed in Section 5.1.1.6 of this report.)

ATSDR Conclusions: In the 1989 health assessment, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In the 1994 health assessment, ATSDR concluded that under conditions at that time the site posed *No Apparent Heath Hazard* (Category 4).

Trace amounts of toluene were found in private well water. PCBs, heavy metals, and metabolites of crystal violet were found in soil samples. But contamination was not remarkably high or widespread, and no data indicated offsite migration. Aniline, N,N-dimethylaniline, crystal violet, chloroform, and carbon tetrachloride were present in the onsite groundwater at levels of health concern were the water used for household purposes. Nevertheless, at the time of the health assessment concentrations were declining and the contamination had not reached nearby residential wells or surface water.

U.S. EPA Update: In its February 2007 Fact Sheet for the Duell & Garder site, U.S. EPA stated in part that

> A Unilateral Administrative Order was issued by the U.S. EPA on June 22, 1994. The potentially responsible party (PRP), CPC International, began design of the remedy in 1994. In July 1999, the PRP ceased all work, after receiving a favorable legal decision on the issue of its underlying liability at the site. Currently, the U.S. EPA and the State of Michigan are addressing the remaining cleanup through fund-financed action.
>
> Predesign work indicated that approximately 200 cubic yards of contaminated soil remains. Predesign groundwater investigations concluded that the contaminant concentrations have declined and have not migrated from the site. Based on these findings, a Record of Decision amendment was signed on 6/29/01 to include soil excavation with offsite disposal, groundwater, consolidation of landfill materials, and capping. The Remedial Action construction was completed in 2001. The Long Term Remedial Action (LTRA) of groundwater extraction and treatment is currently on-going at the site. A Five Year Review was completed in September 2005. On October 30, 2007, a Restrictive Covenant was signed by the property owners and filed in the Muskegon County Michigan Register of Deeds office.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980504716.htm. 2007 Feb [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and DDT and their metabolites were identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.3 E.I. DuPont De Nemours & Co., Inc., Montague Plant

This site was a petrochemical manufacturing plant in the southwestern part of Montague, (Muskegon County) MI, about 1 mile from White Lake. Information regarding this site is from ATSDR's 1989 health assessment.

Demographic Data: Demographic profile is not reported. The 1989 health assessment described the population within 1 mile of the site as approximately 300 persons.

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants at levels that could result in adverse health effects over time, in 1989 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent ATSDR site review and update changed the category to *No Apparent Public Health Hazard* (Category 4).

Contaminants of concern for this site included heavy metals, thiocyanite, carbon tetrachloride and other VOCs (including tetrachlorethylene and trichloroethylene). Thiocyanate entered groundwater and contaminated residential wells. The 1989 assessment indicated that since 1961, no further contamination of private wells had been reported. In addition, private wells were 700 feet upgradient of the contaminated site.

The source of this chemical was a lime waste impoundment containing approximately 1 million tons of ammonia thiocyanate, which discharged to Lake Michigan. Groundwater seeps from the site contaminated White Lake Beach sand. An interceptor well was installed south of the lime pile and the contaminated sands were removed. In 1979, VOCs were found in groundwater and treated through use of purge wells. VOCs were found to have contaminated soils in the bulk storage and unloading area. Contaminated soils were removed, and the lime waste impoundment scheduled for removal.

U.S. EPA Update: This DuPont site is an operating facility under RCRA oversight.

The Michigan Department of Community Health Update: Du Pont is currently conducting an investigation and cleanup. Except for one office building, structures were razed. Du Pont began installation of an enhanced groundwater treatment system in the spring of 2008. Interceptor wells have been installed, and the system is expected to become fully effective in October 2008 (Ronda Blayer, Michigan Department of Environmental Quality, personal communication; 2008 August 19).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant VOCs was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.4 Hooker (Montague Plant)

The Hooker Chemical & Plastics Corp. is a 900-acre site, the southern portion of which borders on White Lake. Over the years, Hooker was reported to have disposed of more than 21 million cubic feet of organic, inorganic, heavy metal, and acid wastes onsite. Much of the contaminated soil had been placed in an onsite clay-lined, clay-capped vault. Groundwater purge wells and a treatment system were installed to capture and cleanse contaminated groundwater before it

discharged into White Lake. The information on this site is from ATSDR's 1989 public health assessment.

Demographic Data: Demographic profile is not reported. As of 1989, approximately 500 persons lived within 1 mile of the site.

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants at levels that could result in adverse health effects over time, and because of the lack of monitoring data, in 1989 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent ATSDR site review and update also categorized the site as an *Indeterminate Public Health Hazard*.

Residential wells downgradient of the site were contaminated with chlorinated VOCs such as carbon tetrachloride and chloroform, but residences were converted to municipal water. Trichloroethylene and tetrachloroethylene were also found in groundwater. The contaminant plume from this site discharged into White Lake, about 1 mile south of the site. The NPDES permit for discharge of treated groundwater from the site into White Lake authorized low levels of chlorinated VOCs and Mirex; this implied that these contaminants were in the groundwater plume. In 1979, fish from White Lake contained Mirex at levels below health-based screening values.

Contaminated equipment and soil were consolidated and contained onsite. An installed groundwater purge system intercepted TCE. As of 1989, an *in-situ* treatment system was scheduled for installation.

U.S. EPA Update: The Hooker Chemical site is a non-NPL site for which no further remedial action is planned.

IJC-critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants were associated with this site.

5.1.1.5 Muskegon Chemical Company

The Muskegon Chemical Company site is in Whitehall (Muskegon County) MI. In 1975, it produced chemicals for the pharmaceutical industry. By 1977, a groundwater contaminant plume consisting of 1,2-dichloroethane, triglycol dichloride, and bis(2-chloroethyl) ether extended from the site into Mill Pond Creek, which flowed into Mill Pond, and thence to White Lake. In each of these surface water bodies site-related contaminants were detected. The information regarding this site is from ATSDR's 1992 public health assessment and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reports the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	152
Females aged 15-44	367
Adults 65 and older	379

ATSDR Conclusions: Although no completed pathways of human exposure were identified, a potential remained for future exposure to hazardous substances in groundwater and surface water at concentrations potentially resulting in adverse health effects. Consequently, in 1992 ATSDR

categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent (1995) ATSDR site review and update categorized the site as posing *No Apparent Public Health Hazard* (Category 4).

In the 1992 health assessment, no contaminants of concern were identified in a completed exposure pathway. Contaminants of concern were, however, present onsite. 1,2 dichloroethane, triglycol dichloride, and bis(2-chloroethyl) ether were found in surface water above health-based screening values, but warnings were posted against wading and swimming in the contaminated water bodies, and private wells were not contaminated.

U.S. EPA Update: In its September 2006 Fact Sheet, U.S. EPA stated in part that

> Construction completion for the site was documented in the preliminary close out report dated June, 1997. Since the Remedial Action resulted in hazardous substances at the site above health-based levels which do not allow for unlimited use and unrestricted exposure, five-year reviews are required. The first five-year review was conducted by the Michigan Department of Environmental Quality (MDEQ) in 1998.
>
> The second five-year review was completed by U.S. EPA and MDEQ in April 2003. That review determined that the remedy 1) remained protective of human health and the environment in the short-term and 2) follow-up actions are necessary to address long-term protectiveness. Recommended follow-up actions include modifying the institutional controls, and the Remedial Action Plan along with continuing the on-going groundwater monitoring and maintenance activities. These actions are on-going. Five Year Reviews for the Site are on-going since the remedy does not allow for unlimited use and unrestricted exposure. The third five-year review is due by March 31, 2008.
>
> The public information repository is located at 3900 W. White Lake Drive in Whitehall, Michigan.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID072569510.htm. 2006 Sep [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants were associated with this site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.6 Ott/Story/Cordova Chemical Co.

The Ott/Story/Cordova site is 2 miles north of the City of North Muskegon, in Dalton Township (Muskegon County) MI. The plant occupies about 25 acres of the 210-acre parcel. From 1957 until 1985, this former chemical manufacturing plant operated under a succession of owners who discharged wastes into unlined, onsite lagoons, discharged purged groundwater into the Little Bear Creek, and, subsequently, discharged purged water and wastewater into the Muskegon County Wastewater management system. Purging of groundwater eventually was discontinued, and a contaminant plume containing many organics expanded offsite toward the southeast, partially discharging into a tributary of Little Bear Creek and contaminating residential wells. In 1978, a large number of waste-filled drums and 8,000 cubic yards of contaminated soils and

sludge were removed. The plant site was securely fenced, but the surrounding areas affected by groundwater contamination were not. Information regarding this site is from the ATSDR's 1993 public health assessment and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	131
Females aged 15-44	294
Adults 65 and older	140

Public Health Outcome Data: For 1983–1987, researchers compared age-adjusted cancer mortality rates available from the Michigan Death Registry for Dalton Township (where the site is located) and Muskegon and Fruitland Townships (adjacent to Dalton Township) with 1985 statewide age-specific mortality rates. Because of the unavailability of sex-related census data for this area, population estimates could not be adjusted by sex. The actual number of deaths observed in these townships were fewer—though not to the level of statistical significance—than expected, given the statewide cancer mortality rate. Thus no evidence indicated the Ott/Story/Cordova Chemical site affected cancer death rates. (This study was also cited in the public health assessment for the Duell & Gardner Landfill, reviewed in Section 5.1.1.2 of this document.)

A subsequent survey of the 29 households with the greatest potential for site-related exposures showed no unusual disease or illness pattern that would suggest a site-related health impact.

ATSDR Conclusions: Because of the risk that could result from chronic exposure to hazardous substances through groundwater and air, ATSDR's 1993 health assessment categorized the site as a *Public Health Hazard* (Category 2).

Exposure through household use of contaminated groundwater—resulting in ingestion, dermal, and inhalation exposure—was considered a completed exposure pathway to a broad array of organic chemicals, including VOCs (1,2-dichloroethane, trichlorethylene, benzene and chlorinated VOCs including vinyl chloride), aniline, and N-nitrosodiphenylamine. In the past, at least four household wells were contaminated. Although alternative water supplies were provided, ongoing exposure was possible through uses of nonpotable water, including watering lawns and gardens and washing cars. Additionally, groundwater discharge areas could have evaporated volatile chemicals into the air, leading to inhalation exposure.

Site remediation since the time of ATSDR's assessment included removal and offsite disposal of contaminated soil and sediment, including soil and sediment from the creek, and groundwater extraction and treatment, which should be completed in 2030.

U.S. EPA Update: In its August 2006 Fact Sheet regarding the Ott et al. site, U.S. EPA stated in part that

> The GWTF design was completed on September 29, 1992, which started treating contaminated groundwater on February 24, 1996, and has removed approximately 9200 pounds of contaminants from approximately 4,265,000,000 gallons of groundwater; system operational and functional status was achieved on September 14, 2000. The Long-Term Response Action (LTRA), started on that date, should be completed by September

30, 2030, and also estimates approximately 31,000 pounds of contaminant, removed from approximately 14,500,000,000 gallons of water treated. The soil RA (Operable Unit #3) under the authority of the State of Michigan was completed on March 21, 2002. The State of Michigan is scheduled to assume 100 percent of the remedy's operation in the year 2010.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID060174240.htm. 2006 Aug [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were detected. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.7 Peerless Plating

At the time of the 1992 ATSDR public health assessment, the Peerless Plating Co. site was an 1-acre, abandoned, former electroplating facility in Muskegon, (Muskegon County) MI. From 1937 to 1983, Peerless operations resulted in wastes with high concentrations of heavy metals and high and low-pH values, which were discharged into unlined lagoons. From manholes inside the building, other wastes were discharged directly to the ground. When the plant closed, not only was the building abandoned, but plating solutions, drummed wastes, and raw materials were left on the site as well. Inside the abandoned buildings, even hydrocyanic acid gas was detected. In 1983 and 1991, U.S. EPA removed acids, cyanide plating solution, chromium plating solution, trichloroethylene, and liquids containing heavy metals. U.S. EPA also remediated the waste lagoons, encapsulated any remaining asbestos, and fenced the site. Information regarding this site was taken from ATSDR's 1992 public health assessment, 1996 site review and update, 2006 health consultation, and the U.S. EPA's 2006 NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,253
Females aged 15-44	2,151
Adults 65 and older	1,371

Public Health Outcome Data: Local health department records revealed no site-related adverse health effects appearing in statistically significant numbers in specified populations.

ATSDR Conclusions: Because of the possible threat to human health from exposure to potentially contaminated groundwater, surface water, sediments, and soil, in 1992 ATSDR characterized this site as an *Indeterminate Public Health Hazard* (Category 3). But a 1996 site review and update determined that in the past, this site should have been classified as a *Public Health Hazard* (Category 2). In 2006, ATSDR categorized the site as an *Indeterminate Public Health Hazard* (Category 3), but identified an old boardwalk as posing a *Public Health Hazard* (Category 2).

The onsite shallow groundwater and soil were contaminated with VOCs (including TCE) and heavy metals, particularly cadmium and chromium. Little Black Creek was a discharge point for the shallow groundwater. Shallow groundwater was also a potable water source. In 1986, 18

business and residential wells within a ½-mile radius of the site were contaminated with heavy metals (chromium) and chlorinated VOCs. Residents were provided with bottled drinking water, and eventually residences were connected to a municipal water supply. Heavy metals, (cadmium, lead and mercury), PCBs, pesticides, SVOCs, and VOCs were also investigated in sediments.

U.S. EPA Update: In its October 2006 Fact Sheet for the Peerless Plating site, U.S. EPA stated in part that

> In 1989, U.S. EPA began a study of the nature and extent of contamination at the site, focusing on the groundwater, soil, and the effect of site-related contaminants on surface waters. In 1992, the study was completed, and a remedy was selected. It called for the treatment of contaminated soils through in-situ vapor extraction of the organic compounds and stabilization of the inorganic compounds. The treated soils will be disposed of offsite in a licensed hazardous waste facility.
>
> The design for this remedy was completed in 1996; U.S. EPA has obligated Superfund monies to implement the remedy. Soil vapor extraction was completed, and approximately 7,500 tons of soil were removed. Construction of the groundwater treatment system has been completed, and the system has been operational since August 2001. It is expected to run over the next 10 years.
>
> A second 5 year review was completed for this site. It found that the remedy in place remains protective of human health and the environment.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID006031348.htm. 2006 Oct [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutants PCBs, lead, and mercury were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.8 Ruddiman Drain Area (Ruddiman Creek Area)

The Ruddiman drain area comprises the west, north, and main branches of Ruddiman Creek watershed, all of which flow through areas of dense residential development and into Ruddiman Pond. Area children play in and around these creek branches and pond; area adults use these natural resources for recreation. Following passage of the Clean Michigan Initiative, Ruddiman Creek Sediments and pond were sampled and adjudged contaminated. The contamination sources were not discussed. Information on this site is taken from ATSDR's 2001 and 2003 health consultations and current U.S. EPA records.

ATSDR Conclusions: Because of the limited monitoring data and uncertainties in estimated human doses, in 2001 and in 2003 ATSDR

categorized this site as an *Indeterminate Public Health Hazard* (Category 3). ATSDR concluded that the uncertainties surrounding the estimated dose of PCBs from sediment exposure, the lack of a lead model for children 10–16 years likely to be exposed to creek sediments, and the limited number of samples that adequately characterized the contamination precluded a definitive hazard conclusion.

PCBs and lead were, however, found at concentrations of concern in Ruddiman Creek main branch sediments, which are contaminated with PCBs and lead at levels of concern for human exposure as well as for ecological effects. But again, the sources of this contamination were not discussed; the conclusion was that additional sampling was needed to define further the extent of contamination—including sampling of fish—and that warning signs were also needed.

U.S. EPA Update Ruddiman Drain is not an EPA site. It has been removed to the archived (NFRAP) database. This site was, however, remediated under the Great Lakes Legacy Act. Between August 2005 and June 2006, 90,000 cubic yards of contaminated sediment were removed from Ruddiman Creek and Pond. Also removed were approximately 126,000 pounds of lead, 320 pounds of PCBs, and 204,000 pounds of chromium. See http://www.epa.gov/glla/ruddiman/ [cited 2008 Jul 29]. See also Ruddiman Creek Remediation Project Honored. Available at: http://www.epa.gov/greatlakes/active/2007/Jun2007.pdf p. 8 [cited 2008 Nov 6].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and metals were identified at this site.

5.1.1.9 SCA Independent Landfill

This landfill site occupies approximately one-third of a 100-acre parcel in Muskegon County, MI. The site is in a swampy area near Black Creek, which flows along the landfill's north side. The refuse deposited there, beginning in the 1950s and continuing through about 1987, probably included industrial as well as domestic waste. The groundwater flow at this site was northward and appeared to empty into wetlands that bordered Black Creek. Information regarding this site is from ATSDR's 1989 health assessment and 1994 site review and update, and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	598
Females aged 15-44	1,054
Adults 65 and older	505

ATSDR Conclusions: Because of the potential threat to human health from contaminant exposure to air and soil and because of the lack of adequate monitoring data, in 1989 and in 1994 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3).

Onsite monitoring wells indicated VOC (including benzene) contamination of groundwater. But as of the 1989 assessment, comparisons with health-based screening values were not available, no downgradient monitoring was done, and other media were not investigated.

U.S. EPA Update: In its March 2008 Fact Sheet regarding the SCA Independent Landfill Site, U.S. EPA stated in part that

> The PRP began long-term groundwater and surface water monitoring in 2001. MDEQ will be working with the PRP to apply Notices of Aesthetic Impact to deeds of downgradient residents. When this is accomplished, all site cleanup will be complete. MDEQ currently anticipates no additional construction; although, enhanced leachate extraction may be needed to address any remaining groundwater/surface water criteria exceedances, since surface water biota cannot be protected with use restrictions.
>
> The May 2005 Five-Year Review Report issued by MDEQ with U.S. EPA concurrence showed that exposure pathways that could result in unacceptable human health risks are being controlled. The remedy will be fully protective of human health and the environment when construction enhancements to the leachate extraction system and land use restrictions are implemented, and when groundwater clean-up goals are attained. MDEQ continues to work with the PRP to implement the recommendations of the Five-Year Review Report.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID000724930.htm. 2008 Mar [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants are implicated as contaminants from this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.10 Thermo-Chem Incorporated

The Thermo-Chem site includes two properties that together cover approximately 9.5 acres in Muskegon County, MI, near the City of Muskegon. Waste solvent reprocessing, storage, and incineration all took place on the site. These operations resulted in extensive contamination of soil and groundwater. Information on this site is from the 1996 ATSDR public health assessment and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census provided the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	420
Females aged 15-44	716
Adults 65 and older	401

Public Health Outcome Data: Cancer incidence data for 1985 through 1989 for the two ZIP code areas (49442, 49444) nearest the Themo-Chem site were compared with the number of expected cases. The comparison was based on age-specific annual rates for the National Cancer Institute Surveillance, Epidemiology, and End Results program. For both ZIP Code areas, the number of observed cases was lower than expected.

ATSDR Conclusions: The 1996 public health assessment characterized this site as an *Indeterminate (formerly potential) Public Health Hazard (*Category 3*).* At the time, the

groundwater was contaminated with VOCs; the groundwater flow was—and presumably remains—toward Black Creek. Some contamination of the surface water and sediments was detected downstream of the site. However, no residences were downgradient of the site, and no wells were found to be contaminated. Some subsurface soil PCB contamination was noted at above health-based screening levels, but surface soil data were not available, and the contamination level was not elevated. PCB concentrations in Black Creek fish were not above FDA action levels.

U.S. EPA Update: In its August 2006 Fact Sheet regarding the Themo-Chem site, U.S. EPA stated in part that

> A study was completed by site PRPs in 2004 to determine if biodegradation occurring at the Site could be enhanced by addition of nutrients to the groundwater. The study concluded that natural biodegradation without enhancement combined with operation of the constructed extraction system should decrease groundwater contaminants to acceptable levels. Site PRPs continue with site monitoring in accordance with the O&M Plan.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID044567162.htm. 2006 August [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.11 Whitehall Municipal Wells

The Whitehall Wells site includes the City of Whitehall's municipal Production Well #3 and some of the surrounding area. In the late 1980s, the well was found to be contaminated with VOCs. The source was, however, unknown. Information on this site is from ATSDR's 1992 public health assessment and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	228
Females aged 15-44	545
Adults 65 and older	507

ATSDR Conclusions: ATSDR's 1989 public health assessment concluded that the site was an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). Because at that time humans were not exposed to significant levels of hazardous substances, ATSDR's 1992 public health assessment concluded that the site posed *No Apparent Public Health Hazard* (Category 4).

In 1981, wells were found to be contaminated with tetrachloroethylene, trichloroethylene, and other chlorinated VOCs. But levels were low, and exposure was minimized by reducing the pumping rates and, ultimately, by taking the wells offline. Monitoring well contamination was sporadic; although this municipal supply well contributed to human VOC exposure, it was not the contamination source, which remained unknown. In any event, the well is no longer in

operation, and the City of Whitehall has assumed responsibility for monitoring the public water supply.

U.S. EPA Update: In its April 2008 Fact Sheet for the Whitehall Municipal Wells site, U.S. EPA stated in part that

> City well PW-3 was closed in 1981, and PW-6 was brought online to increase the water supply. An investigation and risk assessment indicated there was no further public health risk involved with the site as a result of the closing of PW-3. Therefore, no further cleanup action was recommended. The Michigan Department of Public Health will continue its routine sampling of the city water supply to ensure its long-term safety.
>
> Closing PW-3 eliminated the potential for exposure to hazardous materials at the Whitehall Municipal Well site. The state is continuing to sample and monitor the groundwater to ensure continued protection of nearby residents and the environment. This site was deleted from the National Priorities List on February 11, 1991.

Available at: http://www.epa.gov/region5superfund/npl/michigan/index.html. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no critical pollutants were identified. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.2. Summary and Conclusions for the Muskegon Lake AOC and White Lake AOC

5.1.2.1 Hazardous Waste Sites

ATSDR categorized the 11 sites in Muskegon Lake AOC and White Lake AOC as either a public health hazard or an indeterminate public health hazard at some time in their assessment history. Remediation has been completed or is ongoing at all sites.

5.1.2.2 TRI Data

The TRI onsite chemical releases for Muskegon County in 2001 totaled 1,370,434 pounds, the majority of which were released to air, followed by releases to land. See Table 5.1-B.

Limited amounts were released to surface water. Facilities reporting these releases are concentrated in the vicinity of the Muskegon Lake AOC; there are none situated near the White Lake AOC. Facilities that released these pollutants are listed in Table 5.1-B.

Of the total onsite releases, 12,488 (0.9%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury and mercury compounds (to air and land).

The major release (≥ 500,000 pounds) of a non-IJC-critical chemical was of hydrochloric acid aerosols (to air).

5.1.2.3 NPDES Data

The NPDES permitted discharges for Muskegon County, MI are summarized in Table 5.1-C. The average annual permitted discharges in 2004 totaled 77,971 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants DDD (0.0003 pounds), lead (120 pounds), and mercury (5.84 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.1-D.

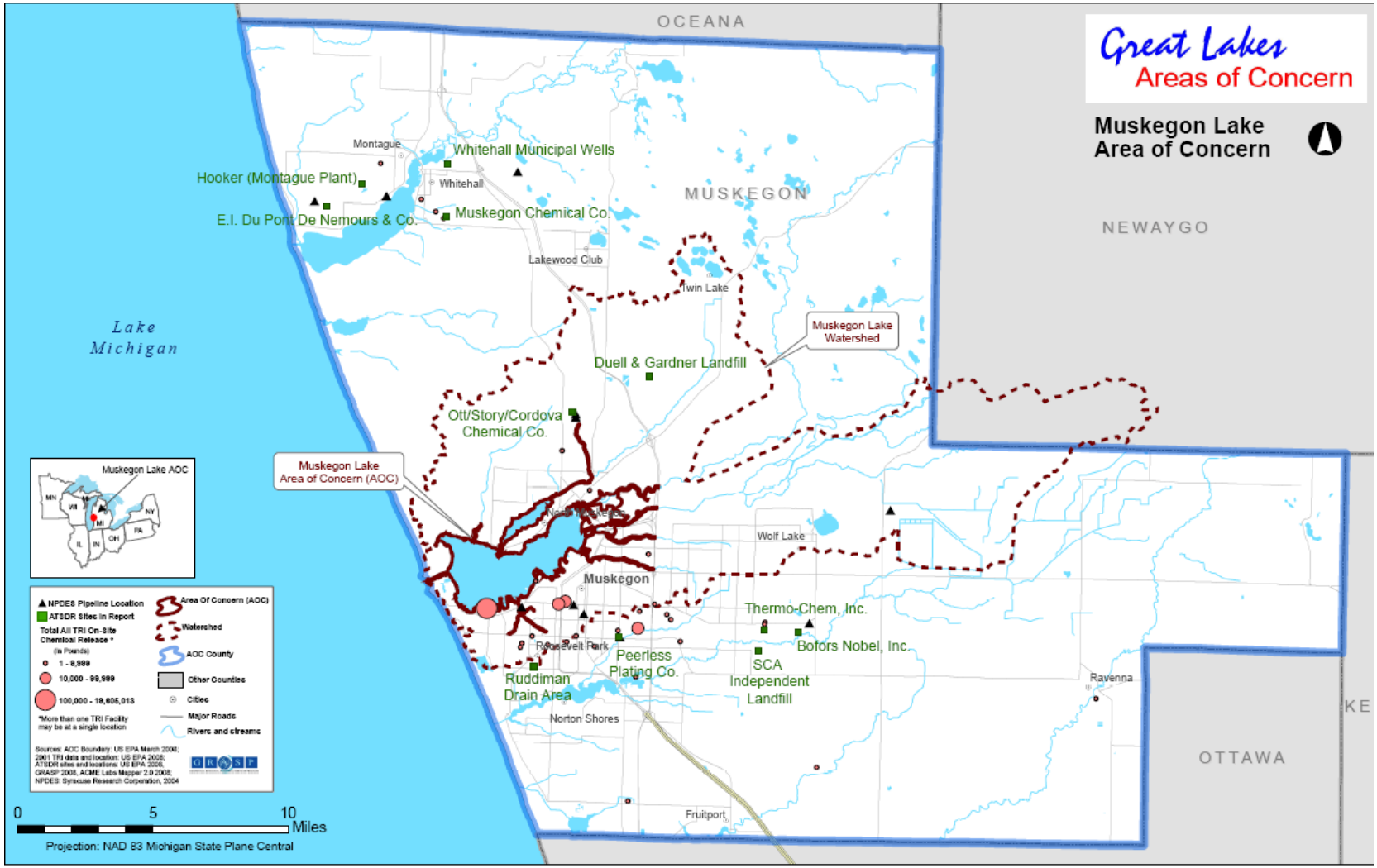
5.1.2.4 County Demographic Data

Vulnerable populations in Muskegon County totaled 9,030. The population in Muskegon County is much more concentrated around the Muskegon Lake AOC than the White Lake AOC.

5.1.2.5 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption and restrictions on drinking water are both cited in the summary table listing BUIs for this AOC. Fish consumption restrictions are specific for Muskegon River and for Muskegon Lake, but fish consumption advisories apply to White Lake as well. Consumption restrictions vary by location, fish species (e.g., for carp, largemouth bass, northern pike, walleye), and for vulnerable populations.

Further information is available at the U.S. EPA Web site: http://www.epa.gov/glnpo/aoc/.


Great Lakes
Areas of Concern
Muskegon Lake
Area of Concern
OCEANA
MUSKEGON
NEWAYGO
OTTAWA
Lake
Michigan
Montague
Whitehall
Hooker (Montague Plant)
E.I. Du Pont De Nemours & Co.
Whitehall Municipal Wells
Muskegon Chemical Co.
Lakewood Club
Twin Lake
Muskegon Lake
Watershed
Duell & Gardner Landfill
Ott/Story/Cordova
Chemical Co.
Muskegon Lake
Area of Concern (AOC)
Wolf Lake
Muskegon
Thermo-Chem, Inc.
Bofors Nobel, Inc.
Roosevelt Park
Peerless
Plating Co.
SCA
Independent
Landfill
Ruddiman
Drain Area
Norton Shores
Ravenna
Fruitport
Muskegon Lake AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site
Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,805,013
*More than one TRI Facility
may be at a single location
Area Of Concern (AOC)
Watershed
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
0
5
10
Miles
Projection: NAD 83 Michigan State Plane Central

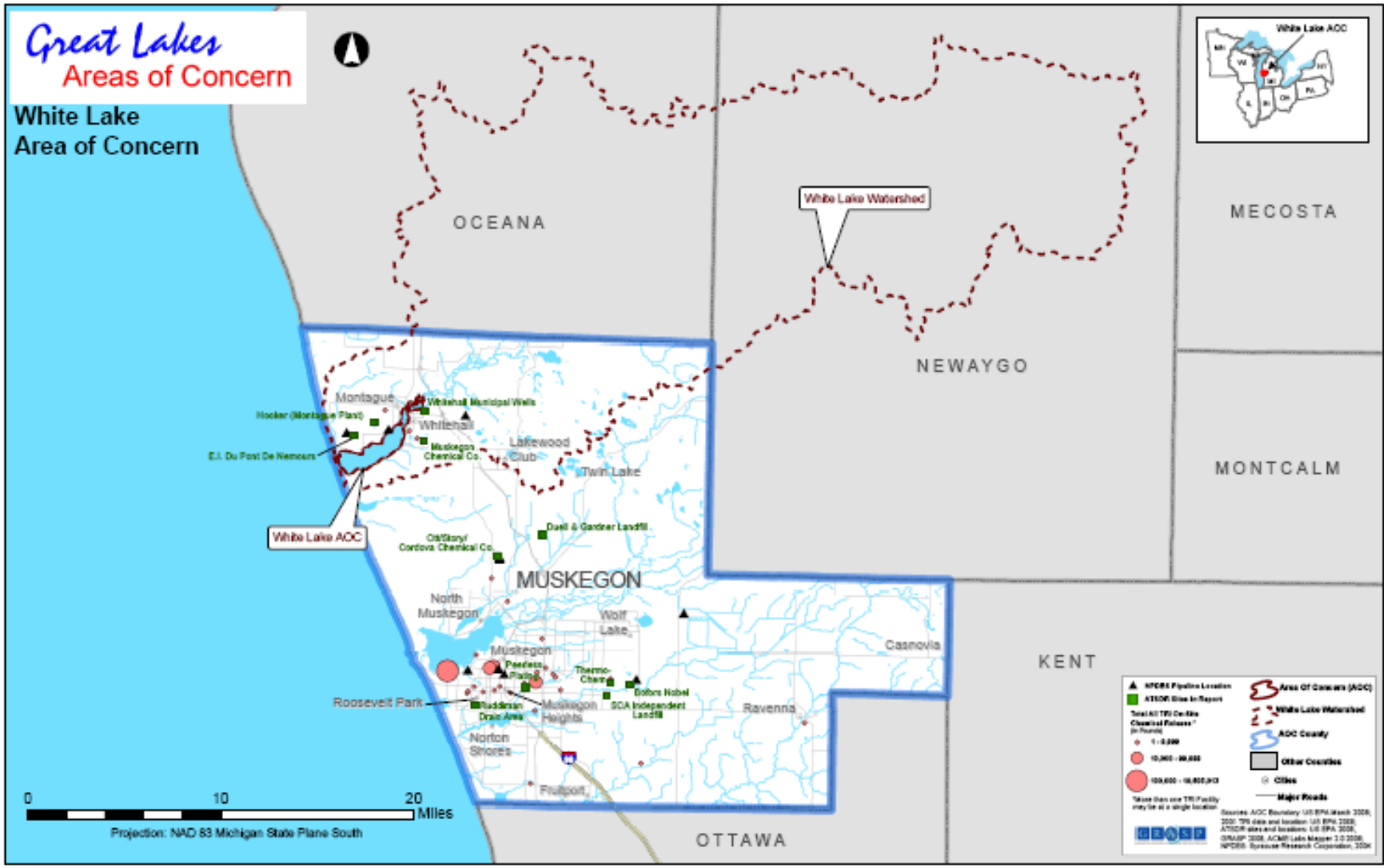

Great Lakes
Areas of Concern
White Lake
Area of Concern
OCEANA
NEWAYGO
MECOSTA
MONTCALM
KENT
OTTAWA
White Lake Watershed
White Lake AOC
MUSKEGON
Montague
Whitehall
Lakewood Club
Twin Lake
North Muskegon
Wolf Lake
Muskegon Heights
Norton Shores
Ravenna
Fruitport
Cannovia
Roosevelt Park
Hooker (Montague Plant)
E.I. Du Pont De Nemours
Muskegon Chemical Co
Duell & Gardner Landfill
Old Story/Cordova Chemical Co
Thermo-Chem
Bofors Nobel
SCA Independent Landfill
0
10
20
Miles
Projection: NAD 83 Michigan State Plane South

Table 5.1-B. TRI Releases (in pounds, 2001) for Muskegon Lake and White Lake AOCs

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00106722	No data	0	0	0.00106722	0	0.00106722
(PCDDs and PDCFs)	3							
LEAD	8	1786	12	0	89	1887	15325.779	17212.779
LEAD COMPOUNDS	8	196.6996	3100.001	0	7100	10396.7006	1684.33037	12081.03097
MERCURY COMPOUNDS	9	153	1	0	50	204	9.23	213.23
	Total IJC	**2135.700667**	**3113.001**	**0**	**7239**	**12487.70167**	**17019.33937**	**29507.04104**
1,2,4-TRIMETHYLBENZENE		236	No data	0	0	236	0	236
1,2-DICHLOROETHANE		22	No data	0	0	22	0	22
3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE		5	No data	0	0	5	7200	7205
4,4'-ISOPROPYLIDENE-DIPHENOL		343	No data	0	0	343	74938	75281
ACETONITRILE		2150	No data	0	0	2150	0	2150
ALUMINUM (FUME OR DUST)		15244	No data	0	153	15397	286	15683
AMMONIA		26755	No data	0	0	26755	0	26755
ATRAZINE		10	0	0	0	10	0	10
BARIUM COMPOUNDS		1297	5800	0	170880	177977	153990	331967
BENZENE		1141	No data	0	0	1141	0	1141

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CERTAIN GLYCOL ETHERS		18	No data	0	0	18	0	18
CHLORINE		3465	0	0	0	3465	0	3465
CHLORINE DIOXIDE		255	No data	0	0	255	0	255
CHLOROBENZENE		12	No data	0	0	12	0	12
CHLOROFORM		430	No data	0	0	430	0	430
CHLOROMETHANE		6680	No data	0	0	6680	0	6680
CHROMIUM		2354	10	0	5	2369	22407	24776
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		0	No data	0	0	0	20233	20233
COBALT		1644	No data	0	5	1649	12732	14381
COBALT COMPOUNDS		0	No data	0	0	0	5780	5780
COPPER		2305	10	0	11	2326	22746	25072
COPPER COMPOUNDS		70	No data	0	0	70	350	420
DICHLOROMETHANE		49106	No data	0	0	49106	0	49106
DIISOCYANATES		1	No data	0	0	1	0	1
DIMETHYL PHTHALATE		0	No data	0	0	0	16000	16000
ETHYLBENZENE		1331	No data	0	0	1331	0	1331
ETHYLENE GLYCOL		12	No data	0	0	12	0	12

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
FORMALDEHYDE		6	No data	0	0	6	0	6
FORMIC ACID		4	No data	0	0	4	0	4
FREON 113		5	No data	0	0	5	0	5
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		691508	0	0	0	691508	0	691508
HYDROGEN FLUORIDE		54923	No data	0	0	54923	0	54923
MANGANESE		5911	5	0	0	5916	13424	19340
MANGANESE COMPOUNDS		33418	0	0	39470	72888	17281	90169
M-CRESOL		3	No data	0	0	3	0	3
METHANOL		87887	No data	0	0	87887	0	87887
METHYL ETHYL KETONE		630	No data	0	0	630	0	630
METHYL ISOBUTYL KETONE		81	No data	0	0	81	0	81
N,N-DIMETHYLFORMAMIDE		244	No data	0	0	244	0	244
N-BUTYL ALCOHOL		36	No data	0	0	36	0	36
N-HEXANE		1500	No data	0	0	1500	0	1500
NICKEL		2383	255	0	5	2643	29427	32070
NICKEL COMPOUNDS		0	No data	0	0	0	2680	2680
NITRATE COMPOUNDS		10	No data	0	0	10	5	15

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
NITRIC ACID		10029	No data	0	0	10029	0	10029
N-METHYL-2-PYRROLIDONE		261	No data	0	0	261	0	261
PHENOL		750	No data	0	0	750	0	750
PHTHALIC ANHYDRIDE		4	No data	0	0	4	0	4
POLYCYCLIC AROMATIC COMPOUNDS		0	No data	0	18	18	4	22
PYRIDINE		277	No data	0	0	277	0	277
STYRENE		18346	No data	0	0	18346	7816	26162
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		51588	No data	0	0	51588	0	51588
TETRACHLORO-ETHYLENE		16	No data	0	0	16	0	16
TOLUENE		15235	No data	0	0	15235	0	15235
TRICHLOROETHYLENE		24510	2	0	0	24512	0	24512
TRIETHYLAMINE		148	No data	0	0	148	0	148
VANADIUM COMPOUNDS		3203	No data	0	20000	23203	4400	27603
XYLENE (MIXED ISOMERS)		3471	No data	0	0	3471	0	3471
ZINC COMPOUNDS		22	22	0	0	44	2216	2260
	Total Non-IJC	**1121295**	**6104**	**0**	**230547**	**1357946**	**413915**	**1771861**
	Total	**1123430.701**	**9217.001**	**0**	**237786**	**1370433.702**	**430934.3394**	**1801368.041**

Table 5.1-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Muskegon Lake and White Lake AOCs

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Muskegon County, MI	2	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		S. D. WARREN CO.	49443SDWRR2400L	MUSKEGON
Lead and lead compounds	12			
Muskegon County, MI	12	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		BEKAERT CORP.	49442BKRTC2121L	MUSKEGON
		DILESCO CORP.	49441DLSCC1806B	MUSKEGON
		EAGLE ALLOY INC.	49442GLLLY5142E	MUSKEGON
		HAYES LEMMERZ INTL. - MONTAGUE INC.	49437HYSLM5353W	MONTAGUE
		MARATHON ASHLAND PETROLEUM L.L.C. NORTH MUSKEGON MI TERMINAL	49445NRTHM3005H	NORTH MUSKEGON
		MUSKEGON CASTINGS CORP.	49442MSKGN2325S	MUSKEGON
		NON FERROUS CAST ALLOYS INC.	49441NNFRR1146N	MUSKEGON
		PORT CITY DIE CAST	49442PRTCT1985E	MUSKEGON
		RAVENNA CASTING CENTER INC.	49451SLDPW3800A	RAVENNA
		TEXTRON INC. CWC DIV.	49441CWCCS2672H	MUSKEGON
		WEST MICHIGAN STEEL FNDY.	49441WSTMC1148W	MUSKEGON
Mercury and mercury compounds	2			
Muskegon County, MI	2	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		S. D. WARREN CO.	49443SDWRR2400L	MUSKEGON

Table 5.1-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Muskegon Lake and White Lake AOC

Chemical	*IJC Tracking Number*	*Discharge*
4,4'-DDD (P,P'-DDD)	5	0.0003
LEAD, TOTAL (AS PB)	8	120.45
MERCURY, TOTAL (AS HG)	9	5.84
	Total IJC	**126.29**
CADMIUM, TOTAL (AS CD)		9.13
CHROMIUM, HEXAVALENT (AS CR)		10.59
CYANIDE, FREE (AMEN. TO CHLORINATION)		23.36
HEPTACHLOR EPOXIDE		0.003
HYDROGEN PEROXIDE		730
LINDANE		0.33
NICKEL, TOTAL (AS NI)		215.35
NITROGEN, AMMONIA TOTAL (AS N)		44286.67
PHOSPHORUS, TOTAL (AS P)		32057.95
ZINC, TOTAL (AS ZN)		511
	Total Non-IJC	**77844.38**
	Total	**77970.67**

5.2. Kalamazoo River AOC, Allegan and Kalamazoo Counties, MI

The Kalamazoo River flows westerly through the southwest portion of Michigan's Lower Peninsula, ultimately discharging into Lake Michigan. The Kalamazoo River AOC extends from the Morrow Dam downstream to Lake Michigan, a distance of approximately 80 miles (see AOC map at end of chapter and in Appendix 2).

5.2.1. Hazardous Waste Sites Relevant to the Kalamazoo River AOC

ATSDR evaluated the data for hazardous waste sites in Allegan and Kalamazoo Counties, MI, and reached conclusions regarding whether these sites posed any potential health effects. Conclusions are summarized in Table 5.2-A for sites categorized as either a public health hazard or an indeterminate public health hazard at some point during their assessment history, together with information regarding the type and location of the site and the date and type of assessment document.

Table 5.2. A Hazardous Waste Sites in Allegan and Kalamazoo Counties, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Allied Paper/Portage Creek/Kalamazoo River, Kalamazoo MID006007306	HA HC HC	1991 2001 2002	2 5 4	NPL	Ongoing
Auto Ion Chemical, Inc., Kalamazoo MID980794382	HA HA SRU	1989 1992 1994	3 3 5	NPL	Completed
Former Miro Golf Course MIXCRA01W000	HC	2005	3	Non NPL	Ongoing
K & L Landfill, Kalamazoo MID980506463	HA HA HC	1989 1992 2003	3 2 N.S.	NPL	Completed
Michigan Disposal Service, Kalamazoo MID000775957	HA HA	1989 1993	3 3	NPL	Completed
Rockwell International, Allegan MID006028062	HA SRU	1989 1995	3 3	NPL	Completed
Roto-Finish company, Kalamazoo MID005340088	HA	1989	3	NPL	Ongoing

2 =Public Health Hazard, 3 =Indeterminate Public Health Hazard, 4 =No Apparent Public Health Hazard, 5=No Public Health Hazard, HA = Public Health Assessment, HC = Health consultation, SRU=Site Review and Update, NS=Not stated

ATSDR has conducted further evaluation of the site data, summarized in the following sections.

5.2.1.1 Allied Paper/Portage Creek/Kalamazoo River

The Allied Paper, Inc. site in Kalamazoo County, Michigan, comprises 75 acres within the City of Kalamazoo. It also includes a 3-mile length of Portage Creek from Cork Street to the creek's confluence with the Kalamazoo River, and 35 miles of the Kalamazoo River itself, from Portage Creek downstream to Lake Allegan in Allegan County.

According to a U.S. EPA NPL site Fact Sheet, the site takes in the entire Kalamazoo River AOC (i.e., the 80-mile length of river from the Morrow Dam downstream to Lake Michigan). Because of Allied Paper's discharge and disposal of waste, the site is contaminated with PCBs. Disposal areas were dispersed along the river banks; contaminated sediments were largely deposited in four impoundment areas. In 2006, U.S. EPA estimated the river sediments contained 110,000 pounds of PCBs. Information regarding this site is from the 1991 ATSDR public health assessment and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	7,085
Females aged 15-44	17,055
Adults 65 and older	8,523

Public Health Outcome Data: As of 1991, on- and offsite human exposure to PCBs at levels of public health concern might have occurred. The site was therefore selected for a possible study to investigate fish ingestion and serum PCB levels. If a large number of people were eating fish from the Kalamazoo River and Portage Creek, a fish consumption study was warranted. In 2000, ATSDR reported that the State of Michigan had begun to assemble a study cohort of anglers. State researchers examined the cohort's fish consumption patterns, obtained medical histories, and collected blood specimens for chemical analysis. When completed, the study found that those who ate fish taken from the Kalamazoo River had higher residue levels of total PCBs and DDE in blood than did those who ate no Kalamazoo River fish. The finding was not, however, statistically significant.

Risk Assessment: In 2002, the Michigan Department of Environmental Quality published the Final (Revised) Baseline Human Health Risk Assessment Report. The risk assessment concluded that significant health risks to people and to fish-eating animals resulted from eating PCB-contaminated Kalamazoo River fish. The risk assessment also found that although dermal exposure to PCB-contaminated floodplain soils presented a health risk to people, recreational activity such as swimming, boating, and wading in the Kalamazoo River did not pose a similar PCB-related public health risk.

ATSDR Conclusions: Because of the threat to human health from exposure to PCBs in environmental media and biota, in its 1991 public health assessment ATSDR categorized this site as a *Public Health Hazard* (Category 2). Subsequent ATSDR health consultations in 2001 and 2002 categorized the site as *No Public Health Hazard* (Category 5) and *No Apparent Public Health Hazard* (Category 4). In 2006, U.S. EPA also reported that during recreational water use, public health threats were associated with dermal contact and incidental ingestion of water and sediments.

The site covered a wide geographic area heavily contaminated with PCBs—the primary contaminant of concern. The maximum levels of PCBs in fish from the Kalamazoo River and Portage Creek exceeded both the FDA limit and the Michigan trigger level for fish consumption advisories (2 ppm). Sizeable and vulnerable populations lived near the site. Although the State of Michigan issued fish consumption advisories, anglers reportedly had been taking fish home in amounts inconsistent with those advisories. Turtles from the river have also been used for food and could have been highly contaminated. PCBs were found in sediment and water of the river and creek.

U.S. EPA Update: In its April 2008 Fact Sheet for the Allied Paper/Portage Creek/ Kalamazoo River site, U.S. EPA stated in part that

> In March 2007, a Time Critical Removal action (TCRA) began to remove 120,000 cubic yards of PCB contaminated sediment from the Kalamazoo River's Plainwell Impoundment. This activity is being conducted by KRSG [Kalamazoo River Study Group] with oversight of U.S. EPA. This is a two year project. In 2007, approximately 37,000 cubic yards of contaminated sediment were removed from the river and nearby banks. In 2008, an estimated 83,000 cubic yards of material will be excavated and disposed off-site. Consistent with the federal Toxic Substances and Control Act, sediment containing PCB concentrations greater than 50 parts per million will be disposed at Environmental Quality Co.'s Wayne Disposal Landfill in Belleville Michigan. The sediment with concentrations less than this, which is considered non-hazardous waste and is 80 percent of the waste material, will be disposed at Allied Waste's C and C Landfill near Marshall MI, and its Ottawa Farms Landfill near Coopersville, MI. The estimated cost of this project is $30 million. Sediment excavation and restoration of this area is expected to be completed by December 2008.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID006007306.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.2 Auto Ion Chemicals, Inc.

Some years ago, from this 1.5-acre site on a bank of the Kalamazoo River within the City of Kalamazoo, Auto Ion Chemicals treated and deposited onsite its wastes from chromium plating operations. Liquid wastes were disposed of in an onsite, unlined lagoon or stored in tanks in a basement. Inadequate waste handling, treatment, and storage led to a number of discharges to the soil, to the storm and sanitary sewers, and directly into the river. During 1985–1986, a cleanup removed water and wastes from the site. The building was demolished and the site was fenced, but soil and groundwater remained contaminated. Information regarding this site was taken from ATSDR's 1992 public health assessment and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	994
Females aged 15-44	708
Adults 65 and older	1,819

ATSDR Conclusions: Because of the potential risk to human health that could result from possible exposure to hazardous substances at levels that could result in adverse health effects over time, in both the 1989 and 1992 health assessments ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1993, the contaminated soil was excavated and disposed offsite in licensed landfills, and the site was backfilled with clean soil. This removed the source of groundwater contamination. Groundwater was thereafter monitored, and a subsequent ATSDR site review and update concluded that the site posed *No Public Health Hazard* (Category 5).

In the past, before the ATSDR site assessments, improper handling of chromium plating wastes contaminated the environment and contributed to potential human exposure. Some VOCs, including vinyl chloride, were found in onsite groundwater at levels above health-based screening values, but the water was not a drinking source or even used as industrial process water. Chromium and cyanide were, however, found in the soil.

U.S. EPA Update: In its April 2008 Fact Sheet for the Auto-Ion site, U.S. EPA stated in part that

> The final remedy selected by U.S. EPA in 1994 called for long-term monitoring of groundwater to ensure contaminants remain at levels that do not raise concerns about adverse impacts to the Kalamazoo River. Under a 1996 Consent Decree, the PRPs installed new monitoring wells in 1997 and began to routinely monitor groundwater. To date, levels of contaminants in onsite monitoring wells have not raised a concern about impacts to the river. Deed restrictions will be placed on the property to prevent future use of groundwater.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980794382.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site. For a more complete listing of the hazardous substances that were found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.3 Former Miro Golf Course, Village of Douglas, MI

The former Miro Golf Course property is west of an Allegan County, MI industrial site first known as Chase Manufacturing, but, as of the date of this report, was owned by Haworth Inc. Earlier in this decade, site monitoring at Chase/Haworth revealed heavy metals in the soil and chlorinated solvents in the groundwater. Monitoring further revealed that part of the contaminated groundwater plume flowed under the former golf course, at one time slated for residential and light commercial redevelopment. In 2002, when the developer learned of the soil

and groundwater contamination, site preparation was halted, and the Michigan Department of Environmental Quality (MDEQ) requested a Remedial Investigation (RI). The RI revealed that the site was contaminated with metals, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) in surface waters, groundwater, and subsurface soils.

The RI addressed the soil and groundwater contamination originating from the Chase/Haworth facility—it did not address the soil contaminated with arsenic at the former golf course. In 2003, The Michigan Department of Community Health (MDCH) released a health consultation for the former Miro Golf Course. Again in 2005, an ATSDR follow-up health consultation addressed additional environmental contamination. Information on this site is from the 2005 ATSDR health consultation.

ATSDR Conclusions: ATSDR concluded in 2005 that in the future, indoor air inhalation in homes and buildings at the site could become an *Indeterminate Public Health Hazard* (Category 3). Still, because of the groundwater depth, VOC vapors in all likelihood would not enter onsite indoor air at harmful levels. Future construction activities in the area near and above the plume could result in preferential vapor pathways leading toward structures. Yet as far as incidental ingestion of local surface waters was concerned, no apparent public health hazard was anticipated—such exposure would have been infrequent and insignificant. Arsenic also remained a concern. Were this area developed, the arsenic would have to be addressed, depending on the proposed land use. On this state-led site, the RI is complete, and remedial activities are ongoing.

U.S. EPA Update: This Former Miro Golf Course site is not a U.S. EPA site and does not appear in CERCLIS.

The Michigan Department of Community Health Update: The Michigan Department of Environmental Quality (MDEQ) is operating an air-sparge/soil-vapor extraction system on the source property and will assess the efficacy of the remediation in 2009 (email from Mark DuCharme, MDEQ Remediation and Redevelopment Division; 2008 Aug 7).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PAHs was identified at this site.

5.2.1.4 K & L Landfill

From the early 1960s until 1979, this 87-acre site in Oshtemo Township (Kalamazoo County) Michigan was a sanitary landfill that accepted liquid and drummed chemical wastes. In 1979, when VOCs were found in nearby residential wells, the landfill was closed. The information regarding this site is from ATSDR's 1992 public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	53
Females aged 15-44	130
Adults 65 and older	61

ATSDR Conclusions: In 1989, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1992, because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that could result in

adverse health effects, ATSDR concluded that the site posed a *Public Health Hazard* (Category 2). The 2003 health consultation was written to document a review of the site Record of Decision and did not include a site category.

Past completed exposure pathways included ingestion, dermal contact, and inhalation of VOCs (including benzene and vinyl chloride) from groundwater used as household water. To avoid exposure, residences were converted to municipal water or to deeper wells. Still, the plume could have reached other residential wells, thus a health hazard concern remained. PCBs were in fact found in onsite in shallow subsurface soil. But the levels were insufficiently high to cause adverse health effects, and the PCB contamination was localized.

U.S. EPA Update: In its February 2007 Fact Sheet for the K & L Landfill site, U.S. EPA stated in part that

> A Record of Decision Amendment was signed in 2003 to address the need for additional homes to be hooked up to municipal water. The hookups were completed by the end of 2004. The amendment also included a requirement for a municipal water service zone, or other institutional controls, within and around the area affected by the contamination.
>
> On September 12, 2005, EPA amended the Record of Decision a second time, to replace the active groundwater pump and treat remedy with a monitored natural attenuation cleanup plan. The amendment also changed several design requirements for the landfill cap, and revised the boundaries of the municipal water service zone.
>
> Construction of the landfill cap began in the fall of 2005 and the pre-final inspection was completed in October 2006. The Preliminary Close-out Report was signed on December 20, 2006. The final inspection will take place in spring 2007. The first five-year review will be completed by August 2009.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980506463.htm. 2007 Feb [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, PCBs and B(a)P were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.5 Michigan Disposal Service

This 68-acre landfill is within the Kalamazoo city limits adjacent to Davis Creek, which flows into the Kalamazoo River. While active—from 1925 to 1968, the landfill accepted household and industrial waste. An onsite incinerator burned some of the waste, and the incinerator ash was deposited in the landfill. After 1968, the site became a Type III landfill, accepting only inert materials such as construction debris. Information regarding this site is from ATSDR's 1993 public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: the 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	830
Females aged 15-44	1,827
Adults 65 and older	863

ATSDR Conclusions: In 1989 and 1993, ATSDR concluded that because critical data were missing (e. g., adequate characterization of groundwater contamination, surface soil concentrations of contaminants), this site posed an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). Several pathways at this site may have resulted in human exposure, but not at significant levels.

Onsite groundwater concentrations of lead exceeded health-based screening values, as did concentrations of arsenic and VOCs, including TCE and benzene. But no exposure pathway was complete; high concentrations were found solely in limited areas or for limited times. Moreover, although groundwater flowed toward Davis Creek, the creek water and sediments were not contaminated.

In 1993, the entire landfill was capped. Groundwater was pumped, treated, and discharged to a wastewater treatment facility.

U.S. EPA Update: In its June 2007 Fact Sheet for the Michigan Disposal Service site, U.S. EPA stated in part that

> A Five Year Review was completed in December 2004 and the assessment of this five-year review found that the remedy was constructed in accordance with requirements of the ROD and the final ROD Amendment. The remedy is functioning as designed. The immediate threats have been addressed and the remedy is expected to be protective as long is maintained and monitored and an IC plan is implemented. Old galvanized steel monitoring wells were replaced by PVC wells and landfill gas probes were installed in 2005. A seep sampling program was begun in 2006 to address concerns that the MDEQ had raised about a potential seep. The PRP has sampled the seep and the results are forthcoming in the winter of 2007.
>
> The PRP, USEPA, and MDEQ are refining the Monitoring program in the winter of 2007 with hopes of approving a modification to the monitoring program by spring 2007. The PRPs have asked to abandon several of the wells so the RPM asked that the PRP conduct analysis of the data to identify the trends in each of the wells of key contaminants.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID000775957.htm. 2007 Jun [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site. For a more complete listing of the hazardous substances at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.6 Rockwell International Corp.

On a 30-acre site in Allegan (Allegan County) MI, from the early 1900s through 1991, Rockwell International manufactured universal joints for heavy trucks and construction equipment. A manufacturing byproduct was the discharge of quenching and cutting fluids directly into the Kalamazoo River. Later, Rockwell deposited the waste liquids into three unlined holding ponds that eventually discharged to the river. When the ponds finally filled with sludge, they were covered over with dirt and new ponds constructed. In 1971, oil seeps that appeared along the river were traced to six of Rockwell's underground storage tanks. By the time of the 1989 health assessment, the leaks had been eliminated—the installation of recovery wells had controlled the oil migration. Information regarding this site is from the 1989 ATSDR health assessment and subsequent 1995 site review and update and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	445
Females aged 15-44	890
Adults 65 and older	505

ATSDR Conclusions: In the 1989 health assessment, ATSDR classified this site as an *Indeterminate (formerly potential) Public Health Hazard.* In the subsequent (1995) site review and update, ATSDR concluded that despite insufficient available data, a risk to human health could result from potential exposure to onsite, detected levels of hazardous substances associated with adverse health effects over time. Consequently, this site was an *Indeterminate Public Health Hazard* (Category 3).

U.S. EPA Update: In its December 2007 Fact Sheet for the Rockwell International site, U.S. EPA stated in part that

> In conjunction with the ROD [Record of Decision], U.S. EPA issued a Unilateral Administrative Order to the site potentially responsible parties, ArvinMeritor, Inc., for the performance of the Remedial Design (RD) and Remedial Action (RA) to implement the ROD. RD work was completed in mid-2004 with RA work commencing in 2005.
>
> In fall 2001, a removal action was commenced to address elevated levels of PCBs present in a residential yard across from the site. After the initial completion of this work, PCB-contaminated oil was found in the bedding material of sewers, running through the neighborhood across the street from the site. The removal action addressed both the contaminated soil and the oil-impacted soils along the sewer lines. Removal work was completed in December 2002.
>
> RA activities which included to actions to address soils and other source materials have been completed with the exception of implementation of deed notices. A final inspection of the site was conducted in October 2006. This constitutes approximately 95% of the RA activities. The remainder of the work involved will include the installation of additional monitoring wells in early 2007. Results from ground water monitoring will be used to

> assess the effectiveness of source material actions and for additional analysis of whether current ground water quality meets MDEQ criteria for discharge to the Kalamazoo River.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID006028062.htm. 2007 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.7 Roto-Finish Company

The 7.5-acre Roto-Finish site is in Portage, MI, near Kalamazoo. From 1960 to 1979, Roto-Finish pumped an estimated 83,000 gallons of manufacturing and processing wastes into two onsite, unlined lagoons. The lagoons often overflowed. Reportedly, Roto-Finish also dumped wastes in low areas behind the shop and in other areas about 1 mile south of the site. From 1979 to 1983, Roto-Finish excavated the lagoons, disposing of the stained soils in an offsite landfill. The excavated areas were backfilled with clean material, and no significant soil contamination was thereafter detected. Information regarding this site is from ATSDR's 1989 public health assessment and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	386
Females aged 15-44	852
Adults 65 and older	305

ATSDR Conclusions: In 1989, ATSDR concluded that because of the risk to human health that could result from possible exposure to hazardous substances at levels resulting in adverse health effects over time, this site posed an *Indeterminate (formerly potential) Public Health Hazard* (Category 3).

As reported in that 1989 health assessment, onsite groundwater contained high levels of chromium and 4,4-methylene bis(2-chloroaniline). 1,1,1-trichloroethane and TCE were also found in groundwater. From 1995 to 2001, an extraction system removed the groundwater for transfer to a wastewater treatment plant. The current remedy is natural attenuation with institutional controls, expected to take 50–60 years. Chlorinated VOCs are the two remaining groundwater contaminants, but monitoring continues.

U.S. EPA Update: In its January 2007 Fact Sheet for the Roto-Finish site, U.S. EPA stated in part that

> The extraction system was shut off and after allowing for a period of equilibrium to occur, supplemental vertical aquifer sampling (VAS) began in August 2001, to more fully determine the extent of the mass of underground contaminants contained within the groundwater. Using a combination of cone penetrometer and rotosonic drilling techniques, VAS work was done in November 2001 and in 2002. Also in 2002, U.S. EPA

performed the first five-year review report to revisit the question of whether the remedy selected remains protective of human health and the environment. The report identified that the 2001 and 2002 sampling results indicated contaminant movement farther to the west and deeper than previously detected. The report determined that the extent of groundwater contamination was still unknown and rate of natural attenuation needed to be evaluated along the core of the groundwater plume. Since 2004, VAS work was completed in 11 locations and 13 monitoring wells have been installed, six wells are located along the core of the groundwater plume. All newly installed wells are currently being sampled on a quarterly basis to determine rates at which the contamination will degrade. The final Remedial Design and Long Term Monitoring Plan is expected to be completed by September 2007. A second five-year review will be conducted in 2007.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID005340088.htm. 2007 Jan [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified as contaminants of concern at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.2. Summary and Conclusions for the Kalamazoo River AOC

5.2.2.1 Hazardous Waste Sites

With regard to hazardous waste sites relevant to the Kalamazoo River AOC, ATSDR has, at some time in their assessment history, categorized seven sites as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Four of the sites have been remediated. At the remaining three sites, remediation is ongoing.

5.2.2.2 TRI Data

The TRI onsite chemical releases for Allegan and Kalamazoo Counties (combined) in 2001 totaled 2,083,449 pounds, the majority of which were released to air, followed by underground injection. Allegan County accounted for 45% and Kalamazoo County accounted for 55% of the total onsite releases. See Tables 5.2-B and 5.2-C

As few as 2,253 pounds (0.1%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury compounds (to air).

The largest releases of non-IJC chemicals, in the range of 300,000–499,999 pounds, were of xylenes and of n-hexane (to air).

5.2.2.3 NPDES Data

The NPDES permitted discharges for Allegan and Kalamazoo Counties, MI are summarized in Table 5.2-D. The average annual permitted discharges in 2004 totaled 317,820 pounds; the majority was ammonia nitrogen and phosphorus.

The IJC-critical pollutants PCBs (0.00004 pounds), lead (77 pounds) and mercury (3.65 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.2-E.

5.2.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired for this AOC. The Kalamazoo Remedial Action Plan is not available on the Internet and consequently was not obtained for this report. The 1998 Remedial Action Plan available on the U.S. EPA Web site was republished in 2000. According to that report, because of PCB concentrations in fish tissue, restrictions have been in place since 1977on consuming fish caught in the Kalamazoo River downstream from Battle Creek. The PCB source is contaminated sediments.

Further information is available at the U.S. EPA Web site: http://www.epa.gov/glnpo/aoc/.

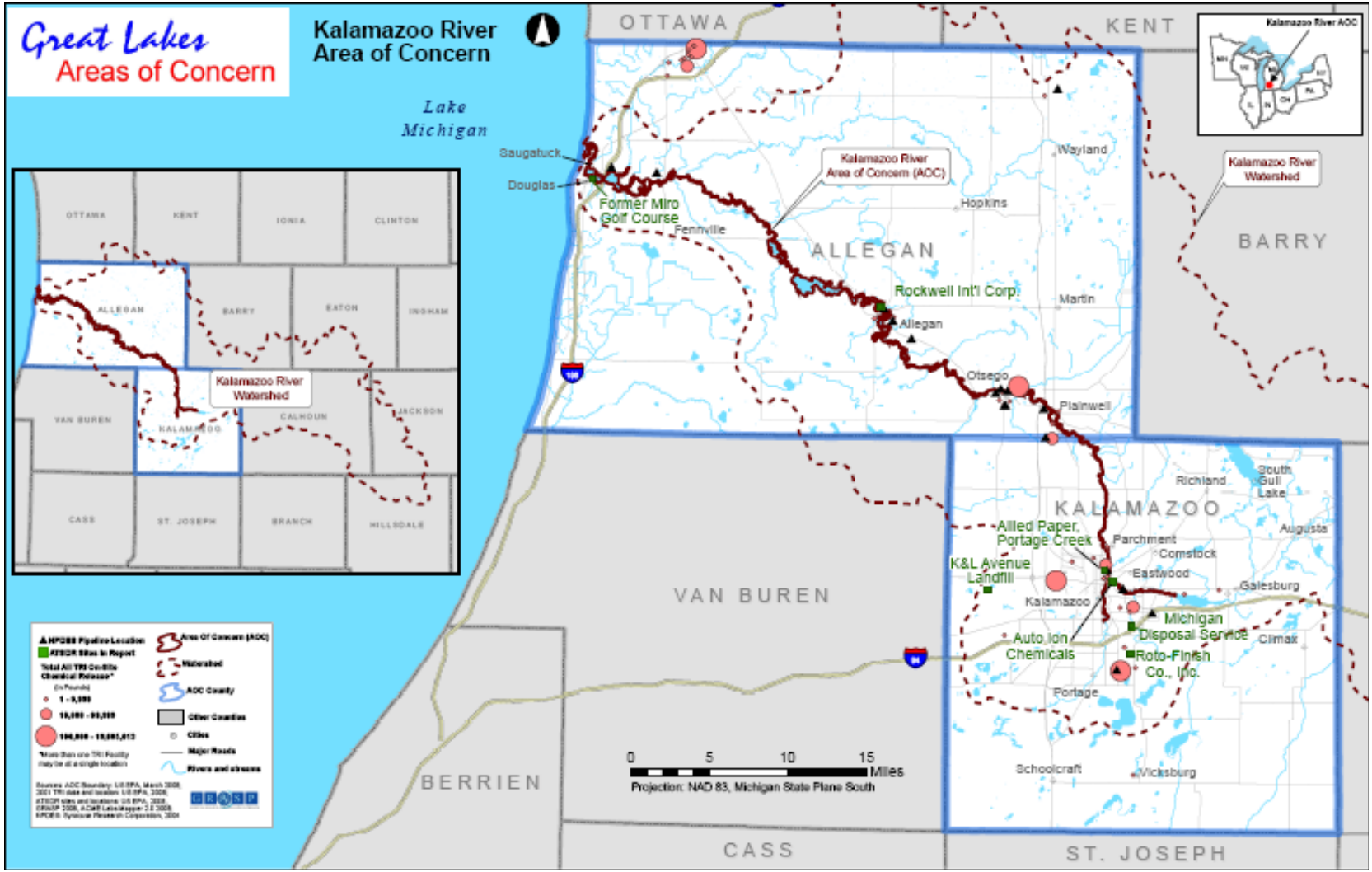

Great Lakes
Areas of Concern
Kalamazoo River
Area of Concern
Lake
Michigan
OTTAWA
KENT
Kalamazoo River AOC
Saugatuck
Douglas
Former Miro
Golf Course
Fennville
Kalamazoo River
Area of Concern (AOC)
Wayland
Hopkins
Kalamazoo River
Watershed
BARRY
ALLEGAN
Rockwell Int'l Corp.
Martin
Allegan
Otsego
Plainwell
Richland
South
Gull
Lake
KALAMAZOO
Augusta
Allied Paper,
Portage Creek
Parchment
Comstock
K&L Avenue
Landfill
Eastwood
Galesburg
Kalamazoo
Michigan
Disposal Service
Climax
Auto Ion
Chemicals
Roto-Finish
Co., Inc.
Portage
VAN BUREN
Schoolcraft
Vicksburg
BERRIEN
CASS
ST. JOSEPH
0 5 10 15
Miles
Projection: NAD 83, Michigan State Plane South
OTTAWA
KENT
IONIA
CLINTON
ALLEGAN
BARRY
EATON
INGHAM
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
CASS
ST. JOSEPH
BRANCH
HILLSDALE
Kalamazoo River
Watershed

Table 5.2-B. TRI Releases (in pounds, 2001) for the Kalamazoo River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.000253575	0	0	0	0.000253575	0	0.000253575
(PCDDs and PCDFs)	3							
LEAD	8	24	11.85	0	0	35.85	1815.63	1851.48
LEAD COMPOUNDS	8	1934.67	28.8	2	222	2187.47	491.1	2678.57
MERCURY COMPOUNDS	9	30.13	0	0	0	30.13	39.53	69.66
	Total IJC	1988.800254	40.65	2	222	2253.450254	2346.26	4599.710254
ACETALDEHYDE		20638	250	0	124	21012	0	21012
ACETONITRILE		12700	0	360	0	13060	0	13060
ACRYLAMIDE		18	0	0	0	18	0	18
AMMONIA		27067	1149	80	8029	36325	0	36325
BARIUM COMPOUNDS		0	0	0	0	0	15148	15148
CERTAIN GLYCOL ETHERS		9	0	0	0	9	0	9
CHLORINE		4870	600	0	0	5470	0	5470
CHLORODIFLUORO-METHANE		11350	0	0	0	11350	0	11350
CHLOROMETHANE		2593	0	0	0	2593	0	2593
CHROMIUM		250	0	0	0	250	0	250

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		2150	0	52000	0	54150	3435	57585
COBALT		250	0	0	0	250	0	250
COPPER		0	0	0	0	0	10	10
COPPER COMPOUNDS		10	0	0	0	10	0	10
CUMENE		130	0	0	0	130	0	130
CYANIDE COMPOUNDS		160	0	0	0	160	0	160
CYCLOHEXANE		214	0	0	0	214	0	214
DICHLOROMETHANE		169750	179	87000	0	256929	10	256939
DIISOCYANATES		2	0	0	0	2	0	2
DIMETHYLAMINE		4262	0	0	0	4262	0	4262
EPICHLOROHYDRIN		127	0	0	0	127	0	127
ETHYLBENZENE		109817	0	0	0	109817	0	109817
FORMALDEHYDE		7181	510	1	0	7692	4500	12192
FORMIC ACID		10	0	60	0	70	0	70
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		130100	0	0	0	130100	0	130100
HYDROGEN FLUORIDE		10030	0	0	0	10030	0	10030

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
MANGANESE		500	0	0	0	500	5	505
MANGANESE COMPOUNDS		3800	0	11000	0	14800	13020	27820
METHANOL		156313	49022	50000	547	255882	1500	257382
METHYL ETHYL KETONE		15845	0	1	0	15846	0	15846
METHYL ISOBUTYL KETONE		9911	0	0	0	9911	0	9911
METHYL TERT-BUTYL ETHER		1260	1	0	0	1261	0	1261
N,N-DIMETHYLFORMAMIDE		1200	0	7100	40	8340	0	8340
N-BUTYL ALCOHOL		116529	0	32	0	116561	0	116561
N-HEXANE		305644	0	0	0	305644	1	305645
NICKEL		250	0	0	0	250	3205	3455
NITRATE COMPOUNDS		0	379	0	725	1104	0	1104
NITRIC ACID		1069	0	0	0	1069	0	1069
OZONE		670	0	0	0	670	0	670
PHENOL		120	0	0	0	120	800	920
POLYCYCLIC AROMATIC COMPOUNDS		0.143	0	0	0	0.143	0	0.143
POTASSIUM DIMETHYLDITHIO-CARBAMATE		13730	0	0	0	13730	0	13730
PYRIDINE		40	0	310	0	350	0	350

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
STYRENE		110053	0	0	0	110053	0	110053
TERT-BUTYL ALCOHOL		1820	0	3	0	1823	160	1983
TOLUENE		46450	24	41	0	46515	0	46515
TRIETHYLAMINE		150	0	2100	0	2250	0	2250
XYLENE (MIXED ISOMERS)		496886	0	0	0	496886	0	496886
ZINC COMPOUNDS		350	250	13000	0	13600	49113	62713
	Total Non-IJC	1796278.143	52364	223088	9465	2081195.143	90907	2172102.143
	Total	1798266.943	52404.65	223090	9687	2083448.593	93253.26	2176701.853

Table 5.2-C. TRI Facilities Releasing Critical Pollutants Onsite for the Kalamazoo River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	1			
Kalamazoo County, MI	1	PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO
Lead and lead compounds	6			
Allegan County, MI	3	ROCK-TENN CO.	49078MDPPR431HE	OTSEGO
		UNIFORM COLOR CO.	49423NFRMC942BR	HOLLAND
		MENASHA CORP.	49078MNSHC320NF	OTSEGO
Kalamazoo County, MI	3	GRAPHIC PACKAGING CORP.	49007JMSRV243EA	KALAMAZOO
		HUMPHREY PRODS. CO.	49003HMPHRKILGO	KALAMAZOO
		PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO
Mercury and mercury compounds	2			
Kalamazoo County, MI	2	GRAPHIC PACKAGING CORP.	49007JMSRV243EA	KALAMAZOO
		PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO

Table 5.2-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Kalamazoo River AOC

Chemical	*IJC Tracking Number*	*Discharge*
POLYCHLORINATED BIPHENYLS (PCBS)	1	0.00004
LEAD, TOTAL (AS PB)	8	76.65
MERCURY, TOTAL (AS HG)	9	3.65
	Total IJC	**80.30**
NITROGEN, AMMONIA TOTAL (AS N)		204582.50
PHOSPHOROUS, IN TOTAL ORTHOPHOSPHATE		2920
PHOSPHORUS, TOTAL (AS P)		109835.80
SILVER, TOTAL (AS AG)		401.50
	Total Non-IJC	**317739.80**
	Total	**317820.10**

Table 5.2-E. NPDES Facilities Permitted to Discharge Critical Pollutants, Kalamazoo AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Polychlorinated Biphenyls (PCBs)	1			
Kalamazoo County, MI	1	GEORGIA PACIFIC-KING HWY SF	MIU990018	KALAMAZOO
Lead	1			
Kalamazoo County, MI	1	AERO-MOTIVE CO	MI0055310	KALAMAZOO
Mercury	1			
Kalamazoo County, MI	1	KALAMAZOO WWTP	MI0023299	KALAMAZOO

5.3. Grand Calumet AOC, Lake County, IN, and Cook County, IL

The Grand Calumet River originates in the east end of Gary, IN. The river then flows through canals, ditches, and manufactured waterways—including the Indiana Harbor and Ship Canal—13 miles through Gary, East Chicago, and into Hammond, the most important harbor complex on the Great Lakes. Ninety percent of the river's flow originates as municipal and industrial effluent, storm water overflows, and cooling and process waste. Most of that water drains into Lake Michigan. The AOC begins 15 miles south of downtown Chicago and includes the east branch and a small segment of the west branch of the river, and also the Indiana Harbor and Ship Canal (see AOC map at end of chapter and in Appendix 2).

5.3.1. Hazardous Waste Sites Relevant to the Grand Calumet AOC

ATSDR evaluated the data for 18 hazardous waste sites in Lake County, IN and Cook County, IL, and reached conclusions regarding the public health threat posed by these sites. The conclusions for sites categorized as either a public health hazard or an indeterminate public health hazard at some point during their assessment history are summarized in Table 5.3-A, together with information regarding the type and location of the site and the date and type of assessment document.

Table 5.3–A. Hazardous Waste Sites in Lake County, IN, and Cook County, IL

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Acme Steel Coke Plant, Chicago ILN000509241	HC	2007	2	Non NPL	Ongoing
American Chemical Services, Inc., Griffith IND016360265	HA HA	1988 1994	3 3	NPL	Ongoing
Calumet Container, Hammond IND980500193	HC	2004	2	Non NPL	Completed
Celotex Corp., Chicago ILD051053692	HC HC	1995 1999	3 2	Non NPL	To be Determined
Double A Metals, Chicago ILD025352139	HC HC	1997 2005	2 5	Non NPL	Completed
Electro Finishers, Chicago ILD009437906	HC HC	2001 2007	2 5	Non NPL	Completed
Elizabeth Street Foundry, Chicago ILD005086822	HC	1997	2	Non NPL	To be Determined
Estech General Chemical, Calumet City ILD099213498	HC	1999	2	Non NPL	Completed

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Hartz Construction, Oak Lawn ILXCARA583000	HC	1999	2	Non NPL	Completed
Keil Chemical, Hammond IND005421755	EI HA	2001 2001	5 3	Non NPL	Active site; RCRA supervised
Lake Sandy Jo Landfill, Gary IND980500524	HA SRU	1985 1992	2 3	NPL	Completed
Lincoln Limited Landfill, Ford Heights ILXCRA0BJ000	HC	2006	3	Non NPL	Completed
Midco I, Gary IND980615421	HA SRU	1987 1992	3 2	NPL	Ongoing
Midco II, Gary IND980679559	HA	1989	3	NPL	Ongoing
Ninth Avenue Dump, Gary IND980794432	HA HC	1989 1999	3 5	NPL	Ongoing
Stauffer Chemical Co., Chicago Heights ILD005110143	HA SRU	1988 1993	3 5	Removed from NPL	Completed
U.S. Smelter and Lead Refinery, Inc. East Chicago IND047030226	HA EI	1994 1998	2 N.S.	Proposed to the NPL	To be Determined
West Pullman Iron & Metal, Chicago ILD005428651	HA	1999	3	Non NPL	Ongoing

2 =Public Health Hazard, 3 =Indeterminate Public Health Hazard, 5 =No Public Health Hazard

HA = Public Health Assessment, HC = Health consultation, SRU=Site Review and Update, EI = Exposure Investigation

ATSDR's additional evaluation of the site data is summarized in the following sections.

5.3.1.1 ACME Steel Coke Plant Site

The former ACME Steel Coke Plant site in Chicago, IL is on about 104 acres surrounded by industrial, agricultural, and residential properties. Torrence Avenue borders the facility on the east. A few residences are to the south, a rail line and a wetland site known as "Interlake Property" to the west, and a vacant property to the north. More residences are about 1,000 feet north of the site. Lake Calumet is less than a mile west, and the Calumet River is only a third of a mile east. Lake Michigan is some 3 miles

east-northeast. Gaseous waste produced in the coking process included hydrogen, methane, carbon monoxide, carbon dioxide, ethane, hydrogen sulfide, ammonia, and nitrogen, all of which were condensed, cooled, and compressed. Liquid wastes included water, tar, and crude light oil. Solid waste included coal dust, heavy hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). Information on this site is from ATSDR's 2007 health consultation.

ATSDR Conclusions: ATSDR concluded that exposure to contaminated surface materials and sediments at the site posed a *Public Health Hazard* (Category 2) to trespassers. Trespassers may have been exposed to contaminants in soil, waste material, and sediments. Residents may have been exposed to dust blown from the site and to emissions from the coke plant during the years it was in operation.

U.S. EPA Update: In 2007 the U.S. EPA Emergency Response Program completed a removal action at the Acme Steel Plant site, and the U.S. EPA Superfund Remedial Program is currently evaluating the site. Available at: http://epaosc.net/site_profile.asp?site_id=2251%20. [cited 2008 Jul 31].

See also Chicago's Steel Heritage Project. Available at: http://www.chicagosteel.org/ [cited 2008 Oct 23].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PAHs was identified at this site.

5.3.1.2 American Chemical Service, Inc.

This site is in Griffith (Lake County) IN and includes three properties with a total area of about 36 acres. American Chemical Service (ACS) began in 1955 as a solvent recovery firm and a chemical manufacturer. One of its associated properties was a chemical drum reconditioning operation. In 1990, it ceased solvent reclamation, but has continued as a chemical manufacturing firm. From 1955 until at least 1975, ACS disposed of hazardous wastes onsite, including an estimated 35,000 waste-filled drums. It also incinerated waste chemicals and disposed of the ash onsite. Information regarding this site is from the 1994 ATSDR public health assessment and the 2008 U.S. EPA NPL site Fact Sheet.

Public Health Outcome Data: ATSDR evaluated heath outcome data to investigate the concerns of community members who believed a high frequency of cancer occurred within an 8-block area north of the ACS site. An ATSDR review of cancer incidence data showed percentages of site-specific cancers for Griffith, IN, as comparable to those for the United States generally. Although a review of mortality rates for all cancer sites showed more deaths than expected in Lake County compared with all of Indiana, the relevance of this finding to the 8-block area of concern north of the ACS site is problematic.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	389
Females aged 15-44	1,002
Adults 65 and older	551

ATSDR Conclusions: Although no evidence indicated current or past residents were exposed to site-related contaminants, the 1994 health assessment raised the concern that as long as contaminants remain at the site, they could migrate to residential wells and pose a long-term

exposure health hazard. Consequently, in the 1989 health assessment, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* and maintained that category in the 1994 health assessment.

Groundwater contaminants of concern onsite and in offsite monitoring wells included benzene and chlorinated VOCs. No site-related contaminants had migrated to residential wells, but in one area of the site, subsurface soil had elevated concentrations of PCBs. No monitoring data were, however, available for surface soil. As of the 1994 assessment, offsite surface water and sediments were not contaminated at levels above background or of public health concern.

After 1994, a subsurface barrier wall around the site helped contain groundwater, and a groundwater treatment system helped decontaminate it. Intact drums were removed and soil vapor extraction was underway and was expected to continue through 2005 or longer. Contaminated areas of the adjacent wetlands were excavated and consolidated onsite.

U.S. EPA Update: In its May 2008 Fact Sheet for the American Chemical Service site, U.S. EPA stated in part that

> During the period of 2002-2004, the companies installed a final soil cover over the off-site containment area and installed a soil vapor extraction system in the onsite area. The onsite soil vapor extraction system was tested and adjusted for efficiency and was brought on line during the summer of 2004.
>
> Also in the fall of 2004 U.S. EPA completed the placement of a final cover over the onsite area and began to inject a chemical oxidant compound under a small area along the southern area of the site (near the Colfax Avenue and Reder Road intersection) that had small amounts of hydrocarbon contamination at the water table (a part of the off-site groundwater cleanup program). Then, because all cleanup components had been installed, U.S. EPA claimed a "construction completion" milestone in September 2004 for the ACS site.
>
> The site is now in the operation and maintenance ("O&M") phase. The soil vapor extraction systems will be operated for about 5 more years and the water treatment system will be operated for 30 years or more. Initially, the soil vapor extraction systems were removing over 1000 pounds per day of volatile organic chemical contaminants from the ground. Now, the average removal rate is about 150-200 pounds per day. It is estimated that as of October 2007, over 800,000 pounds of volatile organic chemical contaminants have been safely removed from the ground at the ACS site and safely destroyed.
>
> The soil covers are inspected periodically and repaired as necessary.
>
> In April 2005 a second round of chemical oxidant injections were performed in and around Colfax Avenue (near Reder Road) and in July 2005 the third round of injections occurred. Still later in early 2006 a fourth and final round of chemical oxidant was injected into the ground. U.S. EPA then began a period of monitoring groundwater quality in this area that will continue until contaminant levels no longer exceed cleanup standards.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND016360265.htm. 2008 May [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, lead, and mercury were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.3 Calumet Container site (a/k/a The Steel Container Corporation)

The Calumet Container site, also known as The Steel Container Corporation, formerly housed a factory in which 5- to 55-gallon drums containing chemicals and paints were emptied, cleaned, repainted, and sold for reuse. The property spans the Indiana-Illinois state border, with about 90% of the 11-acre site in the jurisdiction of the City of Hammond (Lake County) IN, and the remaining 10% in the City of Chicago (Cook County) IL. This factory began its operations in the 1960s and closed in July 1981. Information on this site is from ATSDR's 2004 health consultation.

Demographic Data: According to recent census data approximately 300 persons, including 60 children, reside within ¼ mile of the site.

ATSDR Conclusions: In 2004, ATSDR concluded that because of the lead's toxic effects, especially on children, this site presented a *Public Health Hazard* (Category 2) for trespassers. Also, cadmium, arsenic and chromium levels exceeded comparison values. Evidently, people trespassed on and dug holes in the property. This indicated that people, possibly children, were coming in direct contact with contaminated soils and likely to carry contaminated soils home on their clothes and shoes. Given the current and proposed future recreational use of the property, potential future pathways also provided opportunities for direct exposure with contaminated soils.

U.S. EPA Update: In 2006, U.S. EPA reported that through the joint efforts of local, county, and state governments, the Calumet Container site had been successfully remediated. Available at: http://epaosc.net/site_profile.asp?site_id=1868%20 [cited 2008 Jul 30].

IJC-critical Pollutants Identified within the ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

5.3.1.4 Celotex Corp

This Celotex Corporation plant formerly operated on 24 acres in Chicago (Cook County) IL. Beginning about 1912, Celotex distilled coal tar. Until 1986, it used that coal tar for asphalt roofing tiles. But these distillation activities contaminated the soil with PAHs, and ultimately Celotex came to the attention of the U.S. EPA. In 1994, to reduce possible onsite exposure Celotex covered the site with clean soil. In 1997, it regraded the site and, to reduce flooding, installed a drainage system. Nevertheless, in 1999 U.S. EPA concluded that PAH levels in the onsite soil and, by that time, in the nearby neighborhoods exceeded the typical background level for the Chicago urban area. Information regarding this site is from the 1995 and 1999 ATSDR health consultations.

ATSDR Conclusions: ATSDR's 1995 health consultation categorized this site as an *Indeterminate Public Health Hazard* (Category 3). After a 1999 review of childhood exposures

to some PAH-contaminated residential offsite soil, ATSDR categorized the site as a *Public Health Hazard* (Category 2). The site contained completed exposure pathways. For the incidental ingestion pathway, the contaminants of concern were B(a)P and other carcinogenic PAHs, estimated as B(a)P equivalents in soil. Doses were estimated using a site-specific oral absorption factor of 0.2 for B(a)P (20 ppm) equivalents in soil. Four residential properties were affected.

Although the site itself had been covered with clean soil and had undergone measures to reduce flooding, as of March 2008 the residential properties had not been remediated. Whether the measures taken onsite were adequate to prevent contaminant migration is unclear.

U.S. EPA Update: The Celotex site is now a non-NPL site for which no further remedial action is planned.

Illinois Department of Public Health (IDPH) Update: Illinois EPA staff report that the site has been covered with clean soil and has undergone measures to reduce flooding. As of August 2008, the residential properties had not been remediated. Remediation measures previously taken at the site, however, should prevent migration of any contamination. According to an Illinois EPA database, the site has been transferred to another IEPA or U.S. EPA program. Available at: http://epadata.epa.state.il.us/land/ssu/siteidsearch.asp?SiteID=0316310002. [cited 2008 Aug 19].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant polyaromatic hydrocarbons (including benzo[a]pyrene) was identified.

5.3.1.5 Double A Metals

From 1964 to 1993, Double A Metals processed aluminum dross on a 4-acre site at 3321 S. Pulaski Road in Chicago, IL. Double A shipped processed aluminum dross offsite for recycling until 1989, when it installed an industrial furnace and a dust system for collecting aluminum oxide byproduct. After 1989, the dross was heated onsite and cast into ingots. Four years later Double A abandoned the site. U.S. EPA later removed some of the waste piles of dust and slag, as well as drums of waste oils, solvents, and unknown materials. U.S. EPA also removed stripped electrical transformers from which oil had been dumped onto the ground. At the time ATSDR assessed the site, it was not secure from trespassers, and evidence of trespassing was apparent. This site information is from the ATSDR's 1997 and 2005 health consultations.

ATSDR Conclusions: Because of an apparent explosion or fire hazard from combustible drum materials remaining onsite and because of contaminant concentrations in the remaining waste piles that could cause adverse health effects, in 1997 ATSDR categorized this site as a *Public Health Hazard* (Category 2). Lead was present in the remaining waste piles at concentrations above health-based screening values for lead in soil readily accessible to children. The pathway was incidental ingestion of soil (waste piles). Chromium in the waste piles—if it was chromium (VI)—was also determined to be a hazard for direct skin contact. PCBs were not found above health-based screening values at the site, even in the vicinity of the transformers. No contaminants were found at levels of concern in surface water or in onsite or offsite soil.

Although this site was considered a public health hazard, the areas of chemical contamination at levels high enough to be of concern were limited to the remaining onsite waste piles. All chemical contamination and physical hazards have been removed. Evidence of migration offsite was not found. Because of site remediation, ATSDR's 2005 health consultation categorized this site as *No Public Health Hazard* (Category 5).

U.S. EPA Update: This Double A Metals site is not a U.S. EPA site and does not appear in CERCLIS.

Illinois Department of Public Health (IDPH) Update: According to information in the site file, past remedial activities have removed chemical contamination and physical hazards. Evidence of migration on the site was not found. (Site file, Illinois Department of Public Health; 2008 Aug 8).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

5.3.1.6 Electro Finishers

This 0.44-acre site in Chicago IL, is about 2 miles west of Lake Michigan and 1,000 feet east of the north branch of the Chicago River. For some 40 years, the site was a chromium plating and finishing facility. In 1990, it ceased operations. Before vacating the site, Electro Finishers claimed to have adequately cleaned it up, but some vats or tanks were left in the ground. In 2000, a next-door resident complained of finding green and yellow crystalline material in the house's basement and flood control pit. A classic automobile body shop that occupied a building on the property also found yellow crystals on the walls, on the floor, and in piles of dirt. Site information is from ATSDR's 2001 health consultation.

ATSDR Conclusions: For persons who may have been exposed to chromium (VI) in dust and air inside the building, in 2001 ATSDR categorized this site as a *Public Health Hazard* (Category 2). Chromium (VI) was found at very high concentrations in crumbled concrete and soil inside the building. Lead was also found at relatively high concentrations in soil inside the building. Although air monitoring was not performed, ATSDR was concerned that when the dust was kicked up by activities in the building, airborne contaminant levels could have had an adverse health impact. For people who frequently worked on cars inside the building, incidental ingestion also could have had a health impact. Chromium (VI) and lead levels were high in soil outside the building: high chromium (VI) levels were found in the sump water, and chromium (VI) was detected in wipe samples from the basement wall of the house where the yellow and green crystals were found, indicating contaminant migration. In 2007, after the completion of site cleanup ATSDR reevaluated this site and categorized it as *No Public Health Hazard* (Category 5). As of the date of this report, site remediation is complete.

U.S. EPA Update: The Electro Finishers site is not an NPL site. It is classified as Removal Only. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0508159. [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

5.3.1.7 Elizabeth Street Foundry

Since 1889, an iron foundry had occupied this 1.34-acre site at 5838 S. Racine Avenue on Chicago's South Side. At the time of ATSDR's 1997 investigation, the site was abandoned, and site access was unrestricted. The property surrounding the site was zoned restricted commercial and restricted manufacturing. A public elementary school was some 250 feet northwest of the site, the nearest residence was 300 feet north. Site information is from ATSDR's 1997 health consultation.

Demographic Data: Demographic profiles for vulnerable populations living within 1 mile of this site were not reported. In 1997, the total population living within a 1-mile radius of the site was, however, approximately 55,177 persons.

ATSDR Conclusions: For as long as drums containing relatively low-flash-point chemicals remained onsite and people had site access, ATSDR categorized the Elizabeth Street Foundry site as a *Public Health Hazard* (Category 2). Other contamination found onsite was not considered even an apparent public health hazard, but sampling of surface soil and air was not adequate to evaluate all possible exposure pathways. The major concern was that transients who could light onsite fires had site access, and drums of materials with low flash points could cause an explosion. Also, concentrations of VOCs in the abandoned drums could pose a health threat to those who might contact drum contents. Foundry sand was usually stored onsite for months before disposal, raising the concern that contaminants may have leached into the soil and groundwater. Further information was not provided. As of ATSDR's 1997 consultation, remedial activities had not begun.

U.S. EPA Update: The Elizabeth Street Foundry site is an archived Removal Only Site (No Site Assessment Work Needed). Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm [cited 2008 Jul 30].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and mercury were identified at this site.

5.3.1.8 Estech General Chemical Co.

Although Estech General Chemical had previously used this 54-acre site in Calumet City (Cook County) IL to prepare fertilizers, pesticides, and sulfuric acid, at the time of the 1999 ATSDR health consultation the site was an unpermitted landfill. Some records indicated that drums and pesticides were possibly buried onsite. The information regarding this site is from ATSDR's 1999 health consultation.

Demographic Data: Demographic profiles for vulnerable populations were not reported. In 1999, the total population living within a 1-mile radius of the site was, however, approximately 13,500.

ATSDR Conclusions: Adult males were living on the site and were digging for scrap metal. Because they could be exposed to lead in soil at levels of possible adverse health effects, in 1999 ATSDR categorized this site as a *Public Health Hazard* (Category 2). Exposure to lead from incidental ingestion of, dermal contact with, and inhalation of contaminated soil particles could have occurred at levels of concern for health effects. Moreover, some onsite sediment samples from the Grand Calumet River and the wetland area indicated that contaminants might have migrated offsite.

Site remediation, which included clean up and removal activities, was completed in 1999.

U.S. EPA Update: Estech General Chemical Co is an archived non-NPL site for which no further remedial action is planned.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

5.3.1.9 Hartz Construction

Some time ago, Hartz construction built several houses on a former landfill in Oak Lawn (Cook County) IL. After homeowners had moved in, they reported repeated outages of their water heater pilot lights. Hartz Construction sealed the basements and placed sealed lids on the sump pits, and the pilot light problems ceased. But the pilot light episodes raised the possibility of other environmental issues in the homes.

The purpose of ATSDR's health consultation was to determine whether carbon dioxide or methane in the sealed basements posed a public health hazard, and whether any such hazard could affect other homes. More than 100 homes were on the Hartz Construction site, but how many of them were on the landfill remained uncertain. Information regarding this site is from ATSDR's 1999 health consultation.

ATSDR Conclusions: Although at the time of the health consultation the sealed basements did not contain carbon dioxide or methane at health or explosive hazard levels, basement cracks could have developed in the future, allowing gases to infiltrate. Consequently, in 1999 ATSDR categorized this site as a *Public Health Hazard* (Category 2). The past levels of basement airborne contaminants were unknown; nevertheless, the major concern was for potential infiltration of carbon dioxide and methane into the basements of houses built on a landfill. Yet these gases were not detected in the sealed basements, and, as stated, no one had monitored the gasses before other basements were sealed. One suggestion was that the CO2 source could have been a reaction of acidic leachate with limestone fill.

U.S. EPA Update: This Hartz Construction site is not a U.S. EPA site and does not appear in CERCLIS.

Illinois Department of Public Health (IDPH) Update: The focus of this health consultation was carbon dioxide vapor intrusion thought to be related to the adjacent landfill. The contractor/developer sealed the basements to reduce the potential infiltration of carbon dioxide and other landfill gases into the basements of homes. These gases were not detected in basements that were sealed. No further action was taken or deemed necessary. (Site file, Illinois Department of Public Health; 2008 Aug 8).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant polychlorinated biphenyls (PCBs) was identified at this site.

5.3.1.10 Keil Chemical Company (Ferro Corporation), Hammond, IN

The Keil Chemical Company (a/k/a Ferro Corporation), in Hammond (Lake County) IN, is in a mixed residential and industrial area. Keil manufactures fuel additives and metal lubricants. In 1980, Keil initiated the so-called Pyro-Chek process at the Hammond plant. The process used 1,2 dichloroethane (EDC) as a solvent to produce brominated polystyrene. Before 1995, Keil purchased annually over 900 tons of EDC. Most of the EDC and a breakdown product of vinyl chloride (VC) were thought to volatilize into air rather than release into wastewater. In 1999, ATSDR conducted an Exposure Investigation (EI) sampling for VOCs in ambient air within the community and near the plant. The results from the EI did not detect VC in the air, but EDC was detected (4.2 ppb and 0.86 ppb) at the fence line. Trace amounts of other VOCs typical in urban communities were found at levels below those of health concern. Information on this site is taken from ATSDR's 2001 exposure investigation and public health assessment.

Demographic Data: ATSDR estimated from 1990 U.S. Census data that some 1209 persons lived within 1 mile of this site and that sensitive subpopulations included

Children 6 years and younger	94
Females aged 15-44	247
Adults 65 and older	260

Public Health Outcome Data: Some community members raised concerns regarding a perceived increase in the number of children who lived near the Keil site having been diagnosed with brain and central nervous system cancers. The Indiana State Department of Health (ISDH) evaluated data obtained from the Indiana Cancer Registry to determine whether the rates of cancer in children younger than 20 years of age living near the Lake County were elevated compared with expected county or state rates. IDS found that child cancer rates for Lake County were not elevated compared with the state and other counties. Specifically, brain and central nervous system cancers (individually and combined) were not elevated in Lake County compared with the state and other countries.

ATSDR Conclusions: In 2001, ATSDR concluded that due to lack of air emission data prior to 1988 for EDC and VC, this site posed an *Indeterminate Public Health Hazard* (Category 3) for past exposures. A review of sampling data collected at the air monitoring station from 1988 to 1998 indicated ethylene dichloride, VC, and other target chemicals detected over that period were not at concentrations likely to result in adverse health effects. During ATSDR's 2001 Exposure Investigation, however, the VC and other target contaminants were not detected, and EDC was detected at levels below health concern. Moreover, residents were not receiving their drinking water from sources near the Keil facility and, thus, would not likely be exposed to any contaminated wastewater Keil might have released into the municipal sewer. Cancer rates were not elevated in Lake County, nor, compared with the state and other counties for 1987–1997, in the community surrounding Keil Chemical.

In June 2000, Keil Chemical Company closed its Pyro-Chek operation at this site, and supplies of EDC were removed from the property. Keil remains, however, an active industrial venture. See http://www.manta.com/coms2/dnbcompany_gxd193 [cited 2008 Oct 23].

U.S. EPA Update: This Keil Chemical Company site is an ATSDR petition site that does not appear in the CERCLIS database, and no U.S. EPA regulatory action has been taken with respect to it.

IJC-critical Pollutants Identified within ATSDR Documents: None of the IJC-critical pollutants were cited in this document.

5.3.1.11 Lake Sandy Jo Landfill

The 40-acre Lake Sandy Jo Landfill is in a residential area of Gary (Lake County), IN. ATSDR's 1995 health assessment reviewed well water data and commented on the exposure assessment of a draft Phase I Remedial Investigation.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	948
Females aged 15-44	1,758

Adults 65 and older	1,644

ATSDR Conclusions: In its 1985 health assessment and in the subsequent site review and update, ATSDR found the onsite contamination was inadequately characterized. Still, ATSDR categorized the site as a *Public Health Hazard* (Category 2).

ATSDR found that data were lacking—especially groundwater data. Nevertheless, shallow wells contained arsenic, cyanide, lead and chromium. Sodium levels alone in one private well posed a health risk, especially to anyone on a sodium-restricted diet. Consequently, overall levels of inorganic compounds, including arsenic, prompted the do-not-use recommendation for the contaminated wells and the public health hazard designation for the site.

U.S. EPA Update: In its December 2006 Fact Sheet for the Lake Sandy Jo Landfill, U.S. EPA stated in part that

> A five-year review, dated January 18, 1996, which U.S. EPA concurred with on March 26, 1996, concludes that the remedy remains protective of human health and the environment. A second five-year review for the site was completed in September 2001 and confirmed that the remedy remains protective of human health and the environment.
>
> A third five-year review for the site was completed in September 2006 and confirmed that the site is protective of human health and the environment only in the short-term because the required institutional controls had not been implemented. Institutional controls, such as restrictive covenants and groundwater ordinances are necessary on the landfill property and surrounding areas for the long-term protectiveness of the site.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND980500524.htm. 2006 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, and mercury, were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.12 Lincoln Limited Landfill

The Lincoln Limited Landfill site is in Ford Heights, east of Illinois Route 394 and north of U.S. Route 30 in southern Cook County, Illinois. The landfill is in a rural area composed primarily of farmland area. Homes and businesses in the vicinity of the landfill are scattered and are served by both public water and individual wells. In January 2005, the landfill was active; several trucks were seen dumping material in the landfill. Onsite and offsite groundwater were sampled in January and again in November 2005 to determine the presence of any contaminants that could pose a public health problem. Onsite groundwater chemicals of interest were bis-2-ethylhexylphthalate, arsenic, lead, manganese, and vanadium. PAHs, lead, and asbestos were found in onsite soil samples and became the chemicals of interest. Contaminants found in onsite groundwater were not detected in off-site wells, and at that time no one was exposed to them at that time. Although elevated sodium levels were found in three of the six private wells near the site, its appearance in the wells may not site related. Information from this site is taken from the 2006 ATSDR health consultation.

ATSDR Conclusions: In 2006, ATSDR categorized the site as an *Indeterminate Public Health Hazard* (Category 3). Limited data did not suggest that people near the site were exposed to site-related contaminants at levels that would cause adverse health effects. Asbestos-containing material on a portion of the site had the potential to release fibers into the air that could be carried offsite by wind. Although possible air or soil contamination is unknown, onsite exposure probably is infrequent and would result in negligible exposure. Nevertheless, should groundwater contamination migrate from the site, area private wells could be affected.

U.S. EPA Update: The Lincoln Landfill site is a state-lead investigation site.

Illinois Department of Public Health (IDPH) Update: The site was an illegal landfill that has ceased operation due to Illinois EPA action. The asbestos-containing material was removed through voluntary cleanup (Michelle Ryan, Illinois Environmental Protection Agency, personal communication, 2008 Aug 8).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PAHs was identified at this site.

5.3.1.13 Midco I

From 1974 through 1979, wastes were stored and recycled on this approximately 4-acre site. After a 1976 fire destroyed about 14,000 waste-filled drums, the site was eventually abandoned. In 1979, in addition to the fire-damaged drums, another estimated 14,000 drums remained onsite.

These uncontrolled and abandoned wastes resulted in Midco I becoming an NPL site, and U.S. EPA becoming responsible for its remediation. Accordingly, a foot of topsoil was removed from the entire site, as were two storage tanks full of wastes. The site and the area immediately east of it were covered with a clay cap. By 1982, U.S. EPA had removed all of the surficial wastes. Still, more than 5,000 of the waste-filled drums remained onsite, as did the 14,000 fire-damaged drums. The U.S. EPA Region 5 NPL site Fact Sheet documents the quantities of wastes removed. After the removal action was complete, U.S. EPA placed some clay soil over much of the site.

Information regarding this site is from the 1987 ATSDR public health assessment, the 1992 site review and update, and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	926
Females aged 15-44	1,878
Adults 65 and older	989

ATSDR Conclusions: Because in 1987 contaminants in groundwater constituted a potential public health threat, ATSDR's 1987 public health assessment categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent ATSDR site review and update elevated the site risk to a *Public Health Hazard* (Category 2). The evidence at that time was that exposure to site-related chemicals had occurred, was occurring, or was likely to occur.

Offsite surface water contained chromium, lead, sodium, and cyanide. Sediments in surface waters contained PAHs and PCBs. Because the contaminants buried on the site could possibly

migrate offsite, they were considered a potential health threat. In fact, chromium and cyanide were found in offsite groundwater. Although the groundwater plume had not reached drinking water wells, lead and cadmium had been detected in one residential well.

Since ATSDR's site review and update, the Midco I site has undergone substantial remediation. U.S. EPA reported that a new fence restricted access to the area of contaminated soil and sediment, and a pump-and-treat system contained the contaminated groundwater. Such ongoing treatment continued to remove contaminated soils and groundwater. Onsite workers, who were protected by a U.S. EPA-approved Health and Safety Plan, were the one group that faced any significant, potential human exposure risk. With regard to the lead and cadmium detected in the residential well, U.S. EPA did not find that Midco I was the contamination source. Thus, such detection was irrelevant to the assessment of Midco I risks. As stated, access to Midco I was first restricted in 1981, when U.S. EPA fenced the entire site. In 1994, the fence was extended to include the contaminated sediment areas. In 1992–1993 deed restrictions were recorded. Design and implementation of soil and groundwater treatment have been ongoing since 1993.

U.S EPA Update: The August, 2006 U.S. EPA Fact Sheet for the Midco I site states in part that

> During 2004 and 2005, the MRC [Midco Remedial Corporation] pumped out water within the barrier wall to lower the water table, and this pumping will continue during the soil vapor extraction treatment. The MRC constructed the soil vapor extraction system from March 2005 through January 2006, and the system started continuous operation in March 2006. It is expected that the soil vapor extraction system will operate for several years, after which the highly contaminated soil will be excavated (or treated by solidification/stabilization) and the site cover will be installed. Volatile organic compounds are now at low levels in groundwater outside of the groundwater barrier walls, but contamination by metals is still present.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND980615421.htm. 2006 Aug [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants mercury, lead, PCBs, polyaromatic hydrocarbons (PAHs) fluoranthene, phenanthrene, and chrysene were identified at this site. U.S. EPA reports, however, that these pollutants no longer pose a significant threat to human health.

For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.14 Midco II

Like Midco I, this 7-acre site is also in Gary (Lake County) IN. On this site, Midco stored and disposed of bulk liquids and wastes, including oil sludges, chlorinated solvents, paint solvents and sludges, acids, and spent cyanides. A year after the Midco I fire, a fire at this site destroyed an estimated 60,000 drums. Again like Midco I, Midco II became an NPL site.

Between 1984 and 1989, U.S. EPA removed all Midco II surface wastes and a sludge pit and filter bed. Information regarding this site is from the 1989 ATSDR public health assessment and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	11
Females aged 15-44	11
Adults 65 and older	8

ATSDR Conclusions: Because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that could result in adverse health effects, in 1989 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3).

Before removal actions began, PCBs, TCE, and lead were found at levels of concern in sludge pit soil. Migration of arsenic, lead, and cyanide in groundwater and surface water was also of concern. As with Midco I, however, U.S. EPA reported that the area of contaminated soil and sediment had been fenced, the contaminated groundwater had been contained by a pump-and-treat system, and treatment of contaminated soils and groundwater had been ongoing. As with Midco I, U.S. EPA found no significant potential for human exposure other than to onsite workers, who were protected by a U.S. EPA-approved Health and Safety Plan.

Access to Midco II was first restricted in 1981, when U.S. EPA constructed a fence around the site. This fence was extended in 1994 to include the contaminated sediment areas. In 1992–1993 deed restrictions were recorded, and design and implementation of soil and groundwater treatment has proceeded since 1993. U.S. EPA further reported that the treated groundwater from Midco II is disposed of by deep well injection, and that historical releases of critical pollutants from Midco II never threatened Lake Michigan.

Since ATSDR's 1989 categorization, other, substantial site remediation has occurred, as noted in the excerpt from the August, 2006 U.S. EPA Fact Sheet for the Midco II site, below.

U.S. EPA Update: In its August 2006 Fact Sheet for the Midco II site, U.S. EPA stated in part that

> The MRC [Midco Remedial Corporation] constructed part of the soil vapor extraction and air sparging system in October and November 2003, and conducted pilot testing of this portion of the system. The the soil vapor extraction and air sparging system was constructed from October 2003 through December 2005, and the system started continuous operation in February 2006. It is expected that the soil vapor extraction and air sparging system will operate for several years, after which the highly contaminated soil will be excavated (or treated by solidification/stabilization) and the site cover will be installed. The system has been successfully removing volatile organic compounds, but to date the air sparge system has only been operated at low rates because of concern about pushing vapors beyond the soil vapor extraction system and excessive water entry into the soil vapor extraction system. The soil vapor extraction system and air sparging system has been inoperable since June 2007 because of vandalism, but is now in the process of being repaired.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND980679559.htm. 2006 Aug [cited 2008 Jul 10].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs and lead were identified at this site.

For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.15 Ninth Avenue Dump

In the same Gary, IN, industrial area as the Midco sites—Midco I was only about 700 feet south—the 17-acre Ninth Avenue Dump operated as an uncontrolled chemical waste disposal site from 1973 to 1980. By 1975, an estimated 500,000 gallons of liquid industrial waste had been dumped, and 1,000 drums had been buried onsite. Disposal operations were discontinued in 1980. But not long thereafter, the Ninth Avenue dump, like its neighboring Midco sites, appeared on the NPL.

The Ninth Avenue site was 1¼ miles south of the Grand Calumet River, and approximately 3½ miles south of Lake Michigan. Onsite groundwater was contaminated, and groundwater flow was to the north. For the most part, however, at the time ATSDR assessed the site, groundwater contamination had not crossed site boundaries. U.S. EPA supervised removal of waste-filled drums, abandoned tanker trucks, and some surface soils. U.S. EPA also reported that the site had been completely fenced.

Information regarding this site is from the 1989 ATSDR public health assessment, the 1999 ATSDR health consultation, and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	957
Females aged 15-44	1,893
Adults 65 and older	1,101

ATSDR Conclusions: Because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that could result in adverse health effects, in its 1989 health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In the 1999 health consultation, no hazard category was reported.

Contaminants of concern included PCBs, PAHs, VOCs, lead and chromium in onsite soils, food grown in the soil, and sediment. Bioaccumulation of chemicals such as PCBs in fish was also a concern. If contaminated fish in the area were caught and eaten, this site may have contributed to environmental burden and human exposure to PCBs, PAHs, and lead.

U.S. EPA Update: In its February 2007 Fact Sheet for the Ninth Avenue Dump site, U.S. EPA stated in part that

> The site is presently being maintained. Deed restrictions that restrict access to groundwater and prevent uses that would damage the remedial work have been placed on all but one of the parcels that constituted the original facility. A five-year review report was issued in September 2000 and a second one was issued in September 2005.

> The SVE system was shut down in October 2002 in order to determine if an active system was still needed. Based on the test results it has been determined that it will be sufficient to equip the eight former injection wells with turbine ventilators and use the eight former extraction wells as injection wells. This will provide some flow under the cap so that organics will continue to vent or be biologically destroyed. This system has been installed. The site continues to be monitored.
>
> The 2005 five-year review showed that the remedy had been implemented in accordance with the decision documents, except for the fact that not all of the institutional controls had been implemented. The remedy is functioning as anticipated. The remedy is protective of human health and the environment in the short term. It is not protective in the long term because some of the institutional controls have not been implemented. Plans are underway to implement the institutional controls.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND980794432.htm. 2007 Feb [cited 2008 Jul 14]

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead, polychlorinated biphenyls (PCBs – including Aroclor 1242 and 1254) and polyaromatic hydrocarbons (PAHs – including benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene) were identified. For a more complete list of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.16 Stauffer Chemical Company

The Stauffer Chemical site is a 10-acre site in Chicago Heights (Cook County) IL, at which 175,000 cubic feet of hazardous waste was buried in an unlined pile. In 1970 the pile was clay-capped, and the site was fenced. Information regarding this site is from ATSDR's 1988 health assessment. Although the site at one time was included on the NPL, it has since been removed (post-SARA).

Demographic Data: In 1988 the population within 3 miles of the site was 63,550.

ATSDR Conclusions: Because of the risk to human health from the potential exposure to hazardous substances via groundwater and surface water, in its 1989 public health assessment ATSDR characterized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). At the time, few monitoring data were available; only the shallow aquifer had been tested. The shallow aquifer underlying the site was contaminated with arsenic, antimony, and selenium, but it was not used as a drinking water source. Water supply wells for nearby residences tapped the lower aquifer, which was not tested. The two aquifers were thought to be hydraulically connected.

In the 1980s, the site was placed on the state's remedial priorities list and ultimately, in 1989, delisted from the NPL. The 1993 ATSDR site review and update concluded that "there is no known off-site contaminant migration and no known human exposure to site contaminants." The state, however, issued a notice regarding a large onsite waste pile. Stauffer responded with a groundwater investigation and a remedial plan that included regrading and recapping the waste

pile and creating a leachate management plan. In 2003 the state issued a letter stating that the waste pile issue had been successfully addressed.

U.S. EPA Update: This Stauffer Chemical Company site is a non-NPL site for which no further remedial action is planned.

Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm [cited 2008 Jul 30].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site. For a more complete listing of hazardous substances found at this site, please refer to http://www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.17 U.S. Smelter and Lead Refinery, Inc.

The U.S. Smelter and Lead Refinery (USS Lead) once occupied a 79-acre site in East Chicago (Lake County) IN. The site was within the flood plain of the Grand Calumet River, with the east branch of the Calumet River to the south and the Indiana Harbor Canal to the west. From about 1906 to 1920, a copper smelter operated on the site, a primary lead smelter from 1920 to 1970, and a secondary lead smelter from 1973 to 1985. Blast furnace slag and lead-saturated slag water were dumped into a nearby 21-acre wetland. While the facility operated, it often exceeded the NPDES permit levels for lead and other metals discharged into cooling water and for storm water runoff discharged into the Grand Calumet River. Leaded flue dust trapped in bag filters and stored onsite for possible recycling or sale covered 3–5 acres. In 1982, to prevent dispersion, the dust was brought into a building. By 1992, the dust had been removed from the site. These legal and illegal activities, together with the possibility of an additional onsite arsenic production facility, prompted U.S. EPA to nominate U.S. Smelter for the NPL. Information regarding this site is from the 1994 ATSDR public health assessment and the 2006 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,511
Females aged 15-44	2,604
Adults 65 and older	1,511

Public Health Outcome Data: Over a 2-day period in June 1985, while the lead smelter was still in operation, the Indiana State Board of Health conducted blood lead screening for East Chicago, IN children aged 6 months to 6 years. The proximity of the children's residences to the site was not reported, nor were the criteria used to select the children. Nevertheless, of 53 children tested by finger-stick, 2 were found to have "class II" blood lead levels, indicating a moderate increase (10–20 µg/dL).

No conclusive results were found regarding the lead source. The home of one of the two children had no lead in paint or soil, and the home of the other was an apartment undergoing renovation (no additional information provided). ATSDR determined that this limited information did not support any conclusions regarding the site's effect on area children.

ATSDR Conclusions: Because chronic exposure to contaminated soils, wastes, and airborne dusts could cause adverse health effects, ATSDR's 1994 health assessment categorized this site as a *Public Health Hazard* (Category 2).

Lead was the principal site contaminant of concern. Soils and air at the E.C. Du Pont facility near the site have been heavily contaminated with lead, and that soil contamination extends ½ mile offsite. Soils and air in residential neighborhoods were also contaminated with lead, but to a lesser extent. While the plant was in operation, exposures to onsite airborne lead and offsite at the adjacent DuPont facility were at levels that could be associated with adverse effects. The highest estimated exposure from incidental soil ingestion by offsite (DuPont) workers and offsite children was in fact at a level associated with adverse effects in animal and human studies. Chronic soil and air exposure to arsenic, cadmium, chromium, and antimony also occurred at this site.

U.S. EPA Update: In its December 2006 Fact Sheet for the U.S. Smelter site, U.S. EPA stated in part that

> Parts of the 79 acre facility have been addressed through a long-term Remedial Action (RA). At the present time, the facility has a Consent Order with the Resource Conservation and Recovery Act (RCRA) program. A Corrective Action Management Unit (CAMU) has been built. In 2004, the RCRA program requested Superfund to manage the residential properties north and northeast of the facility because there may be multiple sources of lead.
>
> EPA has begun sampling of the residential area north of USS Lead. High levels of lead have been found in numerous residential yards. EPA is currently searching for potentially responsible parties in the area beyond the USS Lead facility.

Available at: http://www.epa.gov/region5superfund/npl/indiana/IND047030226.htm. 2006 Dec [cited 2008 Jul 15].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.18 West Pullman Iron & Metal

This site comprises two adjacent industrial properties in southeast Chicago (Cook County) IL, commonly known as the Dutch Boy and the International Harvester sites. At the time of the 1999 ATSDR health assessment, both sites were abandoned. From 1937 to 1986, Dutch Boy produced lead-based paints on its 5-acre site. In 1983, Dutch Boy began demolition of some of its paint-processing facilities. In 1985, the State of Illinois tested the blood lead levels of an unknown number of people associated with the site. Of those tested, the nine with the highest blood lead levels were also diagnosed with lead poisoning. ATSDR assumed those diagnosed included three salvage workers, three children of one salvage worker, two former employees of the Dutch Boy facility, and a female teen living near the site during demolition. Due to the removal of personal identifiers linked to the lead data, however, ATSDR was unable to verify these assumptions. But ATSDR could verify that the lead exposure was related to demolition and salvaging activities at the Dutch Boy site. The source of exposure was airborne lead particles released from building surfaces during the demolition. Once that source was identified, demolition was suspended and the site secured.

The adjacent 21-acre International Harvester site manufactured heavy equipment from 1903 to 1983. Operations included onsite power generation, metal forging, machining, heat treating, and painting.

Information regarding the Dutch Boy and International Harvester properties, a/k/a as West Pullman Iron & Metal, was taken from ATSDR's 1999 public health assessment.

Demographic Data: The 1990 U.S. Census reported the following demographic profiles for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	3,697
Females aged 15-44	not reported
Adults 65 and older	2,588

Public Health Outcome Data: With reference to the detected blood lead levels, the Illinois Department of Health reported that nine persons had contracted lead poisoning linked to salvage activities at the Dutch Boy site. ATSDR was not provided the data. In 1986, the Chicago Department of Health performed mass blood lead screening of 599 residents. Identifiers were not provided for these data. ATSDR assumed that the nine highest blood lead levels from the mass screening (31–70 µ/dL) were for the persons exposed onsite. An additional five persons had blood lead levels at or above CDC's level of concern, which at the time was 25 µg/dL. The percentile ranking of all the exposures in the vicinity of the two sites appears to have been intermediate—between that of the general population levels in the second and third National Health and Nutrition Examination Survey (NHANES), which bracketed the time of the 1986 mass screening. In 1996, blood lead screening was offered for children in the neighborhood. Eight children were tested, and each of them had blood lead levels below 10 µg/dL.

ATSDR Conclusions: Because of the potential public health hazard to onsite workers and trespassers who were exposed to elevated levels of lead in onsite soil, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). For the Dutch Boy property, the one competed exposure pathway to contaminants at levels of concern was onsite and in the past. That is, onsite workers and trespassers alone were exposed by inhalation and ingestion of airborne lead particles and by inhalation, ingestion, and dermal exposure to lead in soil. Present and future exposure to lead in soil offsite—on the roadways along the north/northeast borders of the Dutch Boy site—was, however, a potential concern. Exposure to the levels of contaminants found at the International Harvester property were not sufficient to be of concern for adverse health effects.

U.S. EPA Update: As stated, this West Pullman Iron & Metal site is a non-NPL site for which no further remedial action is planned.

Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 30].

Illinois Environmental Protection Agency Update: The Illinois EPA lists this site as active. Available at:

http://epadata.epa.state.il.us/land/SRP/Results.asp?IEPAID=0316750008 [cited 2008 Oct 23]

Technical Outreach Services to Communities (TOSC) states that as few as five site-related cases of lead poisoning were diagnosed. Available at: http://www.egr.msu.edu/tosc/dutchboy/index.shtml [cited 2008 Oct 23].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and lead were identified at this site.

5.3.2. Summary and Conclusions for the Grand Calumet AOC

5.3.2.1 Hazardous Waste Sites

Regarding the Grand Calumet AOC, ATSDR categorized 18 hazardous waste sites as either a public health hazard or an indeterminate public health hazard: eight in Lake County, IN, and 10 in Cook County, IL. Of the eight Lake County, IN sites, two have been remediated, and four are undergoing remediation. One of the two remaining sites, one is in remediation planning, and the other is an active, RCRA-supervised facility. For these sites, the possibility of human exposure and environmental migration of contaminants was mitigated.

5.3.2.2 TRI Data

The TRI onsite chemical releases for Lake County, IN, and Cook County, IL (combined) in 2001 totaled 24,461,209 pounds, with the highest releases to air and land, and high releases to surface water as well. Lake County accounted for 71% and Cook County accounted for 29% of the total onsite releases. See Tables 5.3-B and 5.3-C.

Of the total onsite releases, 429,097 pounds (1.8%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (mostly to surface water and land), mercury compounds (primarily to air), and hexachlorobenzene (to air).

The major release (≥ 500,000 pounds) of non-IJC chemicals was of zinc compounds (mainly to air and land and also to surface water). The next largest releases of non-IJC chemicals, in the range of 300,000–499,999 pounds, were of manganese compounds and nitrate compounds (primarily to air).

In 2006, U.S. EPA also reported that surface water from the Chicago River system had been diverted to the Mississippi River basin.

5.3.2.3 NPDES Data

The NPDES permitted discharges for Lake County, IN, and Cook County, IL are summarized in Table 5.3-D. The average annual permitted discharges in 2004 totaled 173,874,061 pounds, primarily sulfate, chloride, and ammonia nitrogen, followed by fluoride and cyanide.

The IJC-critical pollutants benzo(a)pyrene (0.002 pounds), lead (approximately 13,500 pounds), and mercury (76.7 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.3-E.

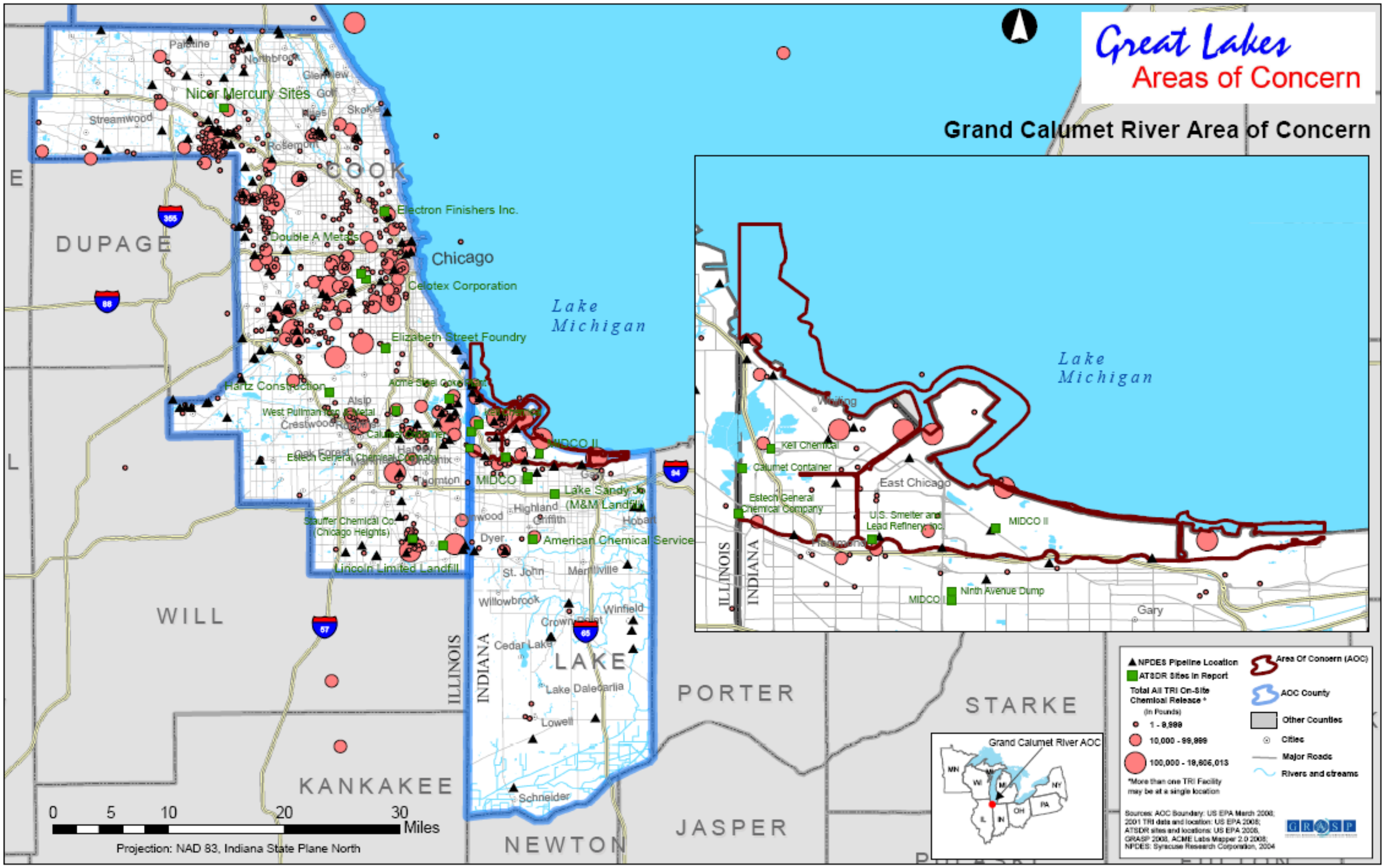
In 2006, U.S. EPA reported that surface water from the Chicago River system had been diverted to the Mississippi River basin.

5.3.2.4 Beneficial Use Impairments (BUIs)

In this AOC, restrictions on fish and wildlife consumption and drinking water were cited as impairments. A no-fish-consumption advisory warned against eating fish caught in the Grand Calumet River and the Indiana Harbor and Canal. Partial fish consumption advisories were issued for Grand Calumet Lagoons, Wolf Lake, and near-shore Lake Michigan. These advisories were based on concentrations of PCBs, PAHs, and mercury.

General information describes how these impairment measures were determined and monitored, but no specific information describes why these areas were considered impaired.

Further information is available at the U.S. EPA Web site: http://www.epa.gov/glnpo/aoc/.



Great Lakes
Areas of Concern
Grand Calumet River Area of Concern
Lake Michigan
DUPAGE
COOK
WILL
KANKAKEE
LAKE
PORTER
STARKE
JASPER
NEWTON
ILLINOIS
INDIANA
Chicago
Nicor Mercury Sites
Electron Finishers Inc.
Double A Metals
Celotex Corporation
Elizabeth Street Foundry
Hartz Construction
MIDCO II
MIDCO I
Lake Sandy Jo (M&M Landfill)
American Chemical Service
Stauffer Chemical Co. (Chicago Heights)
Lincoln Limited Landfill
Kel Chemical
Calumet Container
Estech General Chemical Company
U.S. Smelter and Lead Refinery, Inc.
Ninth Avenue Dump
East Chicago
Whiting
Gary
0 5 10 20 30 Miles
Projection: NAD 83, Indiana State Plane North
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(in Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,606,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Grand Calumet River AOC

Table 5.3-B. TRI Releases (in pounds, 2001) for the Grand Calumet AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.027505039	0	0	0	0.027505039	0.3506391	0.378144139
(PCDDs and PCDFs)	3							
LEAD	8	5994.0842	1	0	15	6010.0842	51657.985	57668.0692
LEAD COMPOUNDS	8	14938.321	254613.3562	0	151737	421288.6772	676231.35	1097520.027
MERCURY	9	29.2	0	0	0	29.2	6.12	35.32
MERCURY COMPOUNDS	9	1617.1	114.2	0	33	1764.3	48503.1	50267.4
HEXACHLOROBENZENE	11	4.85	0	0	0	4.85	0	4.85
	Total IJC	**22583.58271**	**254728.5562**	**0**	**151785**	**429097.1389**	**776398.9056**	**1205496.045**
1,1-DICHLORO-1-FLUOROETHANE		126804	0	0	0	126804	28293	155097
1,2,4-TRIMETHYLBENZENE		103406	10	0	265	103681	1856	105537
1,3-BUTADIENE		445	0	0	0	445	0	445
2,4-D		2	0	0	0	2	0	2
2-ETHOXYETHANOL		1649	0	0	0	1649	0	1649
3-IODO-2-PROPYNYL BUTYLCARBAMATE		0	0	0	0	0	750	750
4,4'-ISOPROPYLIDENEDIPHENOL		986	0	0	0	986	82078	83064
4,4'-METHYLENEDIANILINE		60	0	0	0	60	330	390
ACETONITRILE		178	0	0	0	178	0	178
ACETOPHENONE		3350	0	0	0	3350	0	3350
ACRYLAMIDE		3	0	0	0	3	0	3

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
ACRYLIC ACID		1073	0	0	0	1073	0	1073
ACRYLONITRILE		150	0	0	0	150	0	150
ALUMINUM (FUME OR DUST)		22422	0	0	0	22422	506898	529320
AMMONIA		523345	22306	0	7400	553051	1260017	1813068
ANILINE		1006	0	0	0	1006	128275	129281
ANTHRACENE		2144	4900	0	1	7045	5449	12494
ANTIMONY COMPOUNDS		527	584	0	26000	27111	2747	29858
ARSENIC COMPOUNDS		111	571	0	8900	9582	97836	107418
ASBESTOS (FRIABLE)		250	0	0	0	250	116790	117040
BARIUM COMPOUNDS		34654	8060	0	261807	304521	975017	1279538
BENZENE		96686	456	0	3405	100547	1138	101685
BENZO(G,H,I)PERYLENE		716.59	21	0	0	737.59	955.98	1693.57
BENZYL CHLORIDE		6	0	0	0	6	0	6
BIPHENYL		671	0	0	0	671	0	671
BROMINE		59	0	0	0	59	0	59
BUTYL ACRYLATE		883	0	0	0	883	72	955
CADMIUM COMPOUNDS		401	38	0	14000	14439	24260	38699
CARBON DISULFIDE		45	0	0	0	45	0	45
CARBON TETRACHLORIDE		472	0	0	0	472	0	472
CARBONYL SULFIDE		26000	0	0	0	26000	0	26000

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CERTAIN GLYCOL ETHERS		1089731	0	0	0	1089731	35786	1125517
CHLORINE		10920	0.06	0	0	10920.06	1900	12820.06
CHLOROBENZENE		92	0	0	0	92	3	95
CHLOROFORM		27	0	0	0	27	0	27
CHLOROMETHANE		28800	0	0	3	28803	3	28806
CHROMIUM		13910	5	0	0	13915	48435	62350
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		9485	4994	0	140250	154729	1293761	1448490
COBALT		5	0	0	0	5	0	5
COBALT COMPOUNDS		45	0	0	0	45	2312	2357
COPPER		11720	0	0	5005	16725	76427	93152
COPPER COMPOUNDS		19810	2327	0	46000	68137	806200	874337
CREOSOTE		44587	0	0	0	44587	0	44587
CRESOL (MIXED ISOMERS)		2397	0	0	0	2397	0	2397
CUMENE		95068	10	0	0	95078	0	95078
CUMENE HYDROPEROXIDE		250	0	0	0	250	0	250
CYANIDE COMPOUNDS		12900	14632	0	5100	32632	2823	35455
CYCLOHEXANE		14725	0	0	1900	16625	27	16652
DI(2-ETHYLHEXYL) PHTHALATE		2596	5	0	0	2601	15984	18585
DIBENZOFURAN		1024	0	0	0	1024	3368	4392

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
DIBUTYL PHTHALATE		1038	0	0	0	1038	0	1038
DICHLOROMETHANE		31031	0	0	0	31031	89	31120
DIETHANOLAMINE		8707	0	0	0	8707	250	8957
DIISOCYANATES		1010	0	0	0	1010	1683	2693
DIMETHYL PHTHALATE		1500	0	0	0	1500	0	1500
DIMETHYL SULFATE		15	0	0	0	15	0	15
DIMETHYLAMINE		432	0	0	0	432	0	432
EPICHLOROHYDRIN		1	0	0	0	1	0	1
ETHYL ACRYLATE		2076	0	0	0	2076	4	2080
ETHYLBENZENE		79625	157	0	0	79782	891	80673
ETHYLENE		226324	0	0	0	226324	0	226324
ETHYLENE GLYCOL		34999	10	0	250	35259	51568	86827
ETHYLENE OXIDE		555	0	0	0	555	0	555
FORMALDEHYDE		4238	0	0	0	4238	0	4238
FORMIC ACID		55	0	0	0	55	0	55
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		1003176	0	0	0	1003176	0	1003176
HYDROGEN CYANIDE		819	0	0	0	819	0	819
HYDROGEN FLUORIDE		227983	0	0	0	227983	7110	235093
HYDROQUINONE		11	0	0	0	11	0	11
MALEIC ANHYDRIDE		49563	0	0	0	49563	0	49563

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
MANGANESE		28341	5	0	0	28346	32999	61345
MANGANESE COMPOUNDS		70472	25554	0	4211575	4307601	1893528	6201129
M-CRESOL		10	0	0	0	10	250	260
MECOPROP		5	0	0	0	5	0	5
METHANOL		122239	5	0	0	122244	1551	123795
METHOXONE		1	0	0	0	1	0	1
METHOXYCHLOR		2	0	0	0	2	0	2
METHYL ETHYL KETONE		403610	5	0	2	403617	113779	517396
METHYL ISOBUTYL KETONE		176323	0	0	0	176323	1088	177411
METHYL METHACRYLATE		3583	0	0	0	3583	18	3601
METHYL TERT-BUTYL ETHER		14604	0	0	0	14604	0	14604
MIXTURE		8731	0	0	0	8731	0	8731
MOLYBDENUM TRIOXIDE		1999	965	0	40000	42964	150765	193729
M-XYLENE		6378	0	0	0	6378	0	6378
N,N-DIMETHYLFORMAMIDE		20	0	0	0	20	0	20
NAPHTHALENE		110270	264	0	5	110539	21526	132065
N-BUTYL ALCOHOL		361485	0	0	0	361485	0	361485
N-HEXANE		868096	18	0	220	868334	75	868409
NICKEL		4181	5	0	0	4186	5801	9987
NICKEL COMPOUNDS		5417	2760	0	17000	25177	253018	278195

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
NICOTINE AND SALTS		70	0	0	0	70	22062	22132
NITRATE COMPOUNDS		2771	3256484	0	18560	3277815	3301	3281116
NITRIC ACID		27764	0	0	0	27764	172173	199937
N-METHYL-2-PYRROLIDONE		24698	0	0	0	24698	1436	26134
O-CRESOL		1300	0	0	0	1300	250	1550
O-XYLENE		8248	0	0	0	8248	0	8248
P-CHLOROANILINE		30	0	0	0	30	0	30
P-CRESOL		1500	0	0	0	1500	10000	11500
PERCHLOROMETHYL MERCAPTAN		42	0	0	0	42	0	42
PHENANTHRENE		3992	81	0	3770	7843	841	8684
PHENOL		59974	5423	0	5	65402	1000	66402
PHTHALIC ANHYDRIDE		46920	0	0	0	46920	934621	981541
POLYCHLORINATED ALKANES		505	0	0	0	505	0	505
POLYCYCLIC AROMATIC COMPOUNDS		5199.94	68	0	2114	7381.94	14968.7494	22350.6894
PROPYLENE		161518	0	0	0	161518	0	161518
PROPYLENE OXIDE		5003	0	0	0	5003	0	5003
PYRIDINE		39	0	0	0	39	0	39
QUINOLINE		275	0	0	0	275	0	275
SEC-BUTYL ALCOHOL		77645	0	0	0	77645	3	77648
SELENIUM COMPOUNDS		45	420	0	630	1095	1157	2252

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
SILVER		250	0	0	0	250	265	515
SILVER COMPOUNDS		255	0	0	0	255	5	260
SODIUM DIMETHYLDITHIO-CARBAMATE		20	0	0	0	20	12000	12020
SODIUM NITRITE		4125	0	0	0	4125	21300	25425
STYRENE		122567	230	0	0	122797	221269	344066
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		715591	0	0	0	715591	0	715591
TERT-BUTYL ALCOHOL		3510	0	0	0	3510	0	3510
TETRABROMOBIS PHENOL A		178	0	0	0	178	0	178
TETRACHLORO-ETHYLENE		31117	5	0	0	31122	697	31819
THALLIUM COMPOUNDS		538	100	0	59000	59638	1150	60788
TOLUENE		538875	266	0	69	539210	58446	597656
TOLUENE DIISOCYANATE (MIXED ISOMERS)		5	0	0	0	5	0	5
TRICHLOROETHYLENE		297447	0	0	0	297447	4592	302039
TRIETHYLAMINE		9	0	0	0	9	0	9
VANADIUM COMPOUNDS		2997	2	0	112867	115866	67948	183814
VINYL ACETATE		3652	0	0	0	3652	251	3903
XYLENE (MIXED ISOMERS)		655056	15	0	36	655107	18151	673258
ZINC (FUME OR DUST)		77686	0	0	37815	115501	55897	171398
ZINC COMPOUNDS		342126	1067332	0	5200000	6609458	7834523	14443981
	Total Non-	**9389064.53**	**4419093.06**	**0**	**10223954**	**24032111.59**	**17514090.73**	**41546202.32**

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
	IJC							
	Total	**9411648.113**	**4673821.616**	**0**	**10375739**	**24461208.73**	**18290489.64**	**42751698.36**

Table 5.3-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Grand Calumet AOC

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	15			
Cook County, IL	7	CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		CRAWFORD GENERATING STATION	60623CRWFR3501S	CHICAGO
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
		IMCO RECYCLING OF ILLINOIS	60411CLMBL400EA	CHICAGO HEIGHTS
		INTAC AUTOMOTIVE PRODS. INC.	60439NTCTM15550	LEMONT
		MARBLEHEAD LIME INC. SOUTH CHICAGO PLANT	60617MRBLH3245E	CHICAGO
Lake County, IN	8	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		MARBLEHEAD LIME INC. BUFFINGTON PLANT	46402MRBLHCLARK	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		USS GARY WORKS	46402SSGRYONENO	GARY
Lead and lead compounds	91			
Cook County, IL	75	AALLIED DIE CASTING CO. OF IL	60131LLDDC3021C	FRANKLIN PARK

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		ACME PACKAGING CORP. RIVERDALE FACILITY	60627CMPCK13500	RIVERDALE
		ACME STEEL CO. FURNACE PLANT	60617CMSTL10730	CHICAGO
		ACME STEEL CO. RIVERDALE PLANT	60627CMSTL13500	RIVERDALE
		ADHERON COATINGS CORP.	60452DHRNC16420	OAK FOREST
		ALLIED HASTINGS BARREL & DRUM SVC.	60609LLDHS915W3	CHICAGO
		ALLIED METAL CO.	60616LLDMT2059S	CHICAGO
		ALLIED METAL CO.	60651LLDMT4528W	CHICAGO
		AMES METAL PRODS. CO.	60609MSMTL4323S	CHICAGO
		AMITRON CORP.	60007MTRNC2001L	ELK GROVE VILLAGE
		AMPEL INC.	60007MPLNC925ES	ELK GROVE VILLAGE
		ANDERSON DIE CASTINGS	60007NDRSN901CH	ELK GROVE VILLAGE
		ANDERSON DIE CASTINGS	60090NDRSN1720S	WHEELING
		CALLEN MFG. CORP.	60164CLLNM13ELA	NORTHLAKE
		CALUMET BRASS FNDY. INC.	60419CLMTB14610	DOLTON
		CALUMET STEEL CO.	60411CLMTS317E1	CHICAGO HEIGHTS
		CASTLE METAL FINISHING	60176CSTLM4631N	SCHILLER PARK
		CHICAGO EXTRUDED METALS CO.	60650CHCGX1601S	CICERO
		CHICAGO FAUCET CO.	60018THCHC2100S	DES PLAINES
		CID RECYCLING & DISPOSAL FACILITY	60409CDRCY138TH	CALUMET CITY
		CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		CRAFTSMAN PLATING & TINNING CORP.	60657CRFTS1239W	CHICAGO
		CRAWFORD GENERATING	60623CRWFR3501S	CHICAGO

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		STATION		
		CULLIGAN INTL. CO.	60062CLLGN1CULL	NORTHBROOK
		DU PONT CHICAGO REFINISHING SERVICE CENTER	60053DPNTC7828N	MORTON GROVE
		EASTMAN CHEMICALS ACCURATE DISPERSIONS DIV.	60473MCWHR192W1	SOUTH HOLLAND
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		ELECTROMOTIVE LAGRANGE	60525GMCLC9301W	MC COOK
		ENVIRITE OF ILLINOIS INC.	60426NVRTF16435	HARVEY
		EQUILON ENTERPRISES L.L.C. DES PLAINES TERMINAL	60005DSPLN1605A	ARLINGTON HEIGHTS
		FORD MOTOR CO. CHICAGO ASSEMBLY	60633FRDMT12600	CHICAGO
		G & W ELECTRIC CO.	60406GWLCT3500W	BLUE ISLAND
		GKN SINTER METALS	60471GKNSN22501	RICHTON PARK
		GRIFFITH LABS. USA INC.	60658GRFFT12200	ALSIP
		H. KRAMER & CO.	60608HKRMR1359W	CHICAGO
		HOLCIM (US) INC.	60617HLNMN3020E	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
		IMCO RECYCLING OF ILLINOIS	60411CLMBL400EA	CHICAGO HEIGHTS
		IMPERIAL ZINC CORP.	60628MPRLS10316	CHICAGO
		INLAND DIE CASTING	60090NLNDD161CA	WHEELING
		ITT BELL & GOSSETT	60053TTBLL8200N	MORTON GROVE
		JONAS ENTS. INC.	60644JNSNT21NOR	CHICAGO
		JOSLYN MFG. CO.	60609JSLYN3700S	CHICAGO
		KESTER SOLDER	60018KSTRS515EA	DES PLAINES
		LITTELFUSE INC.	60016LTTLF800EA	DES PLAINES

Critical IJC-Critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
		MANUFACTURERS' SERVICE LTD.	60056MLTGR1800W	MOUNT PROSPECT
		METALDYNE	60648DPGDC6119W	NILES
		MIDWAY WIRE INC.	60632MDWYW4630W	CHICAGO
		MOTOROLA	60196MTRLN1301E	SCHAUMBURG
		MPC PRODS. CORP.	60714MPCPR5600W	NILES
		NATIONAL CASTINGS INC.	60650NTNLC1400S	CICERO
		NATIONAL TECH. INC.	60008NTLTC1101C	ROLLING MEADOWS
		NAZDAR CHICAGO	60622NZDRC1087N	CHICAGO
		NOBERT PLATING	60607NBRTP340NO	CHICAGO
		NOBERT PLATING	60651NBRTP1445N	CHICAGO
		NORTHORP GRUMMAN SYS.	60008NRTHR600HI	ROLLING MEADOWS
		NUART	60638NRT 6247W	BEDFORD PARK
		PERFECTION PLATING INC.	60007PRFCT775MO	ELK GROVE VILLAGE
		PHELPS DODGE CHICAGO ROD INC.	60623MGMCP2324S	CHICAGO
		PLASTICS COLOR CORP. OF IL	60409PLSTC142EA	CALUMET CITY
		PRECISION PLATING CO. INC.	60646PRCSN4123W	CHICAGO
		PRECOAT METALS	60632PRCTM4800S	CHICAGO
		R. S. OWENS & CO.	60630RSWNS55214	CHICAGO
		REPUBLIC TECHS. INTL. HARVEY CFB	60426BLSSL281E1	HARVEY
		S & C ELECTRIC CO.	60626SCLCT6601N	CHICAGO
		SAINT-GOBAIN CONTAINERS	60419BLLGL13850	DOLTON
		SCIENTIFIC PLATING CO. INC.	60614SCNTF2073N	CHICAGO
		SHERWIN-WILLIAMS CO.	60628SHRWN11541	CHICAGO
		SIGNODE	60455SGNDC7701W	BRIDGEVIEW
		SIPI METALS CORP.	60622SPMTL1720E	CHICAGO

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		SPRAYLAT CORP.	60633SPRYL1701E	CHICAGO
		TEMPERBENT GLASS L.P.	60803RDCNC12400	ALSIP
		UNITED REFINING & SMELTING CO.	60131NTDRF3700N	FRANKLIN PARK
		UNITY MFG.	60610NTYMF1260N	CHICAGO
		WHEATLAND TUBE CO. CHICAGO DIV.	60609MNLYL4435S	CHICAGO
Lake County, IN	16	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		HAMMOND GROUP INC. HALSTAB DIV.	46323HMMND3100M	HAMMOND
		HAMMOND LEAD PRODS. HALOX HAMMOND EXPANDERS DIVI.	46323HMMND23081	HAMMOND
		INDIANA HARBOR COKE CO. L.P.	46312NDNHR3210W	EAST CHICAGO
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		NATIONAL BRIQUETTE CORP.	46312NTNLB5222I	EAST CHICAGO
		ONE SHOT L.L.C.	46406CNSMR5300W	GARY
		REPUBLIC TECHS. INTL. GARY 7TH AVENUE	46403RPBLC4000E	GARY
		REPUBLIC TECHS. INTL. GARY DUNES	46401GRYCL2800E	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		SAFETY-KLEEN OIL RECOVERY CO.	46312SFTYK601RI	EAST CHICAGO
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		U.S. GYPSUM CO.	46312SGYPS3501C	EAST CHICAGO

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		USS GARY WORKS	46402SSGRYONENO	GARY
Mercury and mercury compounds	15			
Cook County, IL	5	MARBLEHEAD LIME INC. SOUTH CHICAGO PLANT	60617MRBLH3245E	CHICAGO
		CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		CRAWFORD GENERATING STATION	60623CRWFR3501S	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
Lake County, IN	10	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		INDIANA HARBOR COKE CO. L.P.	46312NDNHR3210W	EAST CHICAGO
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		MARBLEHEAD LIME INC. BUFFINGTON PLANT	46402MRBLHCLARK	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		U.S. GYPSUM CO.	46312SGYPS3501C	EAST CHICAGO
		USS GARY WORKS	46402SSGRYONENO	GARY
Hexachlorobenzene	2			
Lake County, IN	2	ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO

Table 5.3-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Grand Calumet AOC

Chemical	*IJC Tracking Number*	*Discharge*
BENZO(A)PYRENE	4	0.002
LEAD TOTAL RECOVERABLE	8	5180.35
LEAD, TOTAL (AS PB)	8	8351.81
MERCURY TOTAL RECOVERABLE	9	76.67
	Total IJC	**13608.83**
1,1,1-TRICHLOROETHANE		2.19
1,1-DICHLOROETHANE		2.19
ALUMINUM, TOTAL RECOVERABLE		1554.90
BENZENE		10950
CHLORIDE (AS CL)		66740250
CHLORINE, TOTAL RESIDUAL		4305.69
CHROMIUM TOTAL RECOVERABLE		13457.55
CHROMIUM, HEXAVALENT (AS CR)		768.33
CHROMIUM, TOTAL (AS CR)		23841.80
CHROMIUM, TRIVALENT (AS CR)		1494.68
COPPER TOTAL RECOVERABLE		273.75
COPPER, TOTAL (AS CU)		9855
CYANIDE, TOTAL (AS CN)		259033.66
CYANIDE, WEAK ACID, DISSOCIABLE		4650.10
ETHYLBENZENE		3014.90
FLUORIDE, TOTAL (AS F)		694534.17
IRON, DISSOLVED (AS FE)		56575
IRON, TOTAL (AS FE)		88.70
METHYL ETHYL KETONE		9.49
METHYL TERT-BUTYL ETHER		12.78
NITROGEN, AMMONIA TOTAL (AS N)		26975598.20
PHENOLICS, TOTAL RECOVERABLE		19079.72
SELENIUM, TOTAL RECOVERABLE		584
SULFATE, TOTAL (AS SO4)		79008751.67

Chemical	*IJC Tracking Number*	*Discharge*
SULFIDE, TOTAL (AS S)		8431.50
TOLUENE		672.59
TRICHLOROETHYLENE		23.21
XYLENE		711.97
ZINC TOTAL RECOVERABLE		5403.46
ZINC, TOTAL (AS ZN)		16520.60
	Total Non-IJC	**173860451.80**
	Total	**173874060.60**

Table 5.3-F. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Grand Calumet

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Benzo(a)pyrene	1			
Lake County, IN	1	U.S. STEEL LLC - GARY WORKS	IN0000281	GARY
Lead	5			
Lake County, IN	5	EAST CHICAGO_MUNICIPAL STP	IN0022829	CHICAGO
		HAMMOND MUNICIPAL STP	IN0023060	HAMMOND
		ISG INDIANA HARBOR, INC.	IN0000205	CHICAGO
		ISPAT INLAND, INC.	IN0000094	CHICAGO
		U.S. STEEL LLC - GARY WORKS	IN0000281	GARY
Mercury	4			
	4	EAST CHICAGO_MUNICIPAL STP	IN0022829	CHICAGO
		GARY WASTEWATER TREATMENT PLNT	IN0022977	GARY
		HAMMOND MUNICIPAL STP	IN0023060	HAMMOND
		HOBART WWTP	IN0061344	HOBART

5.4. Waukegan Harbor AOC, Lake County, IL

The Waukegan Harbor AOC occupies a small part of Lake County, IL, on Lake Michigan's western shore. As industrial activity on the Great Lakes expanded, a natural inlet and portions of adjacent wetlands were filled to form the harbor. Waukegan Harbor includes approximately 1.2 km^2 of industrial, commercial, municipal, and open or vacant lands. To investigate additional concerns of local residents, an Expanded Study Area was added to the AOC. The Waukegan expanded study area watershed includes the Waukegan River drainage basin, the North Ditch drainage basin, and other near shore areas that drain to Lake Michigan (see AOC map at end of chapter and in Appendix 2).

5.4.1. Hazardous Waste Sites Relevant to the Waukegan Harbor AOC

ATSDR has evaluated the data for hazardous waste sites in the Lake County, IL AOC and reached conclusions regarding the public health threat posed by these sites. Conclusions are summarized in Table 5.4-A for sites categorized as either a public health hazard or an indeterminate public health hazard at some point during their assessment history, together with information regarding the type and location of the site and the date and type of assessment document.

Table 5.4-A. Hazardous Waste Sites in Lake County, IL

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Diamond Scrap Yard, Waukegan IL0001093509	HC	2001	2	Non NPL	To be Determined
H.O.D. Landfill, Antioch ILD980605836	HA HA HC	1989 1998 1999	3 5 4	NPL	Completed
Johns-Manville disposal Area, Waukegan ILD005443544	HA SRU	1988 1994	3 N.S.	NPL	Ongoing
Nicor, Mt. Prospect, ILN000508064	HC	2001	2	Non-NPL	Completed

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Outboard Marine Corp, Waukegan ILD000802827	HA HA SRU HC HC HC HC	1989 1994 1998 2004 2004 2004 2007	2 2 2 4 4 2 5	NPL	Ongoing
Precision Chrome, Inc., Wauconda ILD89062871	HC	1998	3	Non-NPL	Ongoing
Yeoman Creek Landfill , Waukegan ILD980500102	HA HA HC HC HC	1992 1997 1998 2000 2004	3 4 1 4 4	NPL	Ongoing

1 = Urgent Public Health Hazard, 2 = Public Health Hazard, 3 = Indeterminate Public Health Hazard, 4 = No Apparent Public Health Hazard, 5 = No Public Health Hazard, HA = Public Health Assessment, HC = Health Consultation, SRU = Site Review and Update

ATSDR has conducted further evaluation of the site data, summarized in the following sections.

5.4.1.1 Diamond Scrap Yard

The Diamond Scrap Yard began operations the 1930s. On the site coal and petroleum were stored, automobiles and 55-gallon drums were scrapped, wire and transformers burned, and even some iron and steel were produced. This site was an approximately 250 by 3,000-foot property in Waukegan (Lake County) IL. It is only about 250 feet from Lake Michigan; beneath the northern portion of the site, the Waukegan River flows through a culvert and empties into Lake Michigan. The site is no longer in operation. Information regarding this site is taken from ATSDR's 2001 health consultation.

Demographic Data: The demographic profile was not reported for vulnerable populations living within 1 mile of this non-NPL site. In 2001 the total population within a 1-mile radius of the site was, however, 15,155 persons.

ATSDR Conclusions: For the trespassers exposed to contaminated soil while on the property, ATSDR categorized this site as a *Public Health Hazard* (Category 2). In onsite surface soil, lead was present at levels that could cause adverse health effects through incidental ingestion. Because reportedly, one or more persons lived in an abandoned onsite foundation, contact with soil is likely. Although PCBs were found in onsite soil at levels greater than health-based screening values, they were not at levels thought to cause adverse health effects. Moreover, of Waukegan River sediment monitoring did not indicate that chemicals had migrated from the site

into the river. Onsite groundwater contained lead above the drinking water action level, but no one was using onsite groundwater, and all private wells were upgradient of the site.

In 2001, IDPH recommended that Illinois U.S. EPA (IEPA) restrict access to the site and fill basements of buildings to deter people from living on the site. The IEPA agreed to act on these recommendations.

U.S. EPA Update: The CERCLIS database identifies this Diamond Scrap Yard site as a non-NPL site.

Illinois Department of Public Health (IDPH) Update: The site is not listed in the Illinois EPA database. The CERCLIS shows no activity since 1999. IDPH has not had the opportunity to visit the site to confirm the current status. (Site file, Illinois Department of Public Health; 2008 Aug 8)

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and PCBs—including Aroclor 1254 and 1260—were identified at this site.

5.4.1.2 H.O.D. Landfill

On a freshwater wetland in the village of Antioch (Lake County) IL, the 51-acre H.O.D. Landfill operated primarily as a sanitary landfill until 1988. While in operation, however, H.O.D. also accepted some (2% of total volume) special permitted wastes. These special permitted wastes included waste oils, chlorinated solvents, paint sludge, and other wastes metal that contained metal. While it was in operation, H.O.D. accepted an estimated 87,000 drums of hazardous wastes. Reportedly, liquid organic wastes and other hazardous chemicals were illegally disposed of there. In 1984, operations ceased. A leachate collection system was installed, and the entire landfill was covered with a clay cap. Information regarding this site is taken from ATSDR's 1989 and 1998 public health assessments, its 1999 health consultation, and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	611
Females aged 15-44	1,397
Adults 65 and older	649

ATSDR Conclusions: In a 1989 public health assessment, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In a 1998 public health assessment, ATSDR concluded the site posed *No Public Health Hazard* (Category 5). A 1999 ATSDR health consultation also reported that the site posed *No Apparent Public Health Hazard* (Category 4). In the past, contaminants in onsite groundwater included vinyl chloride, thallium, and sodium. These contaminants had also migrated offsite to an Antioch municipal well; thallium and sodium had migrated to nearby private wells. Although levels in the municipal well were above MCLs or health-based criteria, ATSDR concluded that dilution during distribution would diminish levels delivered to the tap.

Site remediation began in 2001. Remedial activities included replacement of the contaminated municipal well, use of leachate and gas extraction to contain contaminant migration,

improvements to the landfill cap, and groundwater-monitored natural attenuation. As of the date of this report, long-term monitoring is in place. Regular monitoring and routine site maintenance will continue.

U.S. EPA Update: In its June 2008 Fact Sheet for the H.O.D. Landfill site, U.S. EPA stated in part that

> After an unsuccessful effort to have the PRPs [Potentially Responsible Parties] sign an AOC [Administrative Order on Consent] for the remedial design and remedial action (RD/RA), Region 5 issued a unilateral administrative order to the PRPs in April 1999 to perform the RD/RA. A PRP began the RD in May 1999, and Region 5 approved the RD in August 2000. The PRP began construction in August 2000 and finished in June 2001. A preliminary closeout report was issued in June 2001 which documents that the PRPs have completed remedial action construction activities at the site.
>
> The PRPs are responsible for long-term maintenance and monitoring of the site. A PRP performed the first periodic long-term monitoring event in February 2002. Long-term operations and maintenance (O&M) is ongoing. A five-year review was completed on September 30, 2005.

Available at: http://www.epa.gov/region5superfund/npl/illinois/ILD980605836.htm. 2008 Jun [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants lead and polyaromatic hydrocarbons (PAHs—including dibenz[a,h]anthracene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, and benzo[k]fluoranthene) were identified at the site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.3 Johns-Manville Disposal Area

This Waukegan (Lake County) IL site is within the Waukegan Harbor Extended Study Area. From 1922 through 1998, the Johns-Manville produced a variety of building and other materials that contained asbestos, lead, pentachlorophenol, bis (2-ethylhexyl) phthalate, and chromium. The wastes were dumped onsite. In an eastern area of the 300-acre property, an estimated 3 million cubic yards of off-specification products and wastewater sludge were disposed of. Information regarding this site is taken from the ATSDR's 1988 public health assessment, its 1994 site review and update, and from the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	623
Females aged 15-44	1,220
Adults 65 and older	746

ATSDR Conclusions: Because of the potential public health threat from exposure to asbestos and lead—were the public allowed access to the site—in 1988 ATSDR categorized this site as an

Indeterminate (formerly potential) Public Health Hazard (Category 3). Onsite asbestos contamination was extensive. Asbestos fibers could, particularly when airborne, pose a threat to onsite workers and trespassers, as well as to recreational users of the nearby state park. Although air monitoring had been conducted since 1988—during the remedial response activities at the site—ATSDR concluded that the air sampling data were not adequate to determine the potential public health threat. High lead-levels in topsoil could pose a threat to children playing on the site, but whether children would, or even could, access the site from the adjacent beach is unclear. In any event, since the time of the 1988 health assessment and the 1994 site review and update, extensive clean up activities have occurred, including a 24-inch soil cover with vegetation over all dry waste areas and paving of asbestos-contaminated parking lots. As of the date of this report, onsite soil cover maintenance and groundwater monitoring were ongoing.

U.S. EPA Update: In its June 2008 Fact Sheet for the Johns-Manville Disposal site, U.S. EPA stated in part

> After Johns-Manville ceased operations on-site in summer 1998, U.S. EPA issued an explanation of significant differences in September 2000 which required the closure of the former wastewater treatment ponds and the miscellaneous disposal pit (which received non-asbestos-containing wastes). Closure of these ponds is proceeding in accordance with the First Amended Consent Decree which was entered in court in December 2004, and investigation of the former manufacturing area is being addressed through IEPA's Voluntary Clean-up Program. Construction on the first of three phases of pond and disposal pit closure began in 2005 and is ongoing. The former settling basin was being dewatered as of summer 2008, and will be covered following dewatering. The remedial design for the ground-level treatment ponds (the industrial canal, pumping lagoon, and collection basin) will begin following completion of the settling basin remedial action.
>
> The first five-year review for the site was completed on January 21, 1999, and a second five-year review was completed on May 2, 2003. A third five year review was completed on May 1, 2008, which found that the remedy was expected to be protective of human health and the environment once all remedial actions have been completed.

Available at: http://www.epa.gov/region5superfund/npl/illinois/ILD005443544.htm. 2008 Jun [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.4 Nicor (Lake County) Mt. Prospect, IL

On July 22, 2000, a resident in Mt. Prospect, IL contacted IDPH and ATSDR to report a mercury spill that occurred while a Nicor contractor was moving an older gas meter and regulator. IDPH contacted Nicor and found that it was investigating this spill together with three others in neighboring homes. Information on this site is taken from the 2001 ATSDR health consultation.

ATSDR Conclusions: After its review of relevant information, ATSDR concluded that because of mercury contamination in many homes in the Chicago suburban area, a *Public Health Hazard* (Category 2) existed. Remedial actions have been completed.

U.S. EPA Update: This Residential Mercury Spill incident is not a U.S. EPA site and does not appear in CERCLIS.

Illinois Department of Public Health (IDPH) Update: Nicor, Inc. continues to operate under the Illinois Attorney General's order stating that whenever mercury is spilled in homes as a result the continued removal of older, mercury-containing gas regulators, Nicor, Inc must follow established reporting and cleanup protocols.

IDPH continues to review post-sampling data from occasional spills that still take place at the rate of about 15 homes per year. To date, all homes have been properly cleaned and residents have re-occupied their homes. (Site file, Illinois Department of Public Health, 2008 Aug 8).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant mercury was identified at this site.

5.4.1.5 Outboard Marine Corp.

Located in and around the upper Waukegan Harbor area in Waukegan (Lake County) IL, this site comprises several areas contaminated by PCBs. From 1959 to 1972, the Outboard Marine Corp. purchased about 8.4 million pounds of hydraulic fluid that contained PCBs. Some of this fluid leaked onto factory floors, where it disappeared through floor drains but ultimately reappeared in Lake Michigan surface water. During the early 1970s, Outboard Marine was one of the major sources of PCBs discharging into Lake Michigan. Information regarding this site is taken from the 1994 ATSDR public health assessment and the 2007 U.S. EPA NPL Fact Sheet for the site.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	2,183
Females aged 15-44	3,754
Adults 65 and older	1,103

ATSDR Conclusions: In its 1989, 1994, and 1998, public health products ATSDR first categorized this site as a *Public Health Hazard* (Category 2), then a *No Apparent Public Health Hazard* (Category 4). In 2004, ATSDR again categorized the site as a *Public Health Hazard* (Category 2). Finally in 2007, ATSDR concluded the site posed *No Public Health Hazard* (Category 5). The primary concern was that consumption of contaminated fish could expose anglers and their families to PCBs at levels possibly resulting in adverse health effects.

U.S. EPA Update: In its December 2007 Fact Sheet for the Outboard Marine sites, U.S. EPA states in part that

> **Waukegan Harbor:** U.S. EPA and OMC entered into a consent decree requiring OMC to clean up Waukegan Harbor and portions of its OMC Plant 2 property in 1989. . . . All construction was completed by 1994 and OMC operated and maintained the containment cells until shortly after it declared bankruptcy in 2000. U.S. EPA, and then Illinois EPA, took over

the maintenance work on the containment cells after OMC ceased performing this work. Presently the city of Waukegan is performing the maintenance work on the containment cells in accordance with an agreement with U.S. EPA and the state.

Future cleanup actions for Waukegan Harbor are being evaluated by U.S. EPA, Illinois EPA, and area stakeholders.

Waukegan Coke Plant: OMC excavated current Boat Slip #4 in Waukegan Harbor because former Boat Slip #3 was converted into a containment cell. In the course of excavating the new boat slip, creosote-contaminated soils were discovered. This lead to the discovery of the Waukegan Coke Plant (WCP) site directly to the south.

* * *

U.S. EPA issued a Record of Decision on September 30, 1999, for the cleanup of the WCP site.

* * *

The groundwater cleanup action design plans were completed in 2006 and construction of the water treatment system began in April 2007. Pump and treatment of contaminated groundwater will begin in about summer 2008 and last through 2011 to 2016, depending on how efficiently run the cleanup action is.

OMC Plant 2: Before the OMC Plant 2 site was abandoned by the OMC bankruptcy trustee in 2002, U.S. EPA and Illinois EPA reached an agreement with the trustee whereby the trustee would perform some cleanup actions inside the plant.

* * *

U.S. EPA began an RI/FS at the site in 2004 to determine the nature and extent of residual contaminants and to evaluate cleanup approaches. We released a cleanup proposal in January 2007 for public comment. Meanwhile, the city of Waukegan began to demolish the clean portions of the OMC Plant 2 building in summer 2006. It completed the bulk of this work in November 2006. U.S. EPA issued a Record of Decision for cleanup work for certain portions (contaminated building and soils) of the site in September 2007. U.S. EPA also began the remedial design phase of the selected cleanup action in September 2007 with the goal of beginning cleanup work in April 2008.

Available at: http://www.epa.gov/region5superfund/npl/illinois/ILD000802827.htm. 2007 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified with ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more complete listing of hazardous substances found at this site, please refer to http://www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.6 Precision Chrome, Inc.

This approximately 3-acre site is in the Village of Fox Lake (Lake County) IL, 7 miles south of the Illinois-Wisconsin border. Precision Chrome is engaged in the production of steel shafts for hydraulic equipment. Production involves cutting, grinding, polishing, induction hardening, and chrome plating. Chromic acid generated by Precision Chrome is sent to a facility that meets requirements for handling reused hazardous waste. Nevertheless, spills at the Precision Chrome have contaminated the environment. Information regarding this site is taken from ATSDR's 1998 health consultation.

ATSDR Conclusions: Because groundwater is contaminated at levels expected to cause adverse health effects in exposed persons, this site was categorized as an *Indeterminate Public Health Hazard* (Category 3).

Lead, manganese, and chromium (VI) have been detected in numerous groundwater monitoring well samples at levels expected to cause adverse health effects. Chromium (VI) was of primary concern. Private and public drinking water wells are on and near the site that have not been adequately monitored to determine whether the site-related contaminants are present and at what concentrations.

In October 1995, U.S. EPA completed a time-critical onsite removal action. In 1997, a groundwater extraction and containment system was installed. The extracted water was piped to the village sanitary sewer, but the system was shut down within about 3 months because the levels of chromium (VI) exceeded the sanitary sewer system permit.

U.S. EPA Update: Precision Chrome is not a federal site—it has been deferred to RCRA. Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 31].

Illinois Department of Public Health (IDPH) Update: The site is an active facility that U.S. EPA referred to the RCRA program. A groundwater extraction and containment system was installed in 1997 and is thought to be effective in preventing the migration of groundwater contamination from the site (Illinois Environmental Protection Agency; 2008 Aug 8). Available at: http://epadata.epa.state.il.us/land/inventory [cited 2008 Aug 19].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site.

5.4.1.7 Yeoman Creek Landfill

The Yeoman Creek Landfill Superfund Site consists of two capped areas: Yeoman Creek Landfill and Edward's Field Landfill. The Yeoman Creek Landfill covers about 49.2 acres in Waukegan (Lake County) IL. In the ATSDR assessments, this landfill and the nearby 11.9-acre Edwards Field Landfill were considered together. But the landfill history is not well documented. Apparently, some hazardous wastes, including PCBs, were dumped there, even though the landfills ostensibly were receiving only landscape and demolition wastes, domestic garbage, and sludge. Surface runoff from the landfill is towards Yeoman Creek, which discharges into the Waukegan River. Information regarding this site was taken from the 1992 ATSDR public health assessment, 1997 ATSDR health assessment, 1998 ATSDR health consultation, and the 2003 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	4,745
Females aged 15-44	8,346
Adults 65 and older	3,219

ATSDR Conclusions: ATSDR assessed this site five times because the available limited information did not indicate that people had been exposed to contaminants at levels of public health concern, and because that information contained significant data gaps. The 1992 health assessment concluded that the site posed an *Indeterminate Public Health Hazard* (Category 3). The 1997 health assessment concluded, on the basis of more complete data, that because of the absence of exposure to contaminants at levels of health concern, the site posed *No Apparent Public Health Hazard* (Category 4). The 1998 health consultation concluded that the infiltration of potentially flammable or confirmed flammable levels of gases into nearby buildings posed an *Urgent Public Health Hazard* (Category 1). But after a ventilation system was installed to eliminate the explosive hazard, the 2000 and 2004 health consultations concluded that the site posed *No Apparent Public Health Hazard* (Category 4).

The 1992 health assessment noted the presence of PCBs and VOCs in groundwater. Still, whether these contaminants could reach private wells north of the site was not known, and concentrations of contaminants in surface soil were similarly unknown. The 1997 health assessment stated that the homes and businesses near the landfills used municipal water from Lake Michigan rather than groundwater. Because a number of contaminants, including PCBs, dieldrin, and B(a)P, exceeded health-based screening values onsite or in Yeoman Creek, access to contaminated areas was restricted.

U.S. EPA Update: In its May 2008 Fact Sheet for the Yeoman Creek site, U.S. EPA stated in part that

> On February 27, 2007, U.S. EPA completed its first Five-Year Review ("FYR") of the site. The FYR cited the following issues: "The remedy has failed to control the migration of LFG [Landfill Gas] in the northern portion of the site. Institutional controls are needed for properties impacted by the site. Many of the groundwater monitoring wells, LFG probes casings and passive vents and a turbine ventilator need repair and maintenance. The perimeter fence and signs need maintenance and/or repair. Grading and reseeding is needed in several areas of the site cover." The FYR includes the following protectiveness statement: "The remedy at the YCL is not protective because the LFG collection system is not operating as designed; i.e., LFG above 50% of the LEL continues to migrate beyond the landfill boundary. Additional remedial action as well as implementation and compliance with land and groundwater use restrictions that prohibit interference with the dual barrier cover and the LFG collection system and prohibit use of groundwater are necessary to ensure protectiveness. U.S. EPA and the responsible parties are negotiating the details of the additional remedial action that is expected to include a separate gas collection system for the northern portion of the site."

> On the northern portion of the site, the PRPs designed a new perimeter trench gas collection system. Construction has started with the installation of the building to house the collection equipment. An investigation to determine the appropriate depth of the trench system was completed in April 2008 and construction will be completed in the summer of 2008.

Available at: http://www.epa.gov/region5superfund/npl/illinois/ILD980500102.htm. 2008 May [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs—including acenaphthylene, chrysene, dibenz[a,h]anthracene, phenanthrene, benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene) were identified at the site.

5.4.2. Summary and Conclusions for the Waukegan Harbor AOC

5.4.2.1 Hazardous Waste Sites

ATSDR categorized seven hazardous waste sites in Lake County, IL as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. Two of the 7 sites have been remediated. As of the date of this report three were under remediation.

5.4.2.2 TRI Data

The TRI onsite chemical releases for Lake County, IL, in 2001 totaled 724,859 pounds, the majority of which were released to air. These data are summarized in Table 5.4-B

Some 4,624 pounds (0.6%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air and surface water), and mercury compounds (primarily to air).

The largest onsite release of non-IJC chemicals, in the range of 150,000-299,999 pounds, was of hydrochloric acid aerosols (to air). All other releases were <150,000 pounds. The facilities that released these pollutants are listed in Table 5.4-C.

5.4.2.3 NPDES Data

The NPDES permitted discharges for Lake County, IL are summarized in Table 5.4-D. The average annual permitted discharges in 2004 totaled 1,805,213 pounds, the majority of which was ammonia nitrogen. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.4.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired at this site. According to the Stage III remedial action plan published in July 1999, restrictions on fish consumption are not specific to this AOC but reflect region wide restrictions for Lake Michigan.

Further information is available at the U.S. EPA Web site: http://www.epa.gov/glnpo/aoc/.

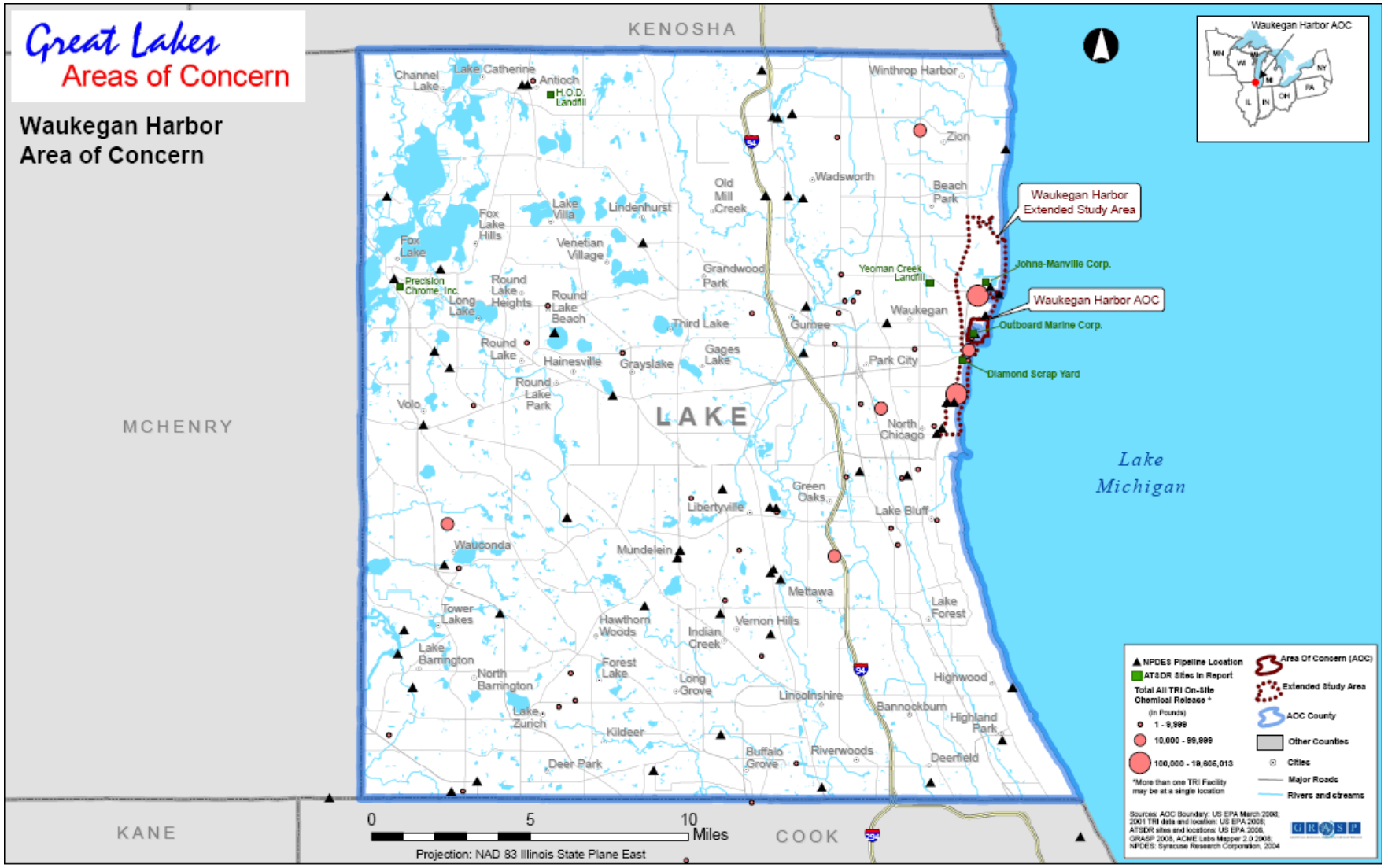

Great Lakes
Areas of Concern
Waukegan Harbor
Area of Concern
KENOSHA
MCHENRY
KANE
COOK
LAKE
Lake
Michigan
Waukegan Harbor AOC
Waukegan Harbor
Extended Study Area
Johns-Manville Corp.
Waukegan Harbor AOC
Outboard Marine Corp.
Diamond Scrap Yard
Yeoman Creek
Landfill
H.O.D.
Landfill
Precision
Chrome, Inc.
Channel
Lake
Lake
Catherine
Antioch
Winthrop
Harbor
Zion
Wadsworth
Beach
Park
Old
Mill
Creek
Lindenhurst
Lake
Villa
Fox
Lake
Hills
Fox
Lake
Venetian
Village
Grandwood
Park
Round
Lake
Heights
Long
Lake
Round
Lake
Beach
Third
Lake
Gurnee
Waukegan
Round
Lake
Hainesville
Grayslake
Gages
Lake
Park
City
Round
Lake
Park
Volo
North
Chicago
Green
Oaks
Libertyville
Lake
Bluff
Wauconda
Mundelein
Mettawa
Lake
Forest
Tower
Lakes
Hawthorn
Woods
Vernon
Hills
Indian
Creek
Lake
Barrington
North
Barrington
Forest
Lake
Long
Grove
Highwood
Lincolnshire
Bannockburn
Lake
Zurich
Highland
Park
Kildeer
Buffalo
Grove
Riverwoods
Deerfield
Deer
Park
0
5
10
Miles
Projection: NAD 83 Illinois State Plane East
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site
Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 18,606,013
*More than one TRI Facility
may be at a single location
Area Of Concern (AOC)
Extended Study Area
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
GRASP

Table 5.4-B. TRI Releases (in pounds, 2001) for the Waukegan Harbor AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.002568825	No data	0	0	0.002568825	0	0.002568825
(PCDDs and PCDFs)	3							
LEAD	8	2584.21	No data	0	0	2584.21	966	3550.21
LEAD COMPOUNDS	8	419.85714	1304.3	0	0	1724.15714	2807.29	4531.44714
MERCURY	9	4.73	No data	0	0	4.73	10.45	15.18
MERCURY COMPOUNDS	9	310.011	1	0	0	311.011	0.042	311.053
	Total IJC	**3318.810709**	**1305.3**	**0**	**0**	**4624.110709**	**3783.782**	**8407.892709**
1,2,4-TRIMETHYLBENZENE		1500	No data	0	0	1500	0	1500
1,4-DIOXANE		250	No data	0	0	250	0	250
2-METHOXYETHANOL		105	No data	0	0	105	0	105
4,4'-ISOPROPYLIDENE-DIPHENOL		694	No data	0	0	694	110	804
ACETONITRILE		9498	No data	0	0	9498	0	9498
ALUMINUM (FUME OR DUST)		2009	No data	0	0	2009	4500	6509
AMMONIA		1595	100	0	0	1695	0	1695
ANTIMONY		0	No data	0	0	0	9	9
BARIUM COMPOUNDS		16993	4400	0	0	21393	38216	59609

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
BROMOMETHANE		248	No data	0	0	248	0	248
CERTAIN GLYCOL ETHERS		2980	No data	0	0	2980	1075	4055
CHLOROFORM		2986	No data	0	0	2986	12	2998
CHROMIUM		0	No data	0	0	0	37	37
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		28	No data	0	0	28	3897	3925
COPPER		0	No data	0	0	0	15659	15659
COPPER COMPOUNDS		833	110	0	0	943	2655	3598
DICHLOROMETHANE		114565	No data	0	0	114565	29	114594
DIISOCYANATES		10	No data	0	0	10	0	10
ETHYLBENZENE		1231	No data	0	0	1231	0	1231
ETHYLENE GLYCOL		10	No data	0	0	10	0	10
ETHYLENE OXIDE		4800	No data	0	0	4800	0	4800
FORMALDEHYDE		5	No data	0	0	5	0	5
FORMIC ACID		92	No data	0	0	92	0	92
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		229170	No data	0	0	229170	0	229170

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
HYDROGEN FLUORIDE		120504	No data	0	0	120504	0	120504
MANGANESE COMPOUNDS		1010	110	0	0	1120	0	1120
METHANOL		84784	No data	0	0	84784	96	84880
METHYL ETHYL KETONE		21506	No data	0	250	21756	250	22006
METHYL ISOBUTYL KETONE		1255	No data	0	5	1260	5	1265
METHYL TERT-BUTYL ETHER		91	No data	0	0	91	5	96
N,N-DIMETHYLFORMAMIDE		735	No data	0	0	735	0	735
NAPHTHALENE		10	No data	0	0	10	0	10
N-BUTYL ALCOHOL		5731	No data	0	0	5731	0	5731
N-HEXANE		5282	No data	0	0	5282	158	5440
NICKEL		250	No data	0	0	250	1538	1788
NITRIC ACID		40	No data	0	0	40	0	40
N-METHYL-2-PYRROLIDONE		579	No data	0	0	579	0	579
OZONE		80	No data	0	0	80	0	80
PROPYLENE OXIDE		34	No data	0	0	34	0	34
SEC-BUTYL ALCOHOL		255	No data	0	0	255	0	255

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
STYRENE		10255	No data	0	0	10255	0	10255
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		5	No data	0	0	5	0	5
TETRACHLORO-ETHYLENE		1010	No data	0	250	1260	250	1510
THIOUREA		52	No data	0	0	52	0	52
TOLUENE		29128	No data	0	250	29378	501	29879
TRICHLOROETHYLENE		13676	No data	0	0	13676	676	14352
VANADIUM COMPOUNDS		433	0	0	0	433	0	433
XYLENE (MIXED ISOMERS)		26961	No data	0	250	27211	368	27579
ZINC COMPOUNDS		1112	130	0	0	1242	250	1492
	Total Non-IJC	**714380**	**4850**	**0**	**1005**	**720235**	**70296**	**790531**
	Total	**717698.8107**	**6155.3**	**0**	**1005**	**724859.1107**	**74079.782**	**798938.8927**

Table 5.4-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Waukegan Harbor AOC

Critical-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	2			
Lake County, IL	2	ABBOTT LABS. NORTH CHICAGO FACILITY	60064BBTTL1400N	NORTH CHICAGO
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN
Lead and lead compounds	13			
Lake County, IL	13	ABBOTT LABS. ABBOTT PARK FACILITY	60064BBTTLINTER	ABBOTT PARK
		ABBOTT LABS. NORTH CHICAGO FACILITY	60064BBTTL1400N	NORTH CHICAGO
		AKZO NOBEL AEROSPACE COATINGS INC.	60085MDLND17EWA	WAUKEGAN
		BARNANT CO.	60010BRNNT28W09	BARRINGTON
		CIRCUT WORKS CORP.	60044CRCTW110AL	LAKE BLUFF
		CITATION DYCAST	60047DYCST320EA	LAKE ZURICH
		NEW NGC INC.	60085GLDBN515SE	WAUKEGAN
		OSRAM SYLVANIA LAKE ZURICH ECS	60084SRMSY800NC	LAKE ZURICH
		PICKARD INC.	60002PCKRD782PI	ANTIOCH
		PRECISION CHROME INC.	60020PRCSN105PR	FOX LAKE
		SIEMENS BUILDING TECHS. INC.	60089LNDSS1000D	BUFFALO GROVE
		TRIAD CIRCUITS	60073TRDCR703NS	ROUND LAKE
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN
Mercury and mercury compounds	2			
Lake County, IL	2	U.S. NAVY NAVAL TRAINING CENTER	60088SNVYN201DE	GREAT LAKES
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN

Table 5.4-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Waukegan Harbor AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
COPPER, TOTAL (AS CU)		744.60
CYANIDE, WEAK ACID, DISSOCIABLE		11.68
ETHYLBENZENE		0.77
NITROGEN, AMMONIA TOTAL (AS N)		1793302.57
PHOSPHORUS, TOTAL (AS P)		11132.50
TOLUENE		14.60
XYLENE		6.57
	Total Non-IJC	**1805213.29**
	Total	**1805213.29**

5.5. Milwaukee Estuary AOC, Milwaukee County, WI

The Milwaukee Estuary AOC includes the inner and outer harbor and the near shore waters of Lake Michigan. The AOC is bounded by a line extending north from Sheridan Park to the City of Milwaukee's Linnwood water intake, as well as the lower 4–5 km of the Milwaukee, Menomonee, and Kinnickinnic Rivers (see AOC map in the Appendix 2). Although the immediate drainage area is relatively small, urban runoff generates a large quantity of pollutants. This AOC is a source of pollution to Lake Michigan and a sink for pollutants originating through the entire Milwaukee River drainage (see AOC map at end of chapter and in Appendix 2).

5.5.1. Hazardous Waste Sites Relevant to the Milwaukee Estuary AOC

ATSDR has evaluated the data for hazardous waste sites in Milwaukee, WI, and reached conclusions regarding the public health threat posed by these sites. Conclusions are summarized in Table 5.5-A for sites categorized as either a public health hazard or an indeterminate public health hazard at some point during their assessment history, together with information regarding the type and location of the site and the date and type of assessment document.

Table 5.5-A. Hazardous Waste Sites in Milwaukee County, WI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Boerke Property, Milwaukee WID981189632	HC	1998	2	Non NPL	Completed
Fadrowski Drum Disposal, Franklin WID980901227	HA HA	1988 1994	3 4	Deleted from NPL	Completed
Former Johnson Property Milwaukee	HC	2006	3	Non NPL	Completed
Former Tannery, Milwaukee WI0001407717	HC	1996	2	Non NPL	Completed
Johnson Controls-Badger Facility, Milwaukee WIT560011116	HC HC	2003 2006	3 3	Non NPL	Completed
Moss-American Co., Inc. (Kerr McGee Oil Co.), Milwaukee WID039052626	HA HA	1988 1991	3 2	NPL	Ongoing
Northwestern Barrel (Former), S. Milwaukee IED981095995	HC HA HC	1997 1998 2002	1 NS 4	Non NPL	Ongoing

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
P & G School Bus Co., Milwaukee WISFN0507920	HC	2002	3	Non NPL	To be Determined
Redi-Quick Dry Cleaners, West Allis WID076169226	HC	2006	2	Non NPL	Completed
Robert Betz Trust Co., Milwaukee WI00001366226	HC HC HC	1998 1999 2001	2 2 2	Non NPL	To be Determined
Schlitz Park Office Building, Milwaukee WIXCRA04R000	HC	2005	2	Non NPL	Completed
Solvay Coke and Gas Company, Milwaukee WIN000508215	HC	2008	2	Non NPL	Ongoing
St. Francis Auto Wreckers, Milwaukee WID988639068	HC	2002	2	Non NPL	Ongoing
Try Chemical Corporation, Milwaukee WID048034300	HC	2001	2	Non NPL	Completed

1 =Urgent Public Health Hazard, 2 =Public Health Hazard, 3 = Indeterminate Public Health Hazard,

4 =No Apparent Public Health Hazard, HA =Public Health Assessment, HC =Health Consultation, NS=Not stated

ATSDR has conducted further evaluation of the site data, summarized in the following section.

5.5.1.1 Boerke Property

Lake Michigan provides one boundary of this abandoned 70-acre property in Oak Creek (Milwaukee County) WI. Boerke was primarily an unlined industrial landfill. A dye manufacturer in operation from about 1915 to 1939 dumped its arsenic wastes into the landfill. A drainage swale runs from the disposal area and empties into Lake Michigan.

ATSDR Conclusions: Because the arsenic contamination in waste materials and adjacent surface soils posed a public health hazard to people who might have entered the property, in 1998 ATSDR categorized this site as a *Public Health Hazard* (Category 2).

Arsenic was the primary contaminant. Arsenic levels in the waste material and soil were as high as 290,000 mg/kg, and in soil. In the drainage swale arsenic levels were in the thousands of ppm range, which would cause harmful effects from incidental inhalation of dust or ingestion of soil. Arsenic had also been found in groundwater beneath and downgradient of the waste disposal

area. The groundwater probably discharged to Lake Michigan, but did not flow towards any wells.

U.S. EPA reported that the Boerke site removal action was completed in 2004. Institutional controls are in place for this area to avoid disturbance or exposure to the public from any remaining contaminated subsurface soils.

U.S. EPA Update: The Boerke site removal action has been completed, but the site remains active pending further assessment. Available at: http://www.epa.gov/region5/sites/boerke/index.htm. 2008 Feb 29 [cited 2008 Oct 27].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site.

5.5.1.2 Fadrowski Drum Disposal

This 20-acre site in the City of Franklin (Milwaukee County) WI, operated as a landfill for construction debris and fill dirt from 1970 to 1982. In 1983, however, excavation for fill dirt on the property revealed barrels of hazardous wastes. Some of the barrels had ruptured during the excavation. As of 1994, the site had been fenced, and 167 buried drums and associated contamination had been excavated and contained. An onsite pond was then drained and backfilled.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	856
Females aged 15-44	2,246
Adults 65 and older	1,208

Public Health Outcome Data: A nonsite-related, but nonetheless applicable, health outcome data assessment studied age-adjusted cancer rates for all cancer sites for in the City of Franklin and compared them with the United States, Wisconsin, and Milwaukee County for three time periods: 1960–1969, 1970–1979, and 1980–1985. The assessment found no significantly elevated rates for individual cancer sites in Franklin, nor did it find elevated rates for specific cancers with an environmental exposure etiology.

ATSDR Conclusions: In a 1988 health assessment, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1994, after some site remediation, ATSDR concluded that the site posed *No Apparent Public Health Hazard* (Category 4). PAHs, DDT, lead, chromium, toluene, and mercury were found in completed exposure pathways related to soil, but concentrations in surface soils were sufficiently low enough that they did not pose a health risk.

Some contaminated soil had migrated from the disposal area into the adjacent wetland sand stream, but the contamination had been covered with clean soil. Groundwater was not appreciably affected. In 1994, the drums were removed, waste was consolidated and capped, and monitoring wells and a leachate collection system were installed. Monitoring since then has shown the remedy was effective, and the site was deleted from the NPL in 2005.

U.S. EPA Update: In its December 2007 Fact Sheet for the Fadrowski Drum Disposal Site, the U.S. EPA stated in part that

> In September 2003, U.S. EPA in cooperation with WDNR, conducted a second five-year review of the site to evaluate the effectiveness of the remedial action. The review confirmed that the cleanup was effective and that the site posed no risks to the community or environment. A final RA close out report was issued by U.S. EPA on August 8, 2003.
>
> With the concurrence of WDNR, U.S. EPA deleted the FDDS from the NPL on September 6, 2005. A consent order was signed between Menards and the WDNR in March 2005 to ensure the continued operation and maintenance of the site. The site groundwater continues to be monitored for parameters required under the 2005 consent order. None of the groundwater contaminants exceed drinking water maximum contaminant levels (MCLs). A third five-year review will be conducted for the site with a report expected in July 2008.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WID980901227.htm. [cited 2008 Jul 31].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants DDT, lead, B[a]A, B[b]F, B[k]F, B[a]P, I[123cd]P, and chrysene, as well as other contaminants previously discussed, were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.5.1.3 Former Johnson Property (Vapor Intrusion)

The Former Johnson Property site consisted of a Milwaukee city block. The site included four residential parcels, each on roughly 0.6 acres. The area has typically been residential but historically has had small commercial properties intermingled including, in 1910, a fur tannery and, in 1951, a gasoline station and auto repair/paint business. During redevelopment of the property in 2000, soil and groundwater sampling indicated high levels of trichloroethylene (TCE). To mitigate potential migration of vapors into indoor air, technicians used a combination of source (soil) removal, subslab depressurization systems for each home, and an underground plastic cutoff wall.

ATSDR Conclusions: In 2006, ATSDR concluded that beneath two of the homes low-level TCE remained in the groundwater and soil, but the subslab depressurization systems prevented the vapor from moving to indoor air. As a result, ATSDR concluded that the remaining TCE in soil and groundwater posed *No Public Health Hazard* (Category 5). Because of concern that vapor intrusion could impact the indoor air of residents located south of these two homes, until the contamination could be further evaluated ATSDR considered the potential exposure to the residents an *Indeterminate Public Health Hazard* (Category 3).

The main contaminant of concern was TCE in the soil and groundwater. The pathway of concern was inhalation of TCE vapors that might migrate into indoor air. While this was not at that time a completed pathway for the residents in homes with subslab depressurization systems, it was a potential completed pathway for homes south of the treated homes. Because residents obtained

their water from municipal sources not affected by this contamination, ingestion of the contaminated groundwater was not a completed exposure pathway.

U.S. EPA Update: This Former Johnson Property site is an U.S. EPA state lead site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: In May 2006, DHFS evaluated the effectiveness of vapor intrusion mitigation systems installed in the two nearby homes by collecting another round of indoor air samples. The results found that these mitigation systems continue to work effectively in preventing completion of the vapor intrusion pathway and this poses a no public health hazard. Additionally, DHFS collected an indoor air sample from a third home and found very low levels of TCE, which posed a no apparent public health hazard. However, as a precautionary measure, DHFS recommended the installation of a mitigation system to interrupt the vapor intrusion pathway, which would result in a no public health hazard. (Chuck Warzecha, DHFS, personal communication with Henry Nehls-Lowe, September 12, 2008)

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site.

5.5.1.4 Former Tannery

The 1.3-acre Former Tannery and now-abandoned site are in east central Milwaukee, near the Kinnickinnic River. At the beginning of the twentieth century the site was a stove shop and foundry. From about 1965 to 1980 it was a tannery. From 1980 to1987 it was used for scrap waste storage and for silver recovery from film—the film was burned to recover the silver. When transformers and cars were dismantled, transformer fluids, other automotive fluids, and gasoline were drained on the property. Although at the time of the ATSDR assessment the site was fenced, illegal dumping and trespassing still occurred. Surface water and shallow groundwater flowed towards the river.

Demographic Data: At the time of the ATSDR assessment over 100 families lived within a short walk to the site.

ATSDR Conclusions: PCBs were present in sufficiently high concentrations in soil and wastes on the property to pose, for people entering the site without personal protection, a *Public Health Hazard* (Category 2). The risk was from direct dermal contact as well as from incidental ingestion and inhalation. In addition, the site could have been contributing to PCB contamination of the Kinnickinnic River, and thus to bioaccumulation in fish. PCB concentrations in fish in this area were sufficiently elevated that fish consumption advisories had been issued for some species.

The asbestos building materials in the yard, the poor condition asbestos insulation on pipes in the building, the chunks of insulation on the floor and in garbage bags, and the friable asbestos in the layer of debris on the building floor all posed a health hazard. The building was open and air flow could transfer asbestos to the outdoors. As of September 1998, removal actions had been completed.

U.S. EPA Update: This Former Tannery site is a non-NPL site and is a Removal Only site – no site assessment work is needed. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0507675 [cited 2008 Oct 27].

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutant PCBs, as well as metals and other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure-related issues.

5.5.1.5 Johnson Controls Incorporated—Badger Facility

At the time of the 2003 and 2006 ATSDR health consultations, the Johnson Controls Incorporated–Badger Facility (JCI) was a 2.8 acre vacant lot in a residential neighborhood in Milwaukee, Wisconsin. The previous plant building operated from 1910 through the 1970s. In 1998, all buildings were removed. In 1999, contractors excavated and thermally treated onsite 9,115 tons of soil contaminated with chlorinated solvents. Vapor intrusion investigations began in 2003.

ATSDR Conclusions: In 2003, and again in 2006, ATSDR concluded that chlorinated solvents were sufficiently concentrated in soil and groundwater to cause vapor migration into nearby residences. Because indoor air data were not available, the site posed an *Indeterminate Public Health Hazard* (Category 3). Elevated levels of contaminants were found in subsurface soils, where people do not have direct contact. Onsite surface soils were not affected and did not pose a health concern unless redevelopment of the property brought people in to direct contact. Groundwater was not consumed as drinking water in this area.

U.S. EPA Update: This Johnson Controls site is a state lead investigation site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: DHFS has learned that the potential for vapor intrusion on the property was ruled out by investigations conducted by a consultant for the developer. The investigation also did not identify any potential vapor intrusion concerns for adjacent, existing residential properties. However, the developer has subsequently withdrawn the redevelopment proposal and the property remains undeveloped. (Robert Thiboldeaux, DHFS, personal communication with Henry Nehls-Lowe, September 8, 2008).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site.

5.5.1.6 Moss-American Co., Inc. (Kerr-McGee Oil Co.)

This 88-acre U.S. EPA NPL site was a wood preserving plant on Milwaukee's northwest side. A 5-mile length of the Little Menomonee River, with associated wetlands, flows through the site. Between 1921 and 1976, the wood-preserving plant used creosote to treat railroad ties. Liquid wastes were discharged directly to the river until 1941, when settling basins were installed. Still, waste discharged from the ponds to the river. In 1971, the company began pretreating its waste and discharging it to a sanitary sewer. Also in 1971, teenagers wading in sediments more than 3 miles downstream from the site received chemical burns, which were determined to have resulted from exposure to creosote-related chemicals originating from the plant. After this incident, warning signs were posted, the waste ponds were dredged and filled, and contaminated sediment along 1,700 feet of the riverbed adjacent to the site was excavated and buried along the west bank of the river. The dredged settling pond sediments were land filled in the northeastern portion of the site. In 1973, sediment was dredged for about 1 mile downstream and also placed in the landfill area along the west bank of the river.

The wood treatment plant closed in 1976. A railroad company thereafter used the western portion of the site for a car loading and storage lot. The remaining 88 acres belong to the Milwaukee County park system.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,587
Females aged 15-44	2,910
Adults 65 and older	1,110

ATSDR Conclusions: In its 1988 health assessment, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). But in 1991, ATSDR concluded that for anyone entering the property or frequenting a length of the Little Menomonee River extending from the site to the river's confluence with the Menomonee River, the site posed a *Public Health Hazard* (Category 2).

As of 1991, site-related chemicals present in onsite soil at levels of concern included the PAHs, phenolic compounds, chlorinated dioxins, arsenic, cadmium, chromium, and lead. Completed exposure pathways were incidental ingestion, dermal absorption, and inhalation of chemicals from soil. The concern was for increased lifetime cancer risk and irritant effects.

Subsequent remedial activities included removal of free product creosote and related wastewater, treatment of the most highly contaminated soils with thermal desorption, and management of site groundwater with a "funnel and gate" process.

Subsequent to the 1991 ATSDR health assessment, U.S. EPA reported significant work to address contaminated soils and groundwater, in addition to previously completed sediment treatment or removal work. The contaminants of concern, which formed the basis for the baseline risk assessment, were eight carcinogenic PAHs (CPAHs). Although dioxin, phenolic compounds, and metals were also detected, these contaminants, relative to the CPAHs, had minimal effect on risk at the site.

U.S. EPA further reported that approximately 5 miles of the Little Menomonee River downstream of the former creosote facility were believed contaminated. Remediation of stream segment 1 occurred in 2002–2003. In 2004, stream segments 2 and 3 were remediated. From November to December 2005, approximately 3,400 cubic yards of sediment were dredged from Segment 4 and transported to the Peoria Disposal facility in Peoria, Illinois.

U.S. EPA Update: In its December 2007 Fact Sheet for the Moss-American site, U.S. EPA stated in part that

> On September 20, 2005, the EPA completed a Five Year Review Report for the site. The review found that the remedy is functioning as intended and is expected to be protective of human health and the environment upon completion. The two following issues were identified in the review: (1) a need for more efficient operation of the funnel and gate groundwater system, (2) proper evaluation and execution of all necessary site institutional controls.

> As of November 2007, sediment management on the 5-mile stretch of Little Menominee River is almost complete, with the last 4,300 feet of Reach 4/5 being the final segment needing cleanup.
>
> U.S. EPA and Wisconsin DNR are considering a proposal from Tronox to enhance groundwater treatment capability through planting trees over a zone of the aquifer where the hydraulic gradient results in particularly slow groundwater movement.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WID039052626.htm. 2007 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutants B[a]A, B[b]F, B[k]F, B[a]P, I[123cd]P, DB[ah], chrysene, dibenzofuran, dioxins, lead, and mercury were identified at this site during ATSDR's assessment of exposure-related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.5.1.7 Northwestern Barrel (Former), (Marina Cliffs)

From 1940 to 1964, Northwestern Barrel operated a barrel reconditioning facility that resulted in the eastern portion of the property becoming contaminated with paint wastes, lead, PCBs, and other chemicals. Chemicals were dumped into pits in this area of the property. Contaminated soils and wastes from the eastern portion were excavated and disposed offsite, but there is some concern regarding the soils around and under the Marina Cliffs Condominiums on the western portion of the former Northwestern Barrel Company property.

Demographic Data: Demographic profiles for vulnerable populations living within 1 mile of this site were not reported for this non-NPL site. In 1998, approximately 1,000 persons lived within 300 yards of the property.

Public Health Outcome Data: Concentrations of three VOCs, ethylbenzene, styrene, and total xylenes, in blood of three nonsmoker residents were compared with those in the third National Health and Nutrition Examination Survey (NHANES). Although one of three residents tested had elevated blood concentrations of these chemicals—which appeared to correlate with increases in indoor and outdoor air concentrations at the location of that person's condominium—the person had no symptoms.

ATSDR Conclusions: In 1997, high levels of lead in surface soil presented an *Urgent Public Health Hazard* to nearby residents. PCBs were also a concern for surface soil. The contaminated soil from the disposal pits was excavated and stockpiled on a prepared clay pad and covered with plastic sheeting. It was then screened to sift out debris before mixing it with cement. These activities released organic vapors. Condominium residents who lived less than 100 yards from these operations complained of noxious odors and of adverse health effects including headaches, sore throats, lethargy, and burning eyes. In 1998 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3) because air coming from the property contained VOCs (including xylene and ethylbenzene) and, although levels of individual chemicals were below levels known to cause illness, residents complained of illness when the odors were strong, and in one person blood samples showed elevated concentrations of several VOCs. By 2002, ATSDR determined that the concentrations of PCBs and lead in surface and

subsurface soils near two of the condominium buildings no longer posed a health concern, even for young children who might have had daily, long-term contact with the soil.

Most remediation was completed in 1995 and 1996; however, some clean up is ongoing.

U.S. EPA Update: This Northwestern Barrel site is a non-NPL site that has been referred for removal pending further assessment. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0505216 [cited 2008 Oct 27].

IJC-critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutants lead and PCBs, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure-related issues.

5.5.1.8 P&G School Bus Service

For an undetermined number of years, school buses and other large vehicles were serviced at this approximately 6-acre site in Milwaukee. In 1995, technicians found debris, solid waste, aboveground storage tanks, containers of waste fluids, oily liquids in storm sewers, burn piles, and stained soils. By 1998, the onsite debris and waste piles remained. Access to much of the property was restricted by a locked chain-link fence. Monitoring data were collected in 1998 as part of a brownfields assessment.

ATSDR Conclusions: Because surface soils had elevated concentrations of some contaminants that could pose a health hazard to people who had frequent contact with the soils, and because SVOCs were found at levels of health concern in surface soils onsite, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). Groundwater at one onsite location contained benzene at levels of concern, but as the groundwater is not a drinking water source. To determine the full extent of contamination before the site was redeveloped, additional monitoring was recommended. Currently, exposure does not seem to be occurring because the site is securely fenced; the concern was for future exposure in the event the site is developed.

U.S. EPA Update: This P & G School Bus Service site is an EPA state lead investigation site and does not appear in CERCLIS.

Wisconsin Department of Natural Resources Update: DNR conducted investigations, in 2000, at the property under the Brownfields Environmental Assessment Program, then provided a written report to the City of Milwaukee. DNR staff reported that the property continues to be undeveloped, and is fenced, but no warning signs have been posted (Binyotti Amungwafor, DNR, Personal Communications with Henry Nehls-Lowe, September 8, 2008).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants hexachlorobenzene, dibenzofuran, B[b]F, B[a]P, DB[ah]A, I[123cd]P, and chrysene were identified at this site.

5.5.1.9 Redi-Quik Dry Cleaners, West Allis, WI

The Redi-Quik Dry Cleaner property is in a West Allis (Milwaukee County) WI residential area. A home adjacent to the Redi-Quik property was evaluated for vapor migration and intrusion impacts. Environmental investigations at the Redi-Quik property found groundwater and soils contaminated with elevated levels of tetrachloroethylene (PCE). In 2001, measurements made by consultants found PCE levels up to 3,900 μg/kg (micrograms per kilogram) at the Redi-Quik

property and 230,000 µg/kg at the residential property. PCE levels at 129,000 µg/kg were found in soil at a monitoring well approximately 10 feet from this house. Monitoring well measurements in 2004 found that shallow groundwater on the Redi-Quik property was contaminated with PCE as high as 45,000 µg/L (micrograms per liter), and 708 µg/L on the residential property.

ATSDR Conclusions: In 2006, ATSDR concluded that elevated levels of tetrachloroethylene (PCE) were detected in the outdoor and indoor air of a West Allis household adjacent to a dry cleaner. Because of a high increased lifetime excess cancer risk, these PCE levels posed a *Public Health Hazard* (Category 2) to residents, but such levels were unlikely to cause noncancer health effects associated with much higher PCE exposures. PCE in soil vapors beneath the home demonstrated that vapor migration and intrusion to indoor air was a completed pathway from the dry cleaner. If the integrity of the basement floor were compromised and similar PCE levels were found in indoor air, these levels were sufficiently elevated to pose to residents a future *Urgent Public Health Hazard* (Category 1). Residents at the home investigated were provided with information to reduce immediately their exposure, and a vapor mitigation system was installed. WDHFS would provide assistance in answering any future questions.

U.S. EPA Update: This Redi-Quik Dry Cleaners site is an EPA state lead investigation site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: On May 5, 2006, a radon mitigation system was installed in the household, and the air exhaust vent on the rear of the dry cleaner was closed. Follow-up air sampling in the home was done 30, 60, and 180 days after the installation of the mitigation system, and PCE levels within the house decreased, respectively, to 10-times lower, 30-times lower, and no-detect. On June 20, 2006, an indoor air investigation of adjacent homes did not find any indication of a vapor intrusion concern coming from the dry cleaner (2006 Jul 25 email from Tim Welch, Shaw Environmental). On November 20, 2006, DNR issued the owner of the dry cleaners a letter of noncompliance regarding the air pollution regulations for dry cleaners, which assisted with addressing worker exposures ([undated] letter from D Rosenthal, Dept of Natural Resources).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site.

5.5.1.10 Robert Betz Trust Co. (Betz, Robert G. Property)

This 4.5-acre property on West Bradley road in Milwaukee operated as a salvage yard from about 1960 to 1994. During that time, asphalt operations were also based on the property, and at various locations excess asphalt was spread on the ground. Following 1994, the property was reportedly used for illegal dumping of waste—including waste oil—and for dismantling of stolen vehicles.

ATSDR Conclusions: Because of physical hazards, ATSDR, in its 1998 health consultation, categorized this site as *a Public Health Hazard* (Category 2). Also in 1999, ATSDR concluded that for people who frequented it, soil contaminants rendered the site a *Public Health Hazard* (Category 2). In 2001, ATSDR concluded on the basis of more recent data that soil contamination required a continuation of the site designation as a *Public Health Hazard* (Category 2).

Arsenic, PAHs, and lead in surface soil were at levels of health concern. In 1999, the buildings were demolished, and debris and solid wastes were hauled away. In 2001, U.S. EPA initiated a time-critical removal action for the property, fenced the site, and completed remediation.

U.S. EPA Update: This Robert Betz Trust Co. site is a non-NPL site and is a Removal Only site—no site assessment work is needed. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0507980 [cited 2008 Oct 27].

Wisconsin Department of Natural Resources (DNR) Update: In 2001, EPA conducted a time-critical removal action on the adjacent residential property that removed elevated levels of arsenic and PAHs and addressed the public health hazard. At that time, EPA also placed a fence around the entire Betz property. In March 2006, Department of Natural Resources (DNR) staff received a supplemental Site Investigation Report, which found that degree & extent of on-site contaminated was more widespread that previously assumed. Since then, the site remains fenced and has not undergone redevelopment. (John Krahling, DNR, Personal communication with Henry Nehls-Lowe, September 8, 2008).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs were identified at this site.

5.5.1.11 Schlitz Park Office Building

In December of 2004, Wisconsin Department of Health and Family Services (DHFS) received odor complaints from occupants of the Bottlehouse B building in the Schlitz Park Office Complex. An investigation discovered that the odor was associated with a sewer relining project underneath the building that employed a "cured in place" technology with resin-impregnated fabric. Air sampling confirmed that the vapor entered through basement cracks and that the odor was Styrene, a major resin component. By March 2005, an exhaust fan placed in the basement near the vapor point of entry helped to reduce measured vapor levels and odors in the building.

ATSDR Conclusions: Indoor air in the Schlitz Park Office building contained airborne styrene levels above guidelines for long-term exposure, as well as other volatile organic compounds. Building occupants reported strong respiratory and mucous membrane effects consistent with elevated VOC levels in the building; consequently, ATSDR classified past conditions at the site as a *Public Health Hazard* (Category 2). Since 2005, however, ventilation and ground thaw have reduced the residual styrene vapors below the building foundation, and further indoor air sampling indicated that the building air quality currently represents *No Apparent Public Health Hazard* (Category 4).

The main onsite contaminant of concern was styrene. During the odor event, pathway for inhalation of styrene vapors was completed. Due to the reduction of vapors, this pathway is no longer a completed pathway.

U.S. EPA Update: This Schlitz Park Office Building site is not a U.S. EPA site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: Exposures to styrene vapors were short term and halted after completion of the re-lining project. Once exposures ended, no further actions were required. (AOC Wisconsin Sites Updates, 2008 Sept 26).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified.

5.5.1.12 Solvay Coke and Gas Company, Milwaukee, WI

The former Solvay Coke site covered about 46 acres of former marsh and waterfront property on East Greenfield Avenue in Milwaukee, at the confluence of the Kinnickinnic and Milwaukee Rivers. From 1902 to 1983, Solvay produced coke and manufactured gas, and at one time operated 200 coke ovens. Coke and gas manufacturing are linked processes resulting in the production of not only coke and fuel gas, but coal tars as well.

After Solvay's 1983 shutdown, Wisconsin Wrecking Company, a concrete recycler, operated from the site, although most of the abandoned Solvay Coke buildings remain. The property lies within a larger, plus 700-acre industrial corridor, along the Lake Michigan waterfront. Information on this site is taken from the 2003 ATSDR health consultation.

ATSDR Conclusions: In 2003, ATSDR concluded that with regard to potential exposure pathways, especially if demolition crews were not experienced in working with hazardous waste, this site was a *Public Health Hazard* (Category 2). But that meant the immediate health threats at the Solvay Coke site were limited because 1) the area was served by municipal water, 2) the property was secured with a chain-link fence, and 3) the nearest residential neighborhood was approximately 1800 feet west of the site.

Contaminated groundwater beneath Solvay Coke was not a then-current drinking water source for humans; thus, contaminated groundwater was not an immediate threat. Nevertheless, buildings on the property contained asbestos pipe insulation that could have dispersed to the environment during building demolition. Deteriorated buildings on the property could also contain imminent structural hazards. The below-surface coal tars were a health threat that could affect future property use. Those health threats included vapor intrusion, direct contact to workers during construction work, and direct contact to users of the adjacent waterway through sediment contact.

U.S. EPA Update: This Solvay Coke and Gas Company site is a non-NPL Superfund Alternative Site. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0508215 [cited 2008 Oct 27]. See also final Community Involvement Plan, Solvay Coke & Gas Site, prepared for U.S. EPA by APEX Direct, Inc., April 2008. Available at: http://www.epa.gov/region5/sites/solvaycoke/pdfs/cip-200804.pdf [cited 2008 Oct 27].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, PAHs, and VOCs were identified at this site.

5.5.1.13 St. Francis Auto Wreckers

This site at 4043 S. Pennsylvania Avenue, St. Francis (Milwaukee County) WI included a fenced auto salvage yard and an unfenced 1.6-acre wooded vacant lot adjacent to a residential neighborhood where children played. Before the salvage business, the site comprised a landfill that accepted foundry sand.

Demographic Data: At the time of the 2002 health consultation, demographic profiles for vulnerable populations living within 1 mile of this site included approximately 100 persons who lived within 300 meters of the property, and about 750 who lived within 600 meters.

ATSDR Conclusions: Because of the presence of hazardous materials in the vacant lot where children play and PCB-contaminated soils in the salvage yard. In 2002 ATSDR categorized this site as a *Public Health Hazard* (Category 2) in 2002.

PCBs and lead were found at elevated levels in soils throughout the salvage yard, but the shallowest samples were 6" deep—too deep to characterize adequately any exposure from surface soil. Although surface soil monitoring in the vacant lot was inadequate, soil samples 6" deep did contain elevated levels of lead and mercury above health-based screening values. Samples taken from 2 feet deep contained PCBs at above health-based screening values. Foundry sand, which could be a source of lead and other heavy metals, was present in the vacant lot. Potential groundwater contamination was to be tested.

U.S. EPA Update: This St. Francis Auto Wreckers site is an EPA state lead site and does not appear in CERCLIS.

Wisconsin Department of Natural Resources Update:

On October 20, 2008, at the request of the Wisconsin Department of Natural Resources, the U.S. Environmental Protection Agency (US EPA) On-Scene Coordinators Stavros Emmanuel and Craig Thomas mobilized the Emergency and Rapid Response Services (ERRS) and the Superfund Technical Assistance and Response Team (START) contractors to the St. Francis Auto Wreckers site, St. Francis, Wisconsin, to remove the imminent and substantial threat posed by the site on the surrounding neighborhood. It is anticipated that the removal action will take 40 working days to complete.

The site is an active auto salvage yard located in a populated, mixed residential and commercial area within the City of St. Francis, Wisconsin. The site covers approximately 115,000 square feet. Previous sampling at the site conducted by the Wisconsin Department of Natural Resources (WDNR), the Wisconsin Department of Transportation (WDOT), and U.S. EPA has shown elevated levels of polychlorinated biphenyls (PCBs), volatile organic compounds, and evidence of buried drums.

Contacts: Stavros Emmanouil (312) 886-1768
Craig Thomas (312) 886-5907

Henry Nehls-Lowe
Division of Public Health
Wisconsin Dept of Health Services
(608) 266-3479

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs and lead were identified at this site.

5.5.1.14 Try Chemical Corp.

This Milwaukee brownfields site is just over 1 acre. The commercial operation that previously occupied it from about 1916 to 1985 did metal finishing, paint stripping, painting, and electroplating. In 1985 the site was abandoned, at which time the U.S. EPA removed processing liquids and waste. In 1997, the City of Milwaukee razed the onsite buildings and filled any basement pits.

Contaminants of Concern in Completed Exposure Pathways: At the time of ATSDR's 2001 health consultation, the IJC-critical pollutants B(a)P and lead were present at concentrations above health-based screening values in subsurface soils. The site was, however, capped with concrete, so completed exposure pathways were eliminated. A few contaminants including vinyl chloride—but not lead—exceeded groundwater screening values, but no contact or ingestion of groundwater was expected.

ATSDR Conclusions: Because of physical hazards, particularly an unfenced terrace at the top a 15-foot retaining wall, in 2001 ATSDR categorized this site as a *Public Health Hazard* (Category 2). Lead and B(a)P and lead were present in subsurface soils, but, as stated, the concrete cap closed off any completed exposure pathways.

U.S. EPA Update: This Try Chemical Corporation site is a non-NPL site for which no further remedial action is planned. Available at: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0505032 [cited 2008 Oct 27].

Wisconsin Department of Health and Family Services Update: In 2005, the City of Milwaukee removed some of the contaminated soils, to level the grade of the property, and demolished all structures on the property, which removed all physical hazards, which previously posed a public health hazard. (Karen Detmer, City of Milwaukee, personal communication with Henry Nehls-Lowe, September 25, 2008).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs and lead were identified at this site.

5.5.2. Summary and Conclusions for the Milwaukee Estuary AOC Hazardous Waste Sites

5.5.2.1 Hazardous Waste Sites

With regard to hazardous waste sites relevant to the Milwaukee Estuary AOC, ATSDR has, at some time in their assessment history, assessed categorized 14 sites as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard health hazard categories 1–3. Eight have completed remediation. As of the date of this report, at four of the sites remediation was ongoing, and at the remaining two sites the remediation status was undetermined.

5.5.2.2 TRI Data

The TRI onsite chemical releases for Milwaukee County in 2001 totaled 2,505,221 pounds, the majority of which were released to air, followed by releases to land. See Table 5.5-B.

IJC-critical pollutants accounted for 10,520 pounds (1%) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 5.5-C.

The major release (≥ 500,000 pounds) of non-IJC chemicals was of hydrochloric acid aerosols to air. The next largest releases (300,000–499,999 pounds) were of hydrogen fluoride (to air), followed by (150,000-299,999 pounds) certain glycol ethers (to air).

5.5.2.3 NPDES Data

As of 2004, quantity average limits were in effect for Milwaukee County, WI. Thus, no NPDES discharge permits have been issued.

5.5.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired at this AOC. Restrictions include resident and migratory fish as posted by the Wisconsin Department of Natural Resources. Although a waterfowl advisory also is in effect, whether the AOC is contributing to contaminant levels in waterfowl is unclear. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

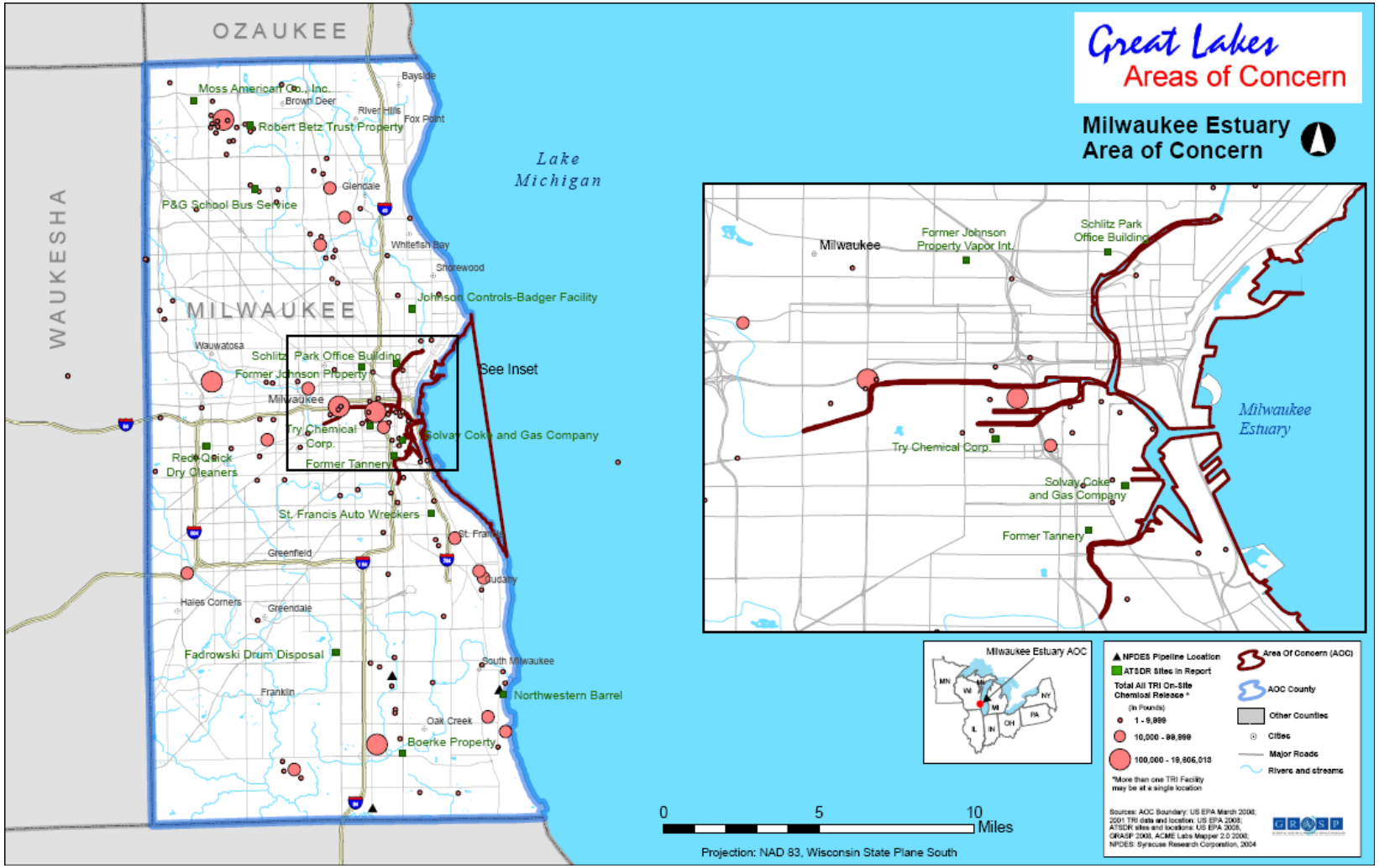

Great Lakes
Areas of Concern
Milwaukee Estuary
Area of Concern
OZAUKEE
WAUKESHA
MILWAUKEE
Lake
Michigan
Moss American Co., Inc.
Brown Deer
Bayside
River Hills
Fox Point
Robert Betz Trust Property
Glendale
P&G School Bus Service
Whitefish Bay
Shorewood
Johnson Controls-Badger Facility
Wauwatosa
Schlitz Park Office Building
Former Johnson Property
Milwaukee
Try Chemical Corp.
Solvay Coke and Gas Company
Former Tannery
See Inset
Red Quick Dry Cleaners
St. Francis Auto Wreckers
St. Francis
Greenfield
Cudahy
Hales Corners
Greendale
Fadrowski Drum Disposal
South Milwaukee
Franklin
Northwestern Barrel
Oak Creek
Boerke Property
Schlitz Park
Office Building
Former Johnson
Property Vapor Int.
Milwaukee
Milwaukee
Estuary
Try Chemical Corp.
Solvay Coke
and Gas Company
Former Tannery
Milwaukee Estuary AOC
MN
WI
MI
NY
IL
IN
OH
PA
NPDES Pipeline Location
AT$DR Sites in Report
Total All TRI On-Site
Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,606,013
*More than one TRI Facility
may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008;
2001 TRI data and location: US EPA 2008;
ATSDR sites and locations: US EPA 2008;
GRASP 2008, ACME Labs Mapper 2.0 2008;
NPDES: Syracuse Research Corporation, 2004
GRASP
0
5
10
Miles
Projection: NAD 83, Wisconsin State Plane South

Table 5.5-B. TRI Releases (in pounds, 2001) for the Milwaukee Estuary AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.0046746	No data	0	0	0.0046746	0.0147735	0.0194481
(PCDDs and PCDFs)	3							
LEAD	8	4264.64	15	0	10	4289.64	16968.4377	21258.0777
LEAD COMPOUNDS	8	1434.476	2695.3	0	1954	6083.776	7415.59	13499.366
MERCURY COMPOUNDS	9	139.4	0.014	0	7.1	146.514	45.9468674	192.4608674
	Total IJC	**5838.520675**	**2710.3**	**0**	**1971.1**	**10519.93467**	**24429.98934**	**34949.92402**
1,2,4-TRIMETHYLBENZENE		8962	0	0	0	8962	0	8962
4,4'-ISOPROPYLIDENE-DIPHENOL		557	No data	0	0	557	4043	4600
ACETALDEHYDE		111694	5	0	0	111699	No data	111699
ACRYLIC ACID		757	No data	0	0	757	0	757
ACRYLONITRILE		5	No data	0	0	5	1308	1313
ALUMINUM (FUME OR DUST)		6026	No data	0	0	6026	102422	108448
AMMONIA		34009	1000	0	14	35023	0	35023
ANTIMONY COMPOUNDS		1	No data	0	0	1	0	1
ARSENIC COMPOUNDS		10	No data	0	0	10	10397	10407
BARIUM		13	No data	0	0	13	1218	1231
BARIUM COMPOUNDS		3500	29	0	140000	143529	921900	1065429
BENZENE		330	0	0	0	330	0	330
BENZO(G,H,I)PERYLENE		10.85	No data	0	0.21	11.06	1.2679	12.3279

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On and Offsite Releases
BUTYL ACRYLATE		1620	No data	0	0	1620	0	1620
CADMIUM COMPOUNDS		10	No data	0	0	10	6998	7008
CERTAIN GLYCOL ETHERS		224074	No data	0	0	224074	9882	233956
CHLORINE		255	250	0	0	505	0	505
CHLOROFORM		1000	No data	0	0	1000	0	1000
CHLOROMETHANE		6320	No data	0	0	6320	No data	6320
CHROMIUM		2024	5	0	0	2029	171376	173405
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		2958	5	0	0	2963	553545	556508
COBALT		0	No data	0	0	0	250	250
COPPER		5034	28	0	0	5062	33563	38625
COPPER COMPOUNDS		584	4800	0	3850	9234	30414	39648
CUMENE HYDROPEROXIDE		0	No data	0	0	0	272	272
CYANIDE COMPOUNDS		505	No data	0	0	505	0	505
CYCLOHEXANE		1200	No data	0	0	1200	0	1200
DICHLOROMETHANE		25705	No data	0	0	25705	7897	33602
DIETHANOLAMINE		16	No data	0	0	16	257	273
DIISOCYANATES		10	No data	0	0	10	2167	2177
EPICHLOROHYDRIN		526	No data	0	0	526	0	526
ETHYL ACRYLATE		603	No data	0	0	603	0	603

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On and Offsite Releases
ETHYLBENZENE		5163	0	0	0	5163	7	5170
ETHYLENE GLYCOL		250	No data	0	0	250	0	250
FORMIC ACID		5424	0	0	0	5424	0	5424
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		924255	No data	0	0	924255	0	924255
HYDROGEN FLUORIDE		401319	No data	0	0	401319	0	401319
MANGANESE		7148	10	0	0	7158	291841	298999
MANGANESE COMPOUNDS		249	11	0	38000	38260	71685	109945
METHANOL		26511	No data	0	0	26511	0	26511
METHYL ETHYL KETONE		24035	No data	0	0	24035	1	24036
METHYL ISOBUTYL KETONE		90108	No data	0	0	90108	0	90108
METHYL METHACRYLATE		6457	No data	0	0	6457	0	6457
METHYL TERT-BUTYL ETHER		755	No data	0	0	755	0	755
NAPHTHALENE		1833	No data	0	0	1833	0	1833
N-BUTYL ALCOHOL		43410	No data	0	0	43410	152	43562
N-HEXANE		3706	0	0	0	3706	0	3706
NICKEL		2223	10	0	0	2233	57949	60182
NICKEL COMPOUNDS		577	1205	0	0	1782	28801	30583
NITRATE COMPOUNDS		571	64	0	17	652	1530	2182
NITRIC ACID		3908	No data	0	250	4158	1000	5158
N-METHYL-2-PYRROLIDONE		21033	No data	0	0	21033	0	21033

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On and Offsite Releases*
OZONE		0.075	0	0	0	0.075	No data	0.075
PHENOL		0	No data	0	0	0	189	189
PHTHALIC ANHYDRIDE		376	No data	0	0	376	2374	2750
POLYCYCLIC AROMATIC COMPOUNDS		893.87	0	0	1.21	895.08	7.146	902.226
SILVER		0	No data	0	0	0	5	5
SODIUM NITRITE		0	No data	0	0	0	5916	5916
STYRENE		47732	No data	0	0	47732	3924	51656
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		45331	No data	0	1500	46831	0	46831
TETRACHLORO-ETHYLENE		12200	No data	0	0	12200	0	12200
TOLUENE		88873	1	0	0	88874	22	88896
TRICHLOROETHYLENE		18684	No data	0	0	18684	0	18684
TRIETHYLAMINE		255	No data	0	0	255	0	255
VANADIUM COMPOUNDS		571	No data	0	5500	6071	35780	41851
XYLENE (MIXED ISOMERS)		68958	1	0	0	68959	37	68996
ZINC COMPOUNDS		2824	1593	0	2600	7017	94166	101183
	Total Non-IJC	**2293951.795**	**9017**	**0**	**191732.42**	**2494701.215**	**2453296.414**	**4947997.629**
	Total	**2299790.316**	**11727.314**	**0**	**193703.52**	**2505221.15**	**2477726.403**	**4982947.553**

Table 5.5-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Milwaukee Estuary AOC

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	3			
Milwaukee County, WI	3	OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE
		WABASH ALLOYS L.L.C.	53154BSHLL9100S	OAK CREEK
Lead and lead compounds	34			
Milwaukee County, WI	34	ACME GALVANIZING INC.	53215CMGLV2730S	MILWAUKEE
		ALUMINUM CASTING & ENG. CO.	53207LMNMC2039S	MILWAUKEE
		ARTISTIC PLATING	53212RTSTC428WV	MILWAUKEE
		COOPER POWER SYS. KYLE DISTRIBUTION SWITCHGEAR	53172CPRPW2800N	SOUTH MILWAUKEE
		DELPHI DELCO ELECTRONICS SYS. MILWAUKEE	53154DLCLC7929S	OAK CREEK
		DYNASTY DIV. C&D TECHS.	53212JHNSN900EK	MILWAUKEE
		EGS ELECTRICAL GROUP APPLETON	53172PPLTN2105S	SOUTH MILWAUKEE
		EVERBRITE INC.	53172VRBRT315MA	SOUTH MILWAUKEE
		GE CO. MEDICAL SYS.	53219GMDCL4855W	WEST MILWAUKEE
		GE MEDICAL SYS. INFORMATION TECHS.	53223MRQTT8200W	MILWAUKEE
		GREDE FOUNDRIES INC. LIBERTY PLANT	53213GRDFN6432W	WAUWATOSA
		GREDE FOUNDRIES INC. MILWAUKEE STEEL FNDY.	53204GRDFN1320S	MILWAUKEE
		JOHNSON CONTROLS BATTERY GROUP INC.	53209JHNSN5400N	MILWAUKEE
		KRAMER INTL. INC.	53204KZMRN114EP	MILWAUKEE
		KRONES INC.	53132KRNSN9600S	FRANKLIN

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		MASTER LOCK CO.	53210MSTRL2600N	MILWAUKEE
		MID-CITY FNDY.	53204MDCTY1521W	MILWAUKEE
		MILWAUKEE COUNTY POWER PLANT	53226MLWKC9250W	WAUWATOSA
		MILWAUKEE DUCTILE IRON INC.	53214BRGGS1706S	WEST ALLIS
		MILWAUKEE ELECTRONICS CORP.	53209PHLPS5855N	GLENDALE
		MILWAUKEE GRAY IRON L.L.C.	53214BRGGS1501S	WEST ALLIS
		OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		PHOENIX ENGINEERED PRODS. INC.	53207PHNXN1924S	MILWAUKEE
		PRESSED STEEL TANK CO. INC.	53214PRSSD1445S	WEST ALLIS
		ROCKWELL AUTOMATION INC.	53204LLNBR1201S	MILWAUKEE
		ROCORE INDS. INC.	53132RCRND9845S	FRANKLIN
		STROH DIE CASTING CO. INC.	53222STRHD11123	WAUWATOSA
		STUDIO ONE ART GLASS INC.	53172STDNR1333M	SOUTH MILWAUKEE
		TULIP CORP.	53212TLLCR714EK	MILWAUKEE
		UNIT DROP FORGE CO. INC.	53219NTDRP1903S	MILWAUKEE
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE
		VULCAN LEAD INC.	53204VLCNL1400W	MILWAUKEE
		WABASH ALLOYS L.L.C.	53154BSHLL9100S	OAK CREEK
		WISCONSIN PAPERBOARD CORP.	53211WSCNS1514E	MILWAUKEE
Mercury and mercury compounds	2			
Milwaukee County, WI	2	OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE

5.6. Sheboygan River AOC, Sheboygan County, WI

The Sheboygan River AOC comprises the lower Sheboygan River downstream from the Sheboygan Falls Dam and the entire harbor and near shore waters of Lake Michigan (see AOC map at end of Chapter 5 and in Appendix 2).

5.6.1. Hazardous Waste Sites Relevant to the Sheboygan River AOC

ATSDR evaluated data for two hazardous waste sites in Sheboygan County, WI and reached conclusions regarding the public health threat posed by these sites. Table 5.6-A summarizes these conclusions, together with information regarding the type and location of the sites and the date and type of assessment document that pertains to them.

Table 5.6-A. Hazardous Waste Sites in Sheboygan County, WI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Kohler Company Landfill, KohlerWID006073225	HA HA	1989 1995	3 2	NPL	Ongoing
Sheboygan River and Harbor WID980996367	HA	1988	2	2	Ongoing

2 = Public Health Hazard, 3 = Indeterminate Public Health Hazard, HA = Public Health Assessment

ATSDR conducted a further evaluation of the data for these sites, which is summarized in the following sections.

5.6.1.1 Kohler Company Landfill

This 40-acre landfill was a disposal site for the Kohler Company, a manufacturer of bathroom fixtures and small engines. The site abuts the Sheboygan River floodplain. The east half of the landfill was built in the historic floodplain, but has filled up to 40 feet above its original elevation. The Sheboygan River borders the site on the south and east and 4.2 miles downstream of the site empties into Lake Michigan. Past disposal practices (mid 1950s through the 1970s) included pouring liquid slurries containing solvents, hydraulic oils, and metals into pits on the site and filling the remainder with foundry sand and other solid and hazardous wastes. Beginning in 1975, however, liquid hazardous wastes were no longer disposed at the site. Since 1980, solid hazardous wastes are no longer disposed at the site.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	119
Females aged 15-44	310
Adults 65 and older	184

ATSDR Conclusions: In its 1989 public health assessment, ATSDR categorized this site as an *Indeterminate Health Hazard* (Category 3). In 1995, because PCBs in the floodplain and sediments adjacent to the Kohler Company Landfill posed a health hazard due to bioaccumulation through the food chain, ATSDR categorized this site as a *Public Health Hazard* (Category 2). Whether the PCB contamination is site-related is, however, is uncertain.

PCBs had been found at high concentrations—above the FDA standard of 2 ppm—in fish from the Sheboygan River and at even higher concentrations in tissues of mallard ducks caught in Sheboygan County. Do-Not-Eat advisories had been issued for some species of fish and ducks.

PCBs had also been found at levels of concern in waste and soil of the landfill. But whether PCBs had migrated to leachate or were present in surface water runoff was unknown—these media had not been monitored for PCBs. Leachate flowed toward the river, and surface water runoff drained directly into the Sheboygan River. PCBs were found in unfiltered samples from the shallow aquifer groundwater monitoring wells, and groundwater flow appeared to be toward the river. Because a significant PCB source was also upstream from the Kohler Landfill, the source of PCBs in the floodplain and in the sediments adjacent to the Kohler Company Landfill was uncertain. VOCs (including vinyl chloride) and lead were present in groundwater at levels of concern, but the groundwater did not supply residential wells water, and the groundwater's discharge into the river did not result in harmful levels of exposure to people who swam or fished there. Remedial activities completed since ATSDR's 1995 assessment included installation of a multi-layer soil cap over the entire landfill, collection of groundwater and leachate within a perimeter drain along the southern and eastern margins of the landfill, and pumping of the collected groundwater and leachate to the City of Sheboygan's publicly-owned treatment works. Thus, future adverse health impacts from the site appear to have been minimized.

U.S. EPA Update: In its April 2008 Fact Sheet for the Kohler Company site, U.S. EPA stated in part that

> Contaminated groundwater and leachate, collected by the perimeter drain, is being pumped to the City of Sheboygan's publically-owned treatment works for treatment and eventual discharge. The perimeter drain system is intercepting over 95 percent of the horizontal flux of groundwater in the upper aquifer, resulting in the collection and treatment of 14,400 gallons of contaminated liquid per day. Construction of this system is complete. A second five-year review was conducted for this site on September 20, 2007. The remedy remains protective of human health and the environment. The next five-year review is due in September 2012.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WID006073225.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.6.1.2 Sheboygan River and Harbor

This site extends over 8 miles of the Sheboygan River downstream from the Sheboygan Falls dam and from the falls area downstream through the City of Sheboygan into Lake Michigan. The site also includes the Sheboygan Harbor area to the outer edge of the breakwaters. The Sheboygan River watershed encompasses an area of about 1,120 square kilometers at the midpoint of Wisconsin's Lake Michigan shore. The region is a mixture of residential, industrial, agricultural, commercial, and natural areas.

In 1974, the U.S. EPA determined that sediments in the upper portion of the federal navigation channel upstream of the river mouth were too polluted with heavy metals to permit their disposal into Lake Michigan. In 1977, because of high PCB levels in fish, the Wisconsin Department of Natural Resources (DNR) and the-then Wisconsin Division of Health issued a fish consumption advisory for the Sheboygan River. In 1987, a waterfowl consumption advisory was issued for this same area. In 1985, the site was proposed for inclusion on the National Priority List.

ATSDR Conclusions: Because of contamination in sediment, water, soil, fish, and waterfowl, ATSDR categorized this site as a *Public Health Hazard* (Category 2) in a 1988 public health assessment. In Sheboygan River fish, PCBs had been found at high concentrations (i.e., above the FDA standard of 2 ppm), and in tissues of mallard ducks caught in Sheboygan County, OCBs had been found at even higher concentrations. The State of Wisconsin issued Do-not-eat advisories for some fish and duck species.

U.S. EPA Update: In its April 2008 Fact Sheet for the Sheboygan River and Harbor site, U.S. EPA stated in part that

> In 1986, the United States Environmental Protection Agency (U.S. EPA) and the state signed a Consent Order with the PRP, requiring the PRP to conduct an investigation at the site to determine the nature and extent of contamination. From 1989 to 1990, the PRP dredged approximately 5,000 cubic yards of contaminated sediments from the upper Sheboygan River. The PRP stored the sediments in two containers onsite: a confined treatment facility (CTF) and a sediment management facility (SMF). The CTF was used for biodegradation studies to evaluate the feasibility of biodegradation of PCBs in place. The SMF was designed for temporary storage of the remaining dredged sediments until they could be disposed of properly. During the period between 1989 and 1990, eight other sediment deposits were "armored" in the upper Sheboygan River. These areas were covered with several layers of geotextile fabric, run of bank material, and cobble and wire cages, filled with rock (gabions), in order to prevent the PCB-contaminated sediment from moving downstream.
>
> The Record of Decision was signed on May 12, 2000, calling for the removal of approximately 21,000 cubic yards of PCB-contaminated sediment from the upper river, 50,000 cubic yards of PCB-contaminated sediment from the inner harbor, removal of PCB-contaminated soil from the floodplains adjacent to the river, long-term monitoring of sediment and fish for the entire river, and additional groundwater/preferential

pathway/source investigations at the Tecumseh plant facility. The estimated cost of the remedy is $41 million.

In fall 2001, Tecumseh Products Company under a separate agreement disposed of approximately 3,800 cubic yards of PCB-contaminated sediment that had been stored in the CTF and SMF. Offsite removal and disposal of these stored sediments comprised one of the components of the ROD, signed in May 2000.

A consent decree with Tecumseh Products Company for development of the remedial design and implementation of the remedial action for the upper river sediment, floodplain soil, and facility investigations was completed. The PRPs finalized the remedial design for Phase 1 of the upper river. This portion of the remedy included removal and offsite disposal of PCB-contaminated soils present at the Tecumseh facility. It also included construction of a groundwater trench at the Tecumseh facility to deal with contaminated groundwater. Remedial action for Phase 1 Upper River began in 2004.

The Phase II Upper River work is being implemented by Pollution Risk Services, which bought the former Tecumseh facility. This work includes the near-shore areas, armored areas (river edges reinforced to prevent erosion) and soft sediments. Phase II work was initiated in June, 2006. Near shore sediments and armored areas were excavated and properly disposed of by October, 2006. Soft sediment dredging in the upper river continued through November 2006. Phase II Upper River soft sediment dredging operations were re-initiated May 2007 and went through October 2007. As of October 2007 sediment dredging in the Upper River was completed. Additionally, the PRP will initiate sample collection and re-characterization of soft sediment deposits for the middle river, Lower River and Inner Harbor in the summer of 2008.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WID006073225.htm. 2008 Apr [cited 2008 Aug 07].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PCBs, PAHs, and mercury were identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.6.2. Summary and Conclusions for the Sheboygan River AOC Hazardous Waste Sites

5.6.2.1 Hazardous Waste Sites

ATSDR assessed two hazardous waste sites in Sheboygan County, WI—the Kohler Company Landfill site and the Sheboygan River and Harbor site—because both were associated with PCB contamination. Several remedial measures have already helped to reduce human exposures to the

pollution at the Kohler Company and the Sheboygan River and Harbor sites, but mitigation remains ongoing.

5.6.2.2 TRI Data

The TRI onsite chemical releases for Sheboygan County in 2001 totaled 575,909 pounds, the majority of which were released to air. See Tables 5.6-B and 5.6-C

IJC-critical pollutants accounted for 9,695 pounds (1.7 %) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury (to air).

The highest onsite release of non-IJC chemicals was of hydrochloric acid aerosols (300,548 pounds) to air. No other chemicals were release in quantities ≥ 150,000 pounds.

5.6.2.3 NPDES Data

The NPDES permitted discharges for Sheboygan County, WI are summarized in Table 5.6-D. The average annual permitted discharges in 2004 totaled 7,760 pounds, the majority of which was ammonia nitrogen.

The IJC-critical pollutant lead (65.7 pounds) was permitted to be discharged. The facility permitted to release this pollutant is listed in Table 5.6-E.

5.6.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed for this AOC site. PCB concentrations in river sediment are cited as contributing to the problem. A Do-Not-Eat consumption advisory is in effect for resident fish in the Sheboygan River. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

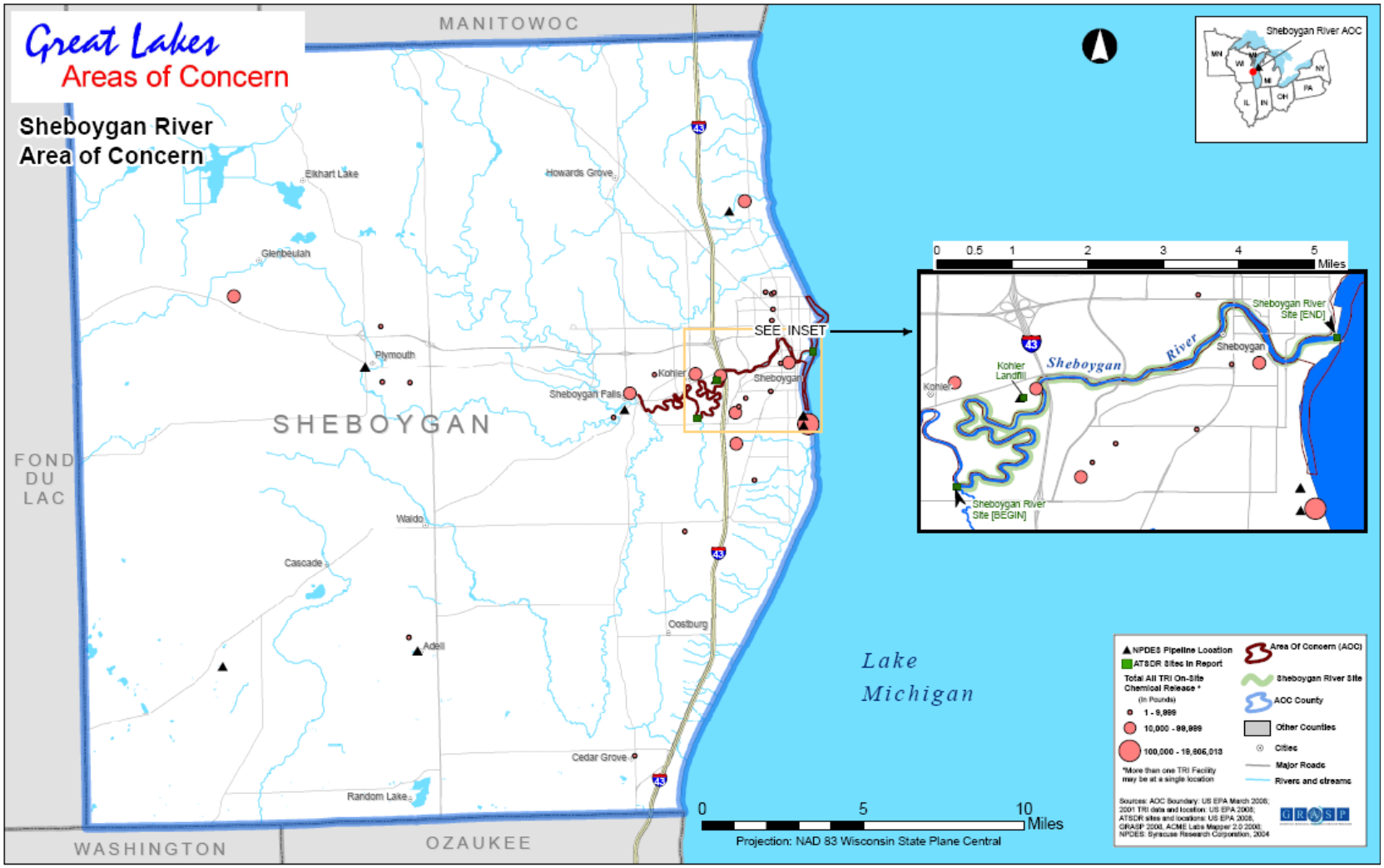

Great Lakes
Areas of Concern
Sheboygan River
Area of Concern
MANITOWOC
SHEBOYGAN
FOND DU LAC
WASHINGTON
OZAUKEE
Elkhart Lake
Howards Grove
Glenbeulah
Plymouth
Sheboygan Falls
Kohler
Sheboygan
SEE INSET
Waldo
Cascade
Adell
Oostburg
Cedar Grove
Random Lake
Lake Michigan
0 5 10 Miles
Projection: NAD 83 Wisconsin State Plane Central
Sheboygan River AOC
0 0.5 1 2 3 4 5 Miles
Sheboygan River Site [END]
Sheboygan River Site [BEGIN]
Kohler Landfill
Sheboygan River
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 18,606,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Sheboygan River Site
AOC County
Other Counties
Cities
Major Roads
Rivers and streams

Table 5.6-B. TRI Releases (in pounds, 2001) for the Sheboygan River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.009368604	No data	0	0	0.009368604	0	0.009368604
(PCDDs and PCDFs)	3							
LEAD	8	9319.238	14.85	0	8.5	9342.588	11332.45	20675.038
LEAD COMPOUNDS	8	124	0	0	0	124	7007	7131
MERCURY	9	228.22	0	0	0	228.22	40.6	268.82
	Total IJC	**9671.467369**	**14.85**	**0**	**8.5**	**9694.817369**	**18380.05**	**28074.86737**

Table 5.6-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Sheboygan River AOC

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	1			
Sheboygan County, WI	1	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN
Lead and lead compounds	13			
Sheboygan County, WI	13	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN
		J. L. FRENCH CORP. TYLR	53082JLFRN3101S	SHEBOYGAN
		J.L. FRENCH CORP. GTWY	53081JLFRN4243G	SHEBOYGAN
		KOHLER CO. - VITREOUS CHINA & POTTERY	53044KHLRC444HB	KOHLER
		KOHLER CO. BRASS DIV.	53044KHLRC444HC	KOHLER
		KOHLER CO. CAST IRON DIV.	53044KHLRC444HA	KOHLER
		KOHLER POWER SYS. AMERICAS	53083KHLRCCOUNT	SHEBOYGAN
		MILLENNIUM TECHS. L.L.C.	53073MLLNM1404P	PLYMOUTH
		PLASTICS ENG. CO.	53081PLSTC1607G	SHEBOYGAN
		PLASTICS ENG. CO.	53083PLSTC2732N	SHEBOYGAN
		SHEBOYGAN PAINT CO.	53081SHBYG1439N	SHEBOYGAN
		THOMAS COMPRESSORS & VACUUM PUMPS	53081THMSN1419I	SHEBOYGAN
		WILLMAN INDS. INC.	53013WLLMN338SM	CEDAR GROVE
Mercury and mercury compounds	1			
Sheboygan County, WI	1	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN

Table 5.6-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Sheboygan River AOC

Chemical	*IJC Tracking Number*	*Discharge*
LEAD, TOTAL (AS PB)	8	65.7
	Total IJC	**65.7**
CADMIUM, TOTAL (AS CD)		10.95
CHROMIUM, TOTAL (AS CR)		259.15
COPPER, TOTAL (AS CU)		313.90
CYANIDE, TOTAL (AS CN)		98.55
NICKEL, TOTAL (AS NI)		361.35
NITROGEN, AMMONIA TOTAL (AS N)		6387.50
SILVER, TOTAL (AS AG)		36.50
ZINC, TOTAL (AS ZN)		226.30
	Total Non-IJC	**7694.20**
	Total	**7759.90**

Table 5.4-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Sheboygan River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Lead and lead compounds	1			
Sheboygan County, WI	1	KOHLER CO	WI0000795	KOHLER

5.7. ower Green Bay and Fox River AOC (Fox River/Southern Green Bay AOC), Brown County, WI

In addition to the names in the section heading, this AOC also is also known as the Lower Fox River and Green Bay AOC. The AOC consists of the lower 11.2 km of the Fox River below the De Pere Dam, as well as a 55 km^2 area of southern Green Bay out to Point au Sable and Long Tail Point (see AOC map at end of chapter and in Appendix 2).

5.7.1. Hazardous Waste Sites Relevant to the Sheboygan River AOC

ATSDR has evaluated the data for hazardous waste sites in Brown County, WI and reached conclusions regarding the public health threat posed by these sites. These conclusions are summarized in Table 5.7-A, together with information regarding the type and location of the site, and the date and type of assessment document, are summarized in Table 5.7-A.

Table 5.7–A. Hazardous Waste Sites in Brown County, WI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Better Brite Plating Co. Chrome and Zinc, De Pere, WIT560010118	HC SRU	1996 1998	2 2	NPL	Completed
Econo Care Cleaners, Green Bay WID065453730	HC	2006	3	Non NPL	Completed
Fox River NRDA/PCB Releases, Green Bay WI0001954841	HA	2006	2	Proposed to the NPL	Ongoing
Scray's Hill, Ledgeview WIN000508277	HC	2002	3	Non NPL	To be Determined
V & L Stripping, Green Bay WID168105591	HC	2003	3	Non NPL	To be Determined

2 =Public Health Hazard 3= Indeterminate Public Health Hazard, HA = Public Health Assessment, HC =Health Consultation, SRU=Site Review and Update

ATSDR has conducted further evaluation of the site data, which is summarized in the following section

5.7.1.1 Better Brite Plating Co.

The two properties, Better Brite Chrome and Better Brite Zinc shops, are about 2,000 feet apart in a mixed industrial and residential neighborhood in De Pere (Brown County) Wisconsin. From 1963 through 1989, chromium, cadmium, zinc, cyanide, and chlorinated organic solvents were used in metal plating operations at both plating shops. Waste disposal practices at the two shops resulted in contaminated soil, air, surface water, and groundwater. The site was the subject of a

1996 ATSDR health consultation and a 1998 site review and update that evaluated seepage into a residential basement.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	893
Females aged 15-44	3,040
Adults 65 and older	1,338

ATSDR Conclusions: Chromium, and particularly chromium (VI), as well as cyanide, VOCs, and zinc were associated with the site. Chromium (VI) was detected in offsite groundwater, surface water, and soil.

In both of its site evaluations, ATSDR found this site was a *Public Health Hazard* (Category 2). The 1998 site review and update indicated that the immediate health hazards had been addressed and that actions to address future health hazards had been planned

Nevertheless, chromium (VI) remained a problem at this site. ATSDR recommended restrictions on residential and worker contact with chromium (VI) and contaminated matter processing (water or soil) methods that would prevent exposure.

As of 1998, however, contaminants in subsurface soil continued to migrate into offsite groundwater. This posed a possible future health risk to people who could contact water as it came to the surface, as it accumulated in sumps of nearby basements, or as it crystallized on basement walls near the site. Remediation occurred in 2000, and groundwater monitoring continues annually.

U.S. EPA Update: In its December 2006 Fact Sheet for the Better Brite Plating site, U.S. EPA stated in part

> U.S. EPA has completed two five-year reviews one in November 1999 and the most recent in November 2004. The five-year review consisted of a Site inspection and review of relevant documents. The five-year review concluded that there was no information that calls into question the protectiveness of the remedy. The five-year review also indicated that stabilized chromium in soil remains at the properties under structures and asphalt and that the groundwater standards have not been achieved in the area around the Site, and that this needs to be officially recorded for this property. The five-year review recommended that WDNR and EPA continue implementing the September 24, 1996 ROD.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WIT560010118.htm. 2006 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead was identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.7.1.2 Econo Care

Although today the Econo Care site is a vacant lot in a Green Bay (Brown County) WI mixed residential and industrial neighborhood, a drycleaners previously operated there. Groundwater underneath the site and the nearby residential area became contaminated with tetrachloroethylene (PCE). The possibility that low levels of PCE could migrate offsite and intrude into the indoor air of nearby residences concerned both the residents and the Wisconsin Department of Health and Family Services.

ATSDR Conclusions: In 2006, ATSDR concluded that for nearby residents the site posed an *Indeterminate Health Hazard* (Category 3). ATSDR said more information was needed to determine confidently the amount of exposure from vapor intrusion into indoor air. ATSDR added, however, that if residences were built on nearby properties, vapor intrusion into indoor air from PCE contamination underneath the site did pose a future health hazard.

The contaminants of concern were tetrachloroethylene (PCE) and trichloroethylene (TCE). The completed exposure pathway at this site was inhalation of PCE via vapor intrusion from contaminated soil and groundwater beneath residential properties south of the Econo Care site into the indoor air of nearby residences. Ingestion of the contaminated groundwater was not a completed exposure pathway—residents obtained their water from municipal sources not affected by this contamination.

U.S. EPA Update: This Econo Care site is EPA state lead investigation site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: On December 12, 2006, an active vapor mitigation system was installed in one house, and the potential vapor intrusion pathway was eliminated. Recent data determined vapor intrusion was not likely at the other house; thus, no mitigation system was necessary (Rob Thiboldeaux, Dept of Health Services, personal communication with Henry Nehls-Lowe, 2008 Sept 8).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, none of the IJC-critical pollutants were identified at this site.

5.7.1.3 Fox River NRDA/PCB Releases

The Fox River Natural Resources Damage Assessment (NRDA)/PCB Releases site comprises the Lower Fox River from Lake Winnebago downstream to the Bay of Green Bay in Lake Michigan. The banks of the Lower Fox River hold the highest concentration of pulp and paper mills in the world. PCBs released from seven pulp and paper companies contaminated river sediments. Of all the hazardous waste sites around Lake Michigan, this site contributes the most PCBs to the lake. Before abatement, approximately 600,000 pounds of PCBs were released into Fox River, of which 160,000 pounds entered Green Bay and Lake Michigan. Although in the early 1970s the pulp and paper mills stopped releasing PCBs into the river, the contamination persists and has bioaccumulated into the food chain. Fish consumption advisories issued in 1976 are still in effect for many fish species. Some 90% of the total PCB mass and a large percentage of the contaminated sediments are in the Fox River's final course from the De Pere Dam downstream to Green Bay.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of the Fox River Paper Company site:

Children 6 years and younger	57

Females aged 15-44	112
Adults 65 and older	140

Demographic profiles for vulnerable populations for the entire site were not provided. But the ATSDR health assessment stated that the total population residing in the communities along the river is approximately 270,000. Thus the vulnerable populations are likely much larger than those reported as living near the Fox River Paper Company.

ATSDR Conclusions: Eating contaminated fish taken from that part of the Fox River in the site area exposed people to PCB concentrations at or above levels of concern, ATSDR therefore categorized this site as a *Public Health Hazard* (Category 2).

The primary public health hazard for the Fox River NRDA/PCB Releases site was high levels of PCBs in fish due to bioaccumulation in the food chain from PCB-contaminated sediment. Fish advisories were issued, but some people might not be aware of them, might eat the fish, and become exposed to PCBs at levels that could cause adverse health effects. Eating other PCB-contaminated wildlife, such as waterfowl and snapping turtles, might also have been of health concern, but less was known about consumption frequency. Through pathways other than fish bioaccumulation, PCB concentrations in sediments were judged insufficient to be of health concern.

Initial remediation of PCB-contaminated sediment, which includes dredging and capping, began in 1999 and, as of the date of this report, was ongoing.

U. S. EPA Update: In its April 2008 Fact Sheet for the Fox River NDRA/PCB Releases site, the U.S. EPA stated in part that

> A Proposed Plan for possible modification of the 2003 Record of Decision for OU [Operable Unit] 2-5 was issued November 13, 2006. A comment period ended January 11, 2007. After consideration of public comments, EPA issued a final Record of Decision Amendment on June 26, 2007. The final decision modified the original remedy from dredging 7.1 million cubic yards and capping 500,000 cubic yards, to dredging 3.5 million cubic yards and placing cap or sand cover 3.7 million cubic yards of PCB contaminated sediment. EPA considers this modified approach to be protective, while allowing the remedy to be completed sooner and at less cost ($390 million for the revised remedy versus $580 million for the previously planned remedy).
>
> A Proposed Plan for possible modification of the 2002 Record of Decision for OU 1 was issued November 26, 2007. This Proposed Plan was similar to the one for OU 2-5 discussed in the above paragraph substituting some dredging with capping and sand covering. The comment period for the Proposed Plan for OU 1 ended January 31, 2008. EPA is presently considering comments and will be issuing a final decision.

Available at: http://www.epa.gov/region5superfund/npl/wisconsin/WI0001954841.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant PCBs was identified at this site. For a more

complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.7.1.4 Scray's Hill, Ledgeview

The Wisconsin Department of Natural Resources (DNR) requested that the state's Department of Health and Family Services (DHFS) evaluate a redevelopment proposal for the Paul Van Dreel Property on Scray Hill Road in the town of Ledgeview. The town proposed this former salvage yard as a water storage and distribution facility for its planned public water supply system. The DNR requested that DHFS identify possible effects on public health and safety based on the limited information available. The property had not been sampled, but no spills on the property had been reported. Because the intended future use of the property would not provide exposure opportunities, the redevelopment proposed by the town of Ledgeview was expected to be protective of public health. Nevertheless, to ensure against any future health hazards, some actions were needed. These actions were likely to be consistent with the existing plans for redevelopment of the property.

ATSDR Conclusions: Because the lack of environmental data made determination of a potential public health risk difficult, ATSDR classified this site as an *Indeterminate Public Health Hazard* (Category 3). In 2002, Wisconsin Department of Health and Family Services (WDHFS) and ATSDR concluded that the proposed redevelopment of this property was not expected to create a public health hazard. WDHFS also advised that locating a public water system reservoir and supporting infrastructure on this property would not compromise the quality or safety of the water supply.

Surface soil contamination in a salvage yard (commonly metals and PAHs) can potentially pose a direct contact threat if frequent access to such materials is not controlled. Because of the limited mobility of these potential contaminants, prevention of direct contact exposures can be relatively simple. If, however, hot spots of solvent contamination are found on the property, offsite groundwater/drinking water protection might have broader implications, but still would not affect the intended property use.

The City of Ledgeview and the Wisconsin Department of Natural Resources agreed to follow the redevelopment plan, and to take the appropriate precautions as recommended, and to ensure any construction and redevelopment of the property is protective of public health.

U.S. EPA Update: This Scray Road Redevelopment site is an EPA state lead investigation site and does not appear in CERCLIS.

Wisconsin Department of Health and Family Services Update: Later in 2002, after the release of the health consultation, DNR conducted a Preliminary Assessment and Site Investigation (PASI) of the site under the EPA Superfund program. The PASI tested for contamination in soils, surface water and groundwater on and adjacent to the site. The investigation found that six private well were contaminated with trichloroethylene (TCE) above the MCL that originates from the property. Health advisory letters were sent to the owners of these six private wells. Low levels of contamination was also found in onsite soils and surface water, but these were not a health concern. The property remains undeveloped and there are no future plans to develop the property. (Al Nass, DNR, personal communication with Henry Nehls-Lowe, September 12, 2008)

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment, the IJC-critical pollutant PAHs was mentioned.

5.7.1.5 V & L Stripping (a/k/a Ken Juza property)

This site is a former dry cleaning business in Green Bay (Brown County) WI with previously confirmed groundwater and soil contamination. The primary contaminants of concern were chlorinated solvents including tetrachloroethylene, trichloroethylene, and other related contaminants. After reviewing the Wisconsin Department of Natural Resources' (DNR) groundwater and soil investigation, ATSDR concluded that some source of remediation would be needed at the site. And after reviewing the site investigation data for soil and groundwater at this site, The Wisconsin Department of Health and Family Services and DNR both recommended additional sampling to better characterize the vapor intrusion pathway from the site to nearby residences. Information on this site is taken from the 2003 ATSDR health consultation.

ATSDR Conclusions: In 2003, ATSDR concluded tetrachloroethylene from the V&L Stripping site resulted in soil vapor detections on two neighboring residential properties. Ongoing exposure posed an I*ndeterminate Public Health Hazard* (Category 3). Existing data were collected during summer months. During winter levels in the indoor air could be higher, even reaching levels of concern,. Remediation of the source area on the site would likely lower the risk of offsite vapor migration. Additional investigation would probably not allow ATSDR to rule out vapor intrusion as a source of human exposure at the nearby residence—where low levels of tetrachloroethylene were found. The soil vapor sample collected at the residence across the alley indicated a very low potential for vapor intrusion into the home on that property. Additional sampling might have ruled out this pathway. Remediation of the source area might also have resulted in eliminating this potential migration pathway. In any event, state DNR and the responsible party agreed to implement ATSDR's vapor treatment system recommendation.

U.S. EPA Update: This V & L Stripping site is not a U.S. EPA site and does not appear in CERCLIS.

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified.

5.7.2. Summary and Conclusions for the Lower Green Bay and Fox River AOC

5.7.2.1 Hazardous Waste Sites

In the Lower Green Bay & Fox River AOC, ATSDR categorized five hazardous waste sites as either a public health hazard or an indeterminate public health hazard. As of the date of this report two sites have completed remedial activities and were no longer expected to pose to human or environmental risks. On one site remedial activities were ongoing, and the remediation status of the remaining two sites was as yet undetermined.

5.7.2.2 TRI Data

The TRI onsite chemical releases for Brown County, WI, in 2001 totaled 2,866,676 pounds, the majority of which were released to air, followed by releases to land and surface water. See Table 5.7-B.

IJC-critical pollutants accounted for 15,619 pounds (0.5 %) of the total onsite releases. The IJC-critical pollutants released were PCBs (to air), PCDDs and PCDFs (primarily to air), lead and lead compounds (primarily to air and land), and mercury compounds (primarily to air).

The major onsite releases (≥ 500,000 pounds) of non-IJC chemicals were of barium compounds (primarily to land) and sulfuric acid aerosols (to air). The next largest releases (300,000–499,999 pounds) were of hydrochloric acid aerosols (to air) and nitrate compounds (primarily to surface water. See Table 5.7-C.

5.7.2.3 NPDES Data

The NPDES permitted discharges for Brown County, WI are summarized in Table 5.7-D. The average annual permitted discharges in 2004 totaled 0.12 pounds, for iodine. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.7.2.4 Beneficial Use Impairments (BUIs)

At this AOC site restrictions on fish and wildlife consumption and drinking water are listed as impairments. Consumption advisories cover 12 species of fish and mallard ducks. The U.S. EPA site does not provide information about drinking water consumption restrictions. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

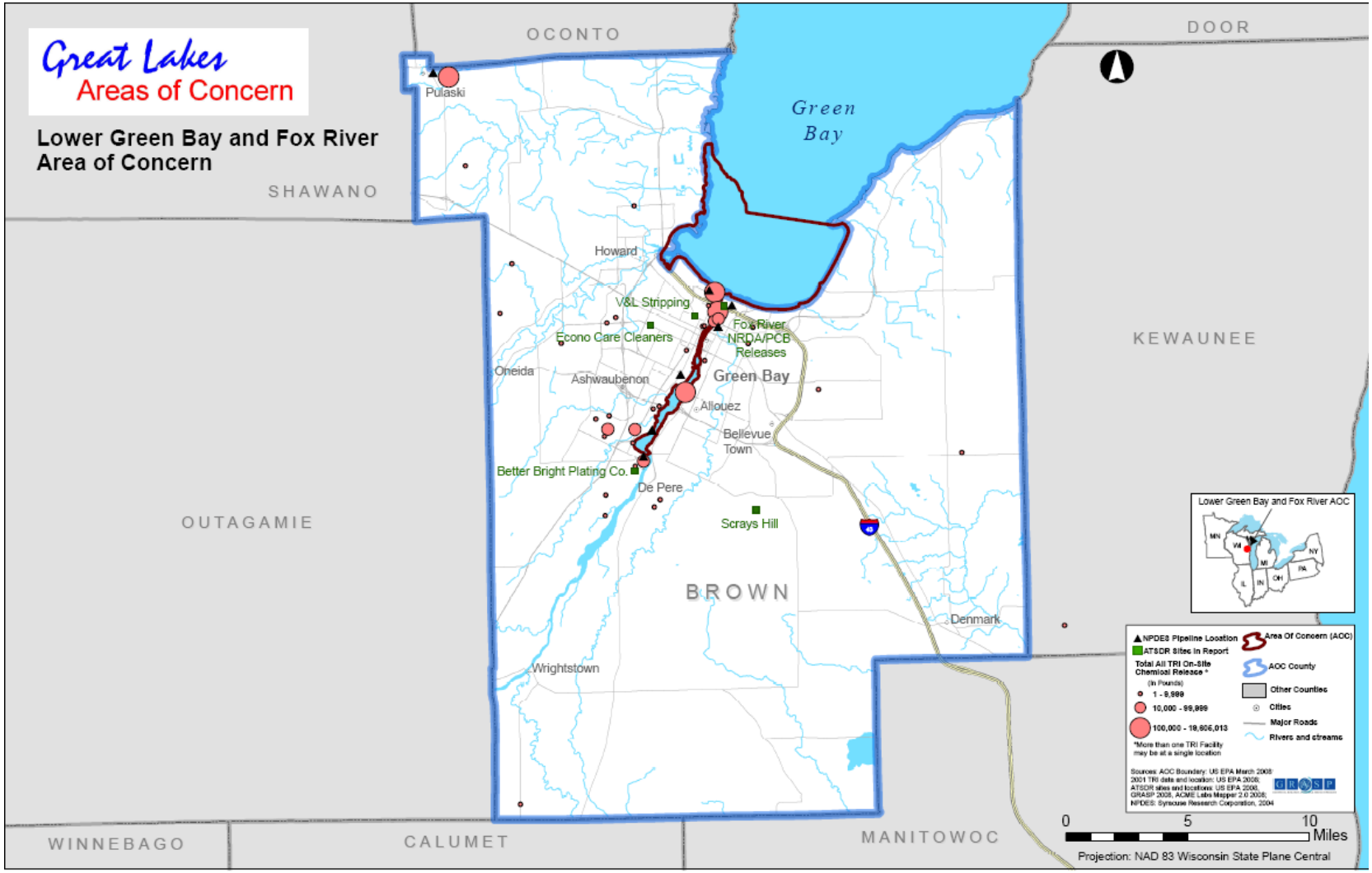

Great Lakes
Areas of Concern
Lower Green Bay and Fox River
Area of Concern
OCONTO
DOOR
SHAWANO
KEWAUNEE
OUTAGAMIE
BROWN
WINNEBAGO
CALUMET
MANITOWOC
Green
Bay
Pulaski
Howard
V&L Stripping
Fox River
NRDA/PCB
Releases
Econo Care Cleaners
Oneida
Ashwaubenon
Green Bay
Allouez
Bellevue
Town
Better Bright Plating Co.
De Pere
Scrays Hill
Denmark
Wrightstown
Lower Green Bay and Fox River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site
Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,606,013
*More than one TRI Facility
may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
0
5
10
Miles
Projection: NAD 83 Wisconsin State Plane Central

Table 5.7-B. TRI Releases (in pounds, 2001) for the Lower Green Bay and Fox River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
POLYCHLORINATED BIPHENYLS	1	2.15	0	0	0	2.15	79	81.15
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.014174622	0.00000154	0	0	0.014176166	0.00034398	0.014520146
(PCDDs and PCDFs)	3							
LEAD	8	64.106	No data	0	1895	1959.106	3304.105	5263.211
LEAD COMPOUNDS	8	6285.346	12.7	0	7194	13492.046	6993.295	20485.341
MERCURY COMPOUNDS	9	128.1	0.7	0	36.7	165.5	11.2	176.7
	Total IJC	**6479.716175**	**13.40000154**	**0**	**9125.7**	**15618.81618**	**10387.60034**	**26006.41652**
1,2,4-TRIMETHYLBENZENE		186	0	0	0	186	1	187
1,3-BUTADIENE		151	No data	0	0	151	0	151
ACRYLAMIDE		201	No data	0	0	201	0	201
AMMONIA		18906	440	0	805	20151	805	20956
BARIUM COMPOUNDS		6460	59	0	580000	586519	0	586519
BENZENE		622	0	0	0	622	0	622
BIPHENYL		40000	0	0	0	40000	0	40000
CHLORINE		410	0	0	0	410	0	410
CHLOROFORM		79200	112	0	0	79312	490	79802
CHROMIUM		263	No data	0	805	1068	6181	7249
CHROMIUM COMPOUNDS (EXCEPT		5	No data	0	24700	24705	49405	74110

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CHROMITE ORE MINED IN THE TRANSVAAL REGION)								
COPPER		1	No data	0	6644	6645	13	6658
COPPER COMPOUNDS		262	3	0	28000	28265	0	28265
ETHYLBENZENE		87	0	0	0	87	0	87
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		484708	No data	0	0	484708	0	484708
HYDROGEN FLUORIDE		137000	0	0	0	137000	0	137000
MANGANESE		370	No data	0	911	1281	938	2219
METHANOL		48500	0	0	0	48500	0	48500
METHYL ETHYL KETONE		6000	No data	0	0	6000	0	6000
METHYL ISOBUTYL KETONE		500	No data	0	0	500	0	500
METHYL METHACRYLATE		18347	No data	0	0	18347	0	18347
N-HEXANE		1337	0	0	0	1337	1	1338
NICKEL		47	No data	0	14	61	3236	3297
NICKEL COMPOUNDS		810	0	0	0	810	62793	63603
NITRATE COMPOUNDS		5	460213	0	0	460218	29	460247
NITRIC ACID		8795	0	0	0	8795	0	8795
PHENOL		0	No data	0	925	925	925	1850
POLYCYCLIC AROMATIC COMPOUNDS		5.7	0	0	2.5	8.2	0	8.2
PROPYLENE		111	No data	0	0	111	0	111

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
STYRENE		242093	No data	0	0	242093	103	242196
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		554493	No data	0	0	554493	0	554493
TOLUENE		3304	0	0	0	3304	1	3305
VANADIUM COMPOUNDS		398	2	0	23000	23400	33000	56400
VINYL ACETATE		42473	0	0	0	42473	5	42478
XYLENE (MIXED ISOMERS)		2209	0	0	0	2209	1	2210
ZINC COMPOUNDS		1160	2	0	25000	26162	24505	50667
	Total Non-IJC	**1699419.7**	**460831**	**0**	**690806.5**	**2851057.2**	**182432**	**3033489.2**
	Total	**1705899.416**	**460844.4**	**0**	**699932.2**	**2866676.016**	**192819.6003**	**3059495.617**

Table 5.7-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Lower Green Bay and Fox River AOC

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Polychlorinated biphenyls	1			
Brown County, WI	1	HALRON EAST TERMINAL	54302HLRNS2220N	GREEN BAY
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	4			
Brown County, WI	4	DEPERE FNDY. INC.	54115DPRFN805SS	DE PERE
		FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		PROCTER & GAMBLE PAPER PRODS. CO.	54308THPRC501EA	GREEN BAY
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY
Lead and lead compounds	13			
Brown County, WI	13	ASTRO INDS. INC.	54304STRND810PA	GREEN BAY
		BAY ENGINEERED CASTINGS INC.	54115BYNGN1900E	DE PERE
		DEPERE FNDY. INC.	54115DPRFN805SS	DE PERE
		FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		FORT JAMES OPERATING CO.	54305JMSRV500DA	GREEN BAY
		FOX VALLEY METAL-TECH INC.	54304FXVLL1201P	GREEN BAY
		GREEN BAY PACKAGING INC. MILL & SHIPPING CONTAINER DIVS.	54302GRNBY1601N	GREEN BAY
		HALRON EAST TERMINAL	54302HLRNS2220N	GREEN BAY
		INTERNATIONAL PAPER - DE PERE FACILITY	54115NCLTP200MA	DE PERE
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY
		SONOCO U. S. MILLS INC. DEPERE MILL	54115SNCSM800FO	DE PERE

Critical IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
		ULTRA PLATING	54306LTRPL345SP	GREEN BAY
		WESTERN LIME CORP. GREEN BAY FACILITY	54303WSTRN101JA	GREEN BAY
Mercury and mercury compounds	3			
Brown County, WI	3	FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		GREEN BAY PACKAGING INC. MILL & SHIPPING CONTAINER DIVS.	54302GRNBY1601N	GREEN BAY
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY

Table 5.7-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Lower Green Bay and Fox River AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
IODINE TOTAL		0.12
	Total Non-IJC	**0.12**
	Total	**0.12**

5.8. Menominee River AOC, Menominee County, MI and Marinette County, WI

The Menominee River AOC includes the lower 4.8 km of the Menominee River (from the Upper Scott Paper Company Dam to the river's mouth) and approximately 5 km north and south of the river's mouth along the Green Bay shoreline. The AOC also includes the cities of Marinette and Menominee (see AOC map at end of chapter and in Appendix 2).

5.8.1. Hazardous Waste Sites Relevant to the Menominee River AOC

ATSDR has evaluated the data for hazardous waste sites in Menominee County, MI and Marinette County, WI, and reached conclusions regarding any public health threats posed by them. ATSDR is summarizes these findings in Table 5.8-A, together with information regarding the type and location of the site, and the date and type of assessment document.

Table 5.8-A. Hazardous Waste Sites in Menominee County, MI and Marinette County, WI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Ansul Company Division of Wormald US Inc, Marinette, WI WID006125215	HC	2006	2	Non-NPL	Ongoing
Marinette Sewage Treatment Plant, Marinette, WI WID980703359	HC	2005	2	Non-NPL	Ongoing

2 =Public Health Hazard, HC =Health Consultation

ATSDR has further evaluated the site data, summarized in the following sections.

5.8.1.1 Ansul Company Division of Wormald US Inc.

At this site, ATSDR evaluated health risks from eating fish caught in areas adjacent to the Ansul Chemical property in Marinette, WI, where arsenic-laden sediment contaminated the Menominee River. ATSDR also evaluated health risks from direct contact with those sediments and from contact with overlying Menominee River surface water. These contaminant-exposure issues arose in the context of the Wisconsin Department of Natural Resources' and the U.S. EPA's efforts to establish cleanup goals for removing arsenic sediments from the river. Two exposure pathways were considered: 1) fish consumption and 2) direct contact with arsenic in sediment and surface water.

ATSDR Conclusions: In 2006, ATSDR concluded that because the arsenic sediment adjacent to the Ansul site could result in an acute exposure to workers during dredging operations, this site presented a *Public Health Hazard* (Category 2). Moreover, any shoreline changes or other changes that increased recreational use of arsenic-contaminated areas of the river represented an additional, future public health hazard. Conversely, the greater-than-background levels of arsenic in sediment near the Sixth Street boat ramp were not an apparent health hazard—the arsenic

concentration was relatively low, as was the expectation of contact. And because of the low bioavailability, toxicity, and overall concentration of the predominant forms of arsenic in fish from the Menominee River, ATSDR classified any possible arsenic-in-fish exposure as no apparent public health hazard. The current Fish Consumption Advisory because of mercury and PCB contaminants in Menominee River fish will also assist in preventing exposure. Thus because of the low concentrations, contact or accidental ingestion of arsenic in Menominee River water was not an apparent health hazard. ATSDR concurred with the WDNR recommendation of 10–20 ppm as a cleanup goal for arsenic in sediment, based on the research review developed in the WDNR Consensus Based Sediment Quality Guidelines.

The responsible party confined the site access by installation of fences and installed slurry walls to prevent off site groundwater migration. Sediment remediation is pending.

U.S. EPA Update: Ansul Division of Wormald US is not a federal site—it has been deferred to RCRA.

Available at: http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm. [cited 2008 Jul 31].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site. ATSDR's 2006 health consultation does, however, mention the Wisconsin Fish Consumption Advisory for the Menominee River based on mercury and PCBs.

5.8.1.2 Marinette Sewage Treatment Plant/Marinette Manufactured Gas Plant Remediation.

From about 1920 to 1960, the former Marinette (Marinette County) WI Manufactured Gas Plant (MGP) operated on this Menominee River-front site, now occupied by the Marinette Wastewater Treatment Plant. During the gas plant's occupancy, river sediments near the plant became saturated with coal tar. At the time of ATSDR's 2005 health consultation, the area surrounding the site was mixed industrial and residential. Shipping-related activities were concentrated along the Menominee River waterfront. Although the area was mostly industrial, several neighborhoods might have been affected by remediation work.

ATSDR Conclusions: In 2005, ATSDR concluded that because of the possibility of contact with tar contaminated sediments in the boat landing area, this site presented a *Public Health Hazard* (Category 2). The potential release of semi-volatile organic compounds to air from staging dredge spoils also represented an indeterminate public health hazard to workers or visitors of adjacent shipbuilding, marina, and wastewater treatment facilities. Dredge spoils removed from the Menominee River near Boom Island Landing would require management to prevent hydrocarbon release to air. Whether the senior residential facility and adjacent residences approximately 250 yards from the dredge spoils area were sufficiently distant from the work site was unclear, especially if releases of volatile and semi-volatile hydrocarbons were not adequately controlled during excavation and staging of dredge spoils. Consequently, to these residents the staging of dredge spoils at Boom Island Landing was an indeterminate public health hazard.

In 2005, upland contamination had been cleaned up, but sediment contamination remained in place. U.S. EPA reported that a remedial design for sediment removal was in place before the

Superfund settlement. Because of concerns over cleanup goals, however, that design was never implemented.

U.S. EPA Update: This Marinette Sewage Treatment site is a state lead investigation site and does not appear in CERCLIS. On September 11, 2008, Mary Logan of the U.S. EPA Region V office reported that although no warning signs have yet been posted in the park, Wisconsin DNR is currently discussing sign placement with the Wisconsin Public Service Corporation. Ms Logan also reported that U.S. EPA expects remediation plans will be developed during 2009 (Henry Nehls-Lowe, personal communication, 2008 Sep 11).

Wisconsin Department of Health and Family Services Update: No warning signs have been posted in the park. The DNR is currently discussing with the Wisconsin Public Service Corporation regarding the placement of signs. U.S. EPA expects the remediation plans will be developed during 2009 (Mary Logan, U.S. EPA Region V office, personal communication with Henry Nehls-Lowe, September 11, 2008).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B(a)P, and additional PAHs as constituents of coal tar were identified at this site.

5.8.2. Summary and Conclusions for the Menominee River AOC

5.8.2.1 Hazardous Waste Sites

In the Menominee River AOC, ATSDR categorized two hazardous waste sites in Menominee County, MI, and Marinette County, WI as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. For both sites, remediation is ongoing.

5.8.2.2 TRI Data

The TRI onsite chemical releases for Menominee County, MN, and Marinette County, WI, (combined) in 2001 totaled 496,429 pounds, the majority of which were released to air, followed by releases to land. See Table 5.8-B.

IJC-critical pollutants accounted for 993 pounds (0.2%) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air and land), lead and lead compounds (primarily to air), and mercury compounds (primarily to air and land). No non-IJC chemicals were released in quantities of at least 150,000 pounds. Facilities that released these pollutants are listed in Table 5.8-C.

5.8.2.3 NPDES Data

The NPDES permitted discharges for Menominee County, MI and Marinette County, WI are summarized in Table 5.8-D. The average annual permitted discharges in 2004 totaled 34,311 pounds, most of which was phosphorus.

The IJC-critical pollutant mercury (1.48 pounds) was permitted to be discharged. The facilities permitted to release this pollutant are listed in Table 5.8-E.

5.8.2.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impairments at this AOC site. No recent information regarding this impairment is provided on the U.S. EPA Web site.

Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

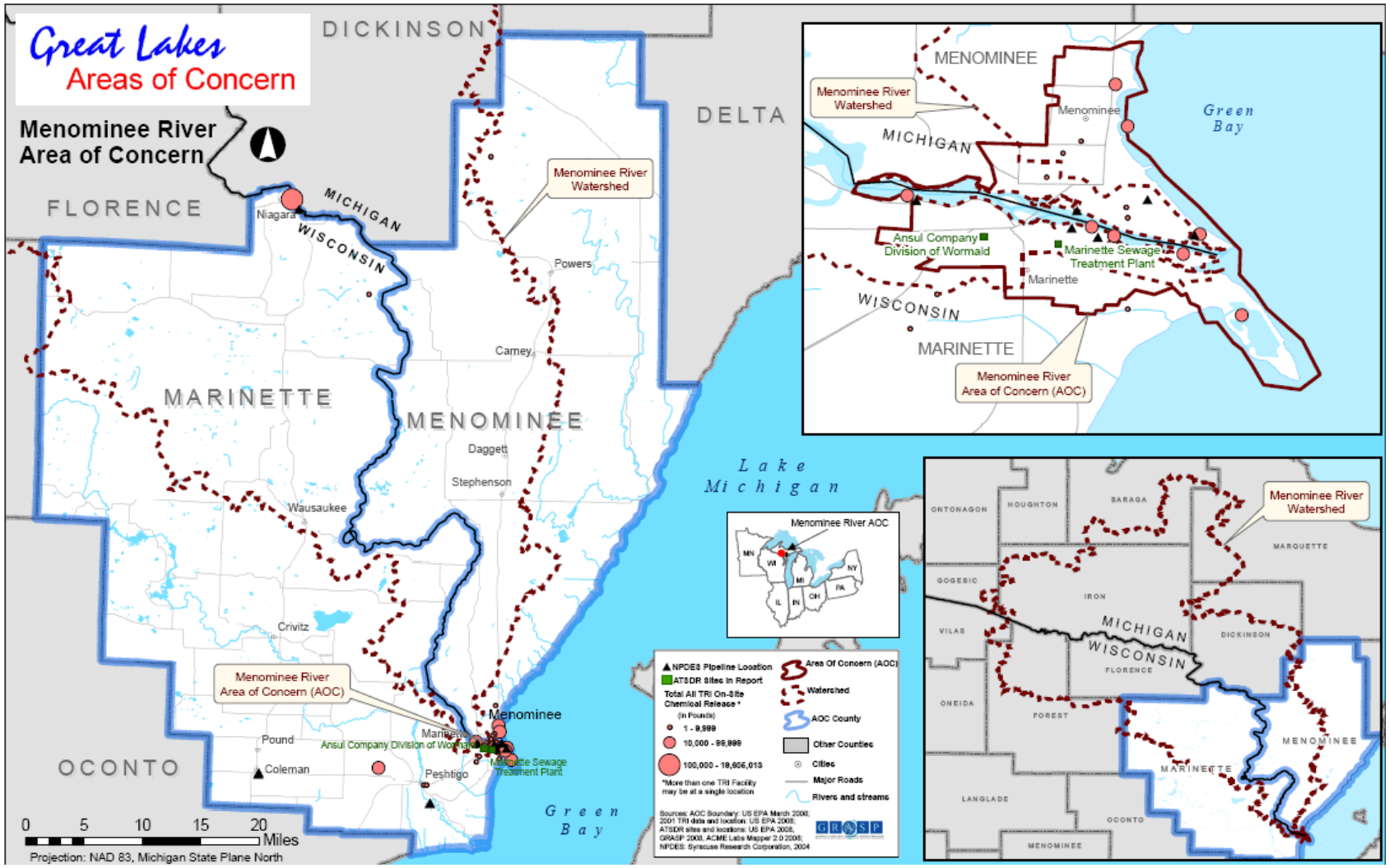

Great Lakes
Areas of Concern
Menominee River
Area of Concern
DICKINSON
DELTA
FLORENCE
MARINETTE
MENOMINEE
OCONTO
MICHIGAN
WISCONSIN
Niagara
Powers
Carney
Daggett
Stephenson
Wausaukee
Crivitz
Pound
Coleman
Peshtigo
Marinette
Menominee
Menominee River Watershed
Menominee River Area of Concern (AOC)
Ansul Company Division of Wormald
Marinette Sewage Treatment Plant
Lake Michigan
Green Bay
0 5 10 15 20 Miles
Projection: NAD 83, Michigan State Plane North
Menominee River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(in Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 18,806,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Watershed
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008; 2001 TRI data and location: US EPA 2008; ATSDR sites and locations: US EPA 2008, GRASP 2008, ACME Labs Mapper 2.0 2008; NPDES: Syracuse Research Corporation, 2004
GRASP
MENOMINEE
MICHIGAN
WISCONSIN
MARINETTE
Menominee River Watershed
Menominee River Area of Concern (AOC)
Ansul Company Division of Wormald
Marinette Sewage Treatment Plant
Green Bay
ONTONAGON
HOUGHTON
BARAGA
MARQUETTE
GOGEBIC
IRON
DICKINSON
VILAS
ONEIDA
FOREST
FLORENCE
LANGLADE
OCONTO
MENOMINEE
MARINETTE

Table 5.8-B. TRI Releases (in pounds, 2001) for the Menominee River AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.000646771	0	0	0.00069506	0.001341831	0	0.001341831
(PCDDs and PCDFs)	3							
LEAD	8	9.3	0	0	0.01	9.31	312.010723	321.320723
LEAD COMPOUNDS	8	31.92	0	0	929.43	961.35	188	1149.35
MERCURY COMPOUNDS	9	14.2	0.1	0	7.7	22	0	22
	Total IJC	**55.42064677**	**0.1**	**0**	**937.1406951**	**992.6613418**	**500.010723**	**1492.672065**
ALUMINUM (FUME OR DUST)		8940	0	0	0	8940	14564	23504
ALUMINUM OXIDE (FIBROUS FORMS)		250	0	0	0	250	2700	2950
AMMONIA		27250	6165	0	14	33429	2501	35930
BERYLLIUM COMPOUNDS		10	5	0	0	15	255	270
BORON TRICHLORIDE		16	0	0	0	16	0	16
CERTAIN GLYCOL ETHERS		16198	0	0	0	16198	250	16448
CHLORINE		136	0	0	0	136	0	136
CHLOROBENZENE		32	0	0	0	32	0	32
CHLOROMETHANE		1405	0	0	0	1405	0	1405
CHROMIUM		1125	255	0	3400	4780	6121	10901

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		255	5	0	0	260	3255	3515
COBALT		269	250	0	3700	4219	4527	8746
COBALT COMPOUNDS		10	5	0	0	15	255	270
COPPER		1616	250	0	70	1936	2080	4016
COPPER COMPOUNDS		255	250	0	0	505	5	510
DICHLOROMETHANE		2328	0	0	0	2328	0	2328
DIISOCYANATES		10	0	0	0	10	5	15
DIMETHYLAMINE		27	0	0	0	27	0	27
ETHYLBENZENE		10505	0	0	0	10505	0	10505
ETHYLENE GLYCOL		500	0	0	0	500	0	500
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		76072	0	0	0	76072	0	76072
HYDROQUINONE		10	0	0	0	10	0	10
MANGANESE		201	0	0	0	201	315	516
MANGANESE COMPOUNDS		255	250	0	0	505	196005	196510
METHANOL		20171	3400	0	0	23571	0	23571
METHYL ETHYL KETONE		250	0	0	0	250	0	250
METHYL ISOBUTYL KETONE		1920	0	0	0	1920	0	1920

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
N,N-DIMETHYLFORMAMIDE		17	0	0	0	17	0	17
N-BUTYL ALCOHOL		50875	0	0	0	50875	1235	52110
NICKEL		1274	255	0	2200	3729	8407	12136
NICKEL COMPOUNDS		500	250	0	0	750	1505	2255
NITRATE COMPOUNDS		0	33000	0	0	33000	5	33005
O-CRESOL		2	0	0	0	2	0	2
PHENOL		6361	250	0	0	6611	250	6861
STYRENE		84311	0	0	0	84311	0	84311
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		500	0	0	0	500	0	500
TOLUENE		33631	0	0	0	33631	9391	43022
TRIETHYLAMINE		5850	0	0	0	5850	0	5850
VINYL ACETATE		20465	0	0	0	20465	0	20465
XYLENE (MIXED ISOMERS)		66660	0	0	0	66660	1235	67895
ZINC COMPOUNDS		750	250	0	0	1000	33505	34505
	Total Non-IJC	**441212**	**44840**	**0**	**9384**	**495436**	**288371**	**783807**
	Total	**441267.4206**	**44840.1**	**0**	**10321.1407**	**496428.6613**	**288871.011**	**785299.6721**

Table 5.8-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Menominee River AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Marinette County, WI	2	KARL SCHMIDT UNISIA INC.	54143KSGND1731I	MARINETTE
		STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA
Lead and lead compounds	6			
Marinette County, WI	4	DECRANE AIRCRAFT SEATING CO. INC. - APD	54157DCRNR701MA	PESHTIGO
		MARINETTE CASTING CORP.	54157MRNTT801MA	PESHTIGO
		KARL SCHMIDT UNISIA INC.	54143KSGND1731I	MARINETTE
		STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA
Menominee County, WI	2	GIDDINGS & LEWIS CASTINGS	49858DDNGS16101	MENOMINEE
		MENOMINEE ACQUISITION CORP.	49858MNMNP144FI	MENOMINEE
Mercury and mercury compounds	1			
Marinette County, WI	1	STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA

Table 5.8-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Menominee River AOC

Chemical	*IJC Tracking Number*	*Discharge*
MERCURY, TOTAL (AS HG)	9	1.48
	Total IJC	**1.48**
PHOSPHORUS, TOTAL (AS P)		34310
	Total Non-IJC	**34310**
	Total	**34311.48**

Table 5.8-E. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Menominee River AOC, Menominee County, MI and Marinette County, WI

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Mercury	2			
Menominee County, MI	2	GREAT LAKES PULP & FIBRE	MI0053601	MENOMINEE
		MENOMINEE WWTP	MI0025631	MENOMINEE

5.9. Manistique River AOC, Schoolcraft County, MI

The Manistique River AOC comprises the river's final last 1.7 miles, from the dam to the mouth of the harbor at Lake Michigan (see AOC map at end of chapter and in Appendix 2).

5.9.1. Hazardous Waste Sites Relevant to the Manistique River AOC

No hazardous waste sites in Schoolcraft County, MI have been categorized by ATSDR as an urgent public health hazard, a public health hazard, or an indeterminate public health hazard.

5.9.2. Summary and Conclusions for the Manistique River AOC

5.9.2.1 Hazardous Waste Sites

ATSDR has not categorized any Schoolcraft County, MI hazardous waste sites as an urgent public health hazard, a public health hazard, or an indeterminate public health hazard.

5.9.2.2 TRI Data

No releases were reported to the TRI for Schoolcraft County in 2001 (or 2000).

5.9.2.3 NPDES Data

The NPDES permitted discharges for Schoolcraft County, MI are summarized in Table 5.9-A.

The average annual permitted discharges in 2004 totaled 6,935 pounds, all of which was phosphorus. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.9.2.4 Beneficial Use Impairments (BUIs)

Of the three health-related BUIs, restrictions on fish were BUIs listed as impairments at this AOC site. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

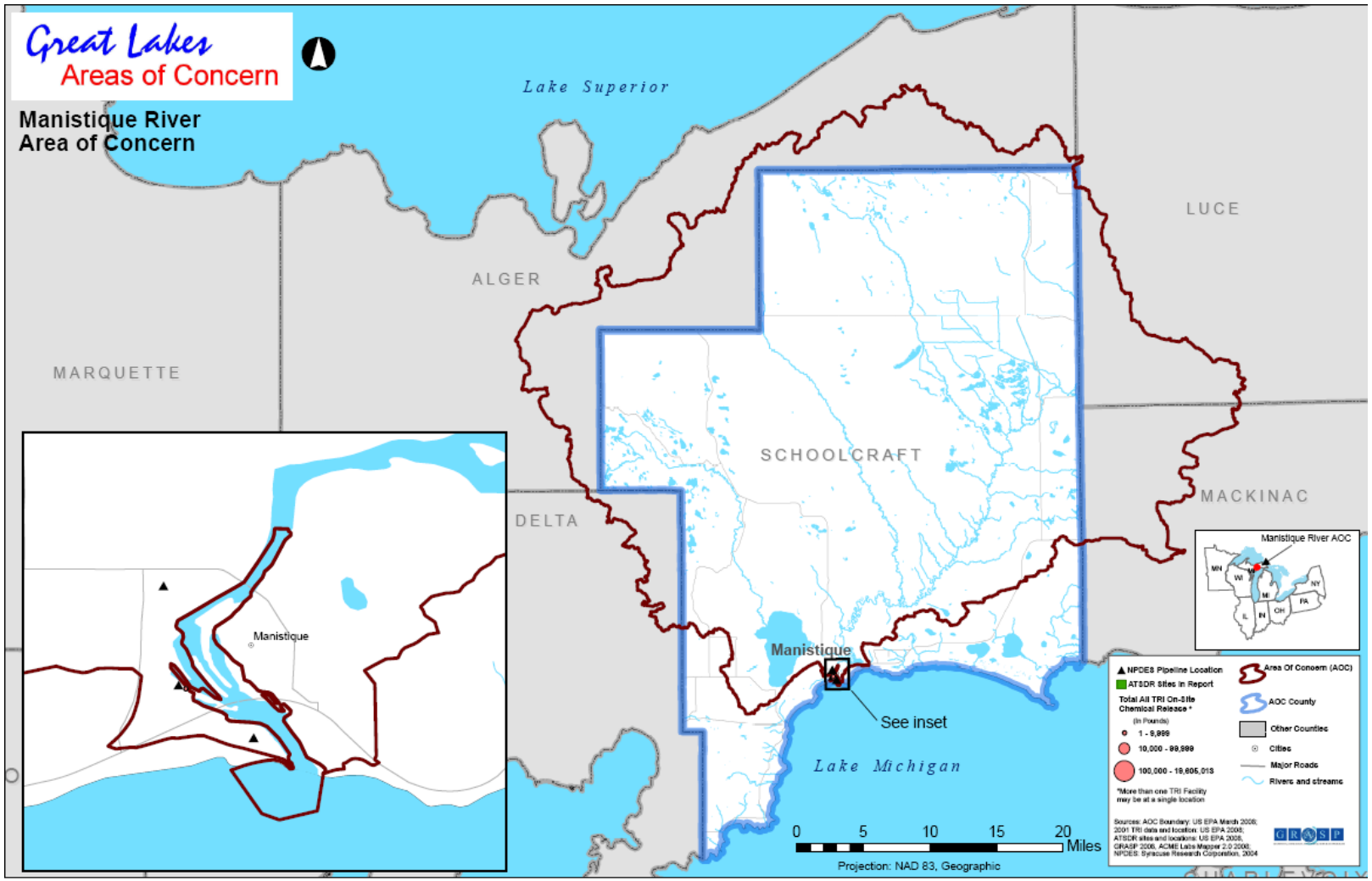

Great Lakes
Areas of Concern
Manistique River
Area of Concern
Lake Superior
LUCE
ALGER
MARQUETTE
SCHOOLCRAFT
MACKINAC
DELTA
Manistique
See inset
Lake Michigan
0 5 10 15 20
Miles
Projection: NAD 83, Geographic
Manistique River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,605,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams

Table 5.9-A. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Manistique River AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	0
PHOSPHORUS, TOTAL (AS P)		6935
	Total Non-IJC	6935
	Total	6935

Chapter 6. Lake Superior

Chapter 6. Lake Superior

6.1. Deer Lake AOC, Marquette County, MI

Deer Lake AOC is in Marquette County, MI. The Deer Lake AOC includes the Carp River watershed: Deer Lake, Carp Creek, and the Carp River downstream about 20 miles to Lake Superior in Marquette (see AOC map at end of chapter and in Appendix 2). In the 1880s, Deer Lake was polluted with mercury from the processing of gold ore and assaying tests conducted on ore samples from another facility. This led to high levels of mercury bioaccumulation in fish.

6.1.1. Hazardous Waste Sites Relevant to the Deer Lake AOC

ATSDR has evaluated the data for hazardous waste sites in Marquette County, MI, and reached conclusions regarding any public health threat posed by sites. Conclusions are summarized in Table 6.1-A for the one site categorized as an indeterminate public health hazard at some point during its assessment history, together with information regarding the type and location of the site and the date and type of assessment document.

Table 6.1-A. Hazardous Waste Sites in Marquette County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Cliff/Dow Dump, Marquette MID980608970	HA	1988	3	Deleted From NPL	Completed

3 = Indeterminate Public Health Hazard, HA = Public Health Assessment

ATSDR conducted further evaluation of the data for this site in the public health assessment document listed in the table. This evaluation is discussed in the following section.

6.1.1.1 Cliff/Dow Dump

The 2-acre Cliff/Dow Dump in the City of Marquette (Marquette County) MI, received wastes from the Cliffs-Dow Chemical Company, which manufactured charcoal at a facility 2 miles from the site.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	137
Females aged 15-44	808
Adults 65 and older	157

ATSDR Conclusions: In 1988, ATSDR concluded that although inadequate site characterization prevented a determination regarding whether offsite exposure to contaminants had occurred, the presence of contaminants at levels of health concern meant the site nonetheless posed an *Indeterminate Public Health Hazard* (Category 3).

Since the time of ATSDR's assessment, the site has been remediated by the removal of waste and fill and the replacement of contaminated fill with clean fill.

U.S. EPA Update: In its September 2006 Fact Sheet for the Cliff/Dow Dump. U.S. EPA stated in part that

> Past studies indicated that natural attenuation is occurring and will effectively remediate the groundwater. In early December 1997, another sampling event was conducted at the site to demonstrate that the remaining groundwater contamination does not pose an unacceptable risk to human health or the environment. The results of this sampling round supported this. The site was deleted from the National Priorities List on October 18, 2000. Deed restrictions on the use of the site and groundwater have been removed.
>
> No five-year review is required, since all contamination was removed from the site.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980608970.htm. 2006 Sep [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants dibenzofurans and PAHs (including acenaphthalene, phenanthrene, and fluorene) were identified. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

6.1.2. Summary and Conclusions for the Deer Lake AOC

6.1.2.1 Hazardous Waste Sites

The one hazardous waste site categorized by ATSDR as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard was contaminated with the IJC-critical pollutants dibenzofurans and PAHs. The site has since been completely remediated. In June, 2006, U.S. EPA reported that contamination of fish with mercury and problems with sewage were of concern at this site.

6.1.2.2 TRI Data

The TRI onsite chemical releases for Marquette County, MI in 2001 totaled 1,000,114 pounds, the majority of which were released to air, followed by releases to land. See Table 6.1-B. IJC-critical pollutants accounted for 3,214 pounds (0.3 %) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead, and lead compounds (primarily to land) and mercury compounds (primarily to air and land). The largest release (400,000 pounds) of non-IJC chemicals was of hydrochloric acid aerosols to air. The next largest releases (150,000–299,999 pounds) were of barium compounds (primarily to land), and hydrogen fluoride (to air). See Table 6.1-C.

6.1.2.3 NPDES Data

The NPDES permitted discharges for Marquette County, MI are summarized in Table 6.1-D. The average annual permitted discharges in 2004 totaled 360,104 pounds, the majority of which was ammonia nitrogen.

The IJC-critical pollutant mercury (0.66 pounds) was permitted to be discharged. The facilities permitted to release this pollutant are listed in Table 6.1-E.

6.1.2.4 County Demographic Data

Vulnerable populations in Marquette County, MI totaled 27,610.

6.1.2.5 Beneficial Use Impairments (BUIs)

A fish consumption restriction in the Deer Lake AOC has been established because of mercury concentrations exceeding the 1.5mg/kg Do-Not-Eat threshold established by the Michigan Department of Community Health. Currently, all fish from Deer Lake are under a possession ban. Brook trout from Carp Creek and the Carp River may be consumed, but consumption of other species from these sources is not advised. Wildlife in the Deer Lake AOC are under no consumption advisories. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

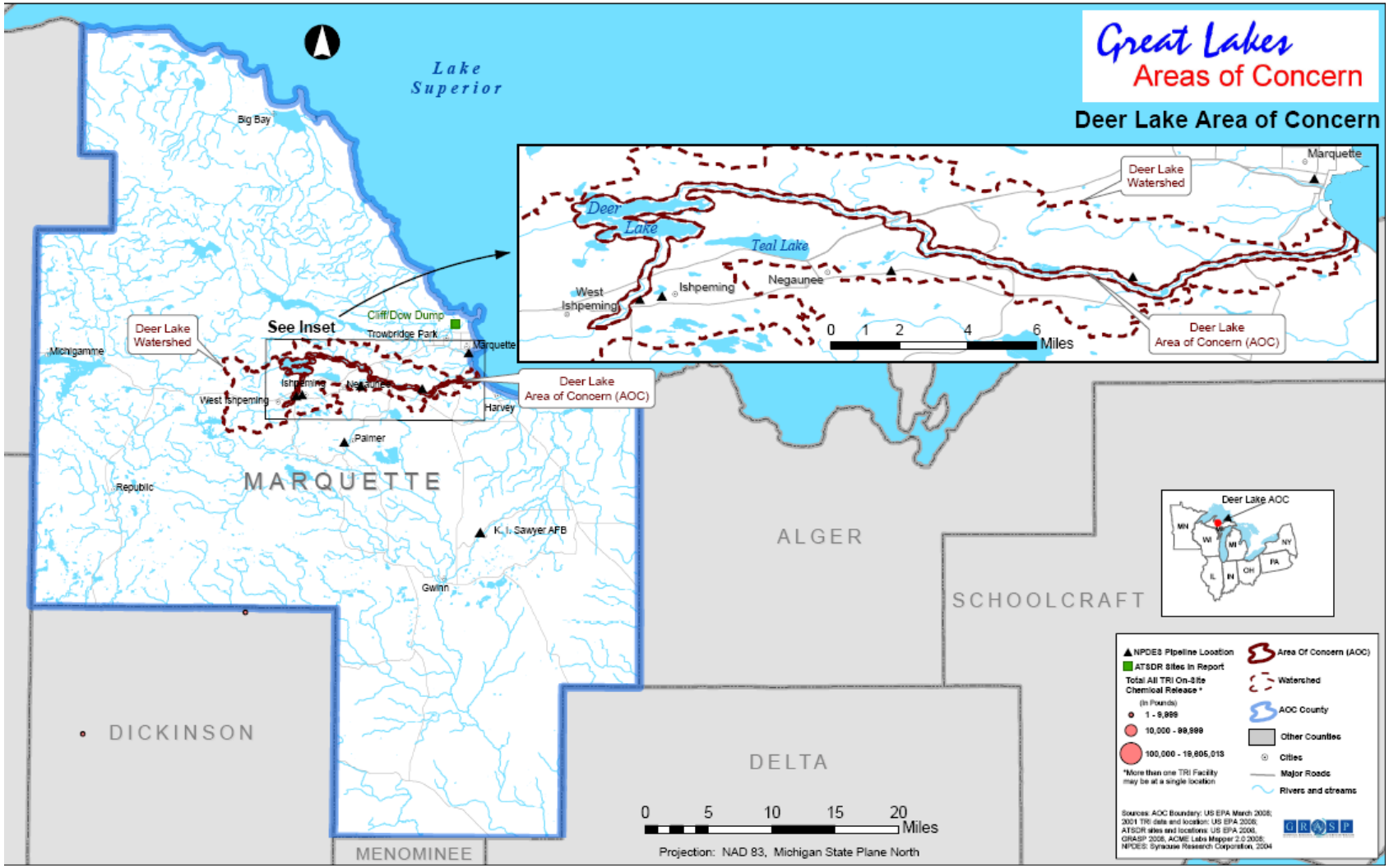

Great Lakes
Areas of Concern
Deer Lake Area of Concern
Lake Superior
Big Bay
Deer Lake Watershed
Michigamme
See Inset
Cliff/Dow Dump
Trowbridge Park
Marquette
Ishpeming
Negaunee
West Ishpeming
Harvey
Deer Lake Area of Concern (AOC)
Palmer
Republic
MARQUETTE
K. I. Sawyer AFB
Gwinn
ALGER
SCHOOLCRAFT
DICKINSON
DELTA
MENOMINEE
0 5 10 15 20 Miles
Projection: NAD 83, Michigan State Plane North
Deer Lake
Teal Lake
West Ishpeming
Ishpeming
Negaunee
Deer Lake Watershed
Deer Lake Area of Concern (AOC)
0 1 2 4 6 Miles
Deer Lake AOC
MN
WI
MI
NY
PA
IL
IN
OH
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical Release *
(In Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,805,013
*More than one TRI Facility may be at a single location
Area Of Concern (AOC)
Watershed
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
GRASP

Table 6.1-B. TRI Releases (in pounds, 2001) for the Deer Lake AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00200214	No data	0	0	0.00200214	0	0.00200214
(PCDDs and PCDFs)	3							
LEAD	8	5.6	No data	0	0	5.6	0	5.6
LEAD COMPOUNDS	8	36.6	0	0	3012	3048.6	1084.3	4132.9
MERCURY COMPOUNDS	9	115.98	0.006	0	44.1	160.086	16.8	176.886
	Total IJC	**158.1820021**	**0.006**	**0**	**3056.1**	**3214.288002**	**1101.1**	**4315.388002**
BARIUM		0	No data	0	0	0	117000	117000
BARIUM COMPOUNDS		3000	30	0	260000	263030	0	263030
BENZO(G,H,I)PERYLENE		0	11	0	1.3	12.3	0	12.3
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		400000	No data	0	0	400000	0	400000
HYDROGEN FLUORIDE		190000	No data	0	0	190000	0	190000
MANGANESE COMPOUNDS		223	720	0	19000	19943	0	19943
NICKEL COMPOUNDS		130	0	0	8500	8630	0	8630
NITRATE COMPOUNDS		1000	No data	0	0	1000	0	1000
POLYCYCLIC AROMATIC COMPOUNDS		1.48	No data	0	7.546	9.026	0	9.026
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		62000	No data	0	0	62000	0	62000
VANADIUM COMPOUNDS		460	No data	0	44000	44460	0	44460
ZINC COMPOUNDS		86	230	0	7500	7816	118	7934

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
	Total Non-IJC	**656900.48**	**991**	**0**	**339008.846**	**996900.326**	**117118**	**1114018.326**
	Total	**657058.662**	**991.006**	**0**	**342064.946**	**1000114.614**	**118219.1**	**1118333.714**

Table 6.1-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Deer Lake AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	1			
Marquette County, MI	1	PRESQUE ISLE POWER PLANT	49855PRSQS2701L	MARQUETTE
Lead and lead compounds	2			
Marquette County, MI	2	L-P GWINN STUDMILL	49841LPGWN650AA	GWINN
		PRESQUE ISLE POWER PLANT	49855PRSQS2701L	MARQUETTE
Mercury and mercury compounds	2			
Marquette County, MI	2	MARQUETTE BD OF LIGHT & POWER	49855MRQTTEHAMP	MARQUETTE
		PRESQUE ISLE POWER PLANT	49855PRSQS2701L	MARQUETTE

Table 6.1-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Deer Lake AOC

Chemical	*IJC Tracking Number*	*Discharge*
MERCURY, TOTAL (AS HG)	9	0.66
	Total IJC	**0.66**
BERYLLIUM, TOTAL (AS BE)		12.78
NITROGEN, AMMONIA TOTAL (AS N)		332971.25
PHOSPHORUS, TOTAL (AS P)		26937
SELENIUM, TOTAL (AS SE)		73
VANADIUM, TOTAL (AS V)		109.50
	Total Non-IJC	**360103.53**
	Total	**360104.19**

Table 6.1-E. NPDES Facilities Permitted to Discharge IJC-critical Pollutants, Deer Lake AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Mercury	2			
Marquette County, MI	2	MARQUETTE WWTP	MI0023531	MARQUETTE
		NEGAUNEE WWTP	MI0021296	NEGAUNEE

6.2. Torch Lake AOC, Houghton County, MI

Situated on Michigan's Keweenaw Peninsula, the Torch Lake AOC includes the Keweenaw Waterway (North Entry Harbor of Refuge, Portage Lake, and Torch Lake), its watershed, portions of two other watersheds (Trout River and the Eagle River Complex), and several miles of western Lake Superior shoreline. These areas share one contaminant problem: copper mining waste materials. The largest and only waste site within the AOC is the western shore of Torch Lake (see AOC map at end of chapter and in Appendix 2). Information regarding this site is from ATSDR's 1989 public health assessment, 1998 health consultation, and U.S. EPA's June 2008 NPL site Fact Sheet.

6.2.1. Hazardous Waste Sites Relevant to the Torch Lake AOC

ATSDR has evaluated the data for hazardous waste sites in Houghton County, MI, and reached conclusions regarding the public health threat posed by these sites. Table 6.2-A summarizes these conclusions for the one site categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some time during its assessment history, together with information regarding the type and location of the site, and the date and type of assessment document.

Table 6.2-A. Hazardous Waste Sites in Houghton County, MI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
Torch Lake, Houghton County	HA	1989	3	NPL	Ongoing
MID980901946	HC	1998	2		

3 = Indeterminate Public Health Hazard, 2= Public Health Hazard, HA = Public Health Assessment

HC= Health Consultation.

ATSDR conducted further evaluation of the data for this site in the document listed in the table, which evaluation is discussed in the following section.

6.2.1.1 Torch Lake

Torch Lake is a 2,700-acre lake in the Keweenaw Waterway. From the 1890s until 1969, the lake was heavily polluted by copper mining activities. Mill tailings (stamp sands) were dumped into the lake and along the shoreline. The tailings were dredged up and processed with flotation chemicals (creosotes and xanthates) to reclaim the copper. The wastes were then returned to the lake and to the shoreline. A high incidence of tumors were found in Torch Lake fish.

The Torch Lake site comprises three Operable Units (OU). OU1 includes stamp sands and tailings, slag, and drums along the western short of Torch Lake. OU2 includes groundwater, surface water and sediments associated with the site, and OU3 includes several other areas on the Keweenaw Peninsula contaminated with stamp sands. Information regarding this site is taken from the 1989 ATSDR public health assessment, the 1998 ATSDR health consultation, and the 2008 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	259
Females aged 15-44	516
Adults 65 and older	559

Public Health Outcome Data: The 1989 health assessment concluded the incidence of cancer deaths from 1970 to 1981 indicated that all but stomach cancer were at or below the state average for age-adjusted cancer mortality. ATSDR suggested that stomach cancer in this locale may be higher because of the population's predominantly Scandinavian origin; Scandinavians have a high intake of salt and salted foods. Consumption of high levels of salt and salted foods is a risk factor for stomach cancer. The health assessment did not provide further details, however.

ATSDR Conclusions: In 1989, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In 1998 ATSDR concluded that given the possibility of long-term exposure from incidental ingestion (arsenic) or pica behavior (lead) on the properties considered for residential development, levels of arsenic and the IJC-critical pollutant lead in the soil of some of the brownfields properties posed a *Public Health Hazard* (Category 2). In 2006, U.S. EPA reported, however, that since 1993, the Michigan Department of Natural Resources had not received any reports of fish tumors.

Remediation of the area included removal of drums buried in piles of tailings on the shore and in the lake, as well as the contaminated soil beneath the drums. A removal action is also underway to address asbestos at the Quincy Smelter. About 800 acres of tailings and slag piles are being covered with soil and vegetation. This process was to be completed in 2004. Long-term monitoring of Torch Lake is in place and further abatement measures are under consideration.

U.S. EPA Update: In its June 2008 Fact Sheet for the Torch Lake site, U.S. EPA stated in part that

> In 2007, U.S. EPA's Removal Program completed the Torch Lake Area Assessment, which consisted of a wide-ranging sampling effort of mining impacts in the Keweenaw Peninsula. A report summarizing the sampling effort was finalized in 2007, and the conclusions of the report are being considered by U.S. EPA and MDEQ. The Removal Program identified an area in Lake Linden with elevated levels of arsenic and lead in soils. In August 2007, approximately 1,010 cubic yards of contaminated soils were excavated from this area by Removal contractors. In 2008, U.S. EPA's Removal Program also began asbestos abatement activities at Quincy Smelter.
>
> A second five year review was completed in March 2008. This Five Year Review identified several issues that U.S. EPA and MDEQ plan to address, including implementation of institutional controls at certain properties, investigation of residential wells in the site area, further assessment of the Lake Linden and Mason Sands area, and completion of removal actions at Quincy Smelter.

Available at: http://www.epa.gov/region5superfund/npl/michigan/MID980901946.htm. 2008 Jun [cited 2008 14 Jul].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants PAHs and lead were identified at this site. For a more complete listing of the hazardous substances found at this site please refer to www.epa.gov/superfund/sites/npl/npl.htm.

6.2.2. Summary and Conclusions for the Torch Lake AOC

6.2.2.1 Hazardous Waste Sites

The Torch Lake site was the only site in this AOC that ATSDR categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. The more recent assessment for this site focused on brownfields properties near the lake and concluded that if some of the properties were to be developed residentially, arsenic and possibly the IJC-critical pollutant lead were present at levels of concern. In June, 2004, however, U.S. EPA reported that many of the brownfields sites were remediated and no longer posed a threat.

In the past, Torch Lake was directly affected by tailings in the water and around the shoreline. Although the initial ATSDR health assessment noted the past, high incidence of fish tumors from an unknown etiologic agent, fish tumor incidence has since returned to normal.

Remediation has occurred, and monitoring has indicated that most contamination levels were within safety standards. In 2004, U.S. EPA reported the elimination of exposure risk to residents from onsite contaminants (e.g., pica ingestion behavior in children). U.S. EPA further reported (2006) that since 1999, when Superfund clean up began, almost 800 acres of the Torch Lake Superfund site have been remediated. Only a portion of those 800 acres (approximately 480 acres), however, is within the Torch Lake AOC boundaries.

6.2.2.2 TRI Data

The TRI onsite chemical releases for Houghton County, MI in 2001 totaled 487,148 pounds, all of which were released to air. See Table 6.2-B.

IJC-critical pollutants accounted for 0.332 pounds of the total onsite releases. The IJC-critical pollutants released were lead and lead compounds (to air).

The largest release (408,000 pounds) of non-IJC chemicals was of ammonia (to air). No other chemicals were released in quantities as large as 150,000. See Table 6.2-C.

6.2.2.3 NPDES Data

The NPDES permitted discharges for Houghton County, MI are summarized in Table 6.2-D. The average annual permitted discharges in 2004 totaled 9,490 pounds, all of which was phosphorus. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

6.2.2.4 Beneficial Use Impairments (BUIs)

The U.S. EPA Web site states that a restriction on fish and wildlife consumption was documented in the 1987 Remedial Action Plan but was not updated. The advisory was limited to

sauger and walleye in Torch Lake and announced April 1983. That advisory has since been discontinued *per* Michigan Department of Community Health, 2008 Jun 25.

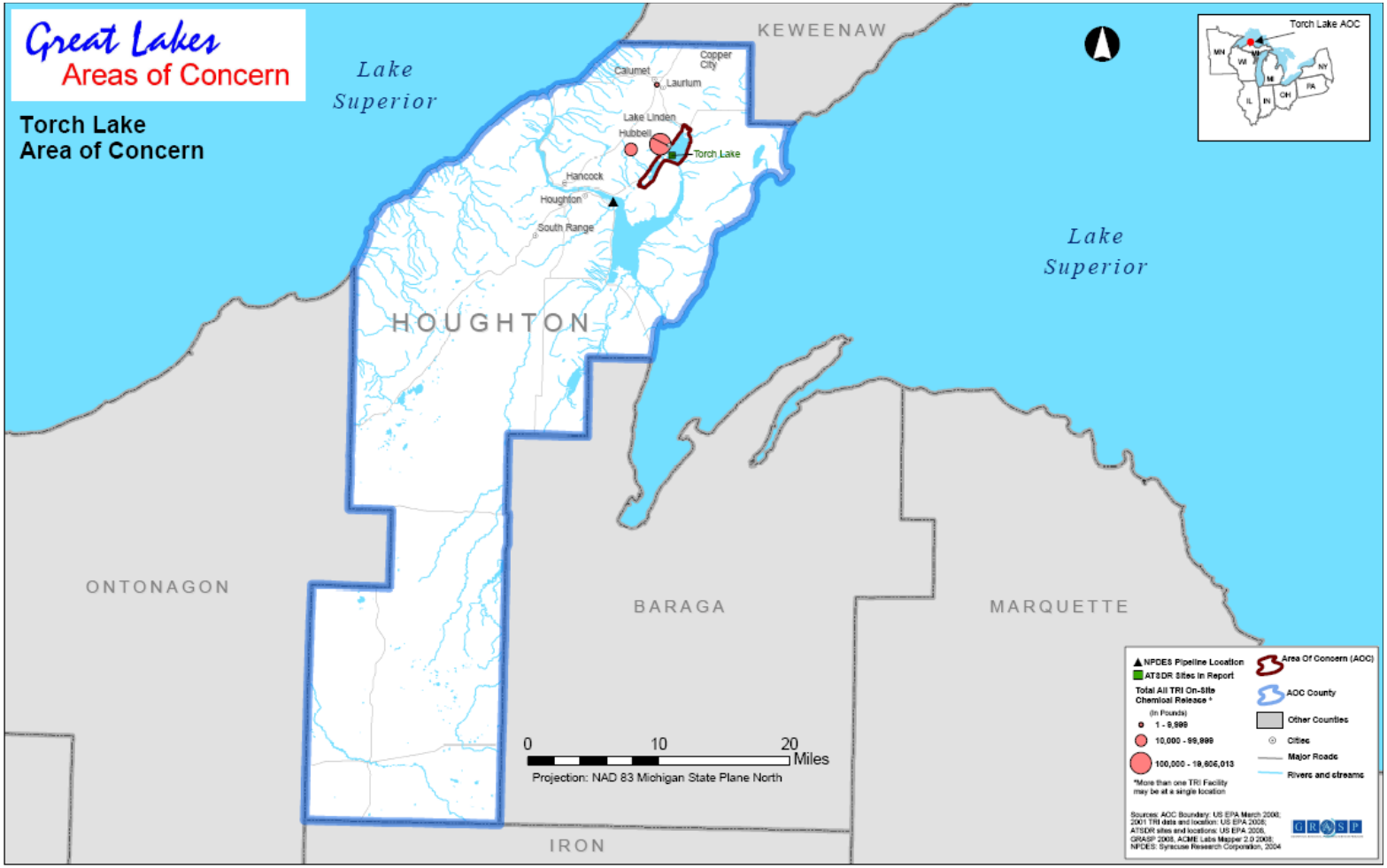

Great Lakes
Areas of Concern
Torch Lake
Area of Concern
Lake
Superior
KEWEENAW
Copper
City
Calumet
Laurium
Lake Linden
Hubbell
Torch Lake
Hancock
Houghton
South Range
HOUGHTON
Lake
Superior
ONTONAGON
BARAGA
MARQUETTE
IRON
0
10
20
Miles
Projection: NAD 83 Michigan State Plane North
Torch Lake AOC
MN
WI
MI
NY
IL
IN
OH
PA
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site
Chemical Release *
(in Pounds)
1 - 9,999
10,000 - 99,999
100,000 - 19,806,013
*More than one TRI Facility
may be at a single location
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Major Roads
Rivers and streams
Sources: AOC Boundary: US EPA March 2008;
2001 TRI data and location: US EPA 2008;
ATSDR sites and locations: US EPA 2008;
GRASP 2008, ACME Labs Mapper 2.0 2008;
NPDES: Syracuse Research Corporation, 2004
GRASP

Table 6.2-B. TRI Releases (in pounds, 2001) for the Torch Lake AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
LEAD	8	0.3	No data	0	0	0.3	0	0.3
LEAD COMPOUNDS	8	0.032	No data	0	0	0.032	5.52	5.552
	Total IJC	**0.332**	**No data**	**0**	**0**	**0.332**	**5.52**	**5.852**
AMMONIA		408109	No data	0	0	408109	0	408109
COPPER COMPOUNDS		500	No data	0	0	500	59011	59511
METHYL METHACRYLATE		1398	No data	0	0	1398	0	1398
STYRENE		77141	No data	0	0	77141	0	77141
	Total Non-IJC	**487148**	**No data**	**0**	**0**	**487148**	**59011**	**546159**
	Total	**487148.332**	**No data**	**0**	**0**	**487148.332**	**59016.52**	**546164.852**

Table 6.2-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the Torch Lake AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Lead and lead compounds	2			
Houghton County, MI	2	CALUMET ELECTRONICS CORP.	49913CLMTL25830	CALUMET

Table 6.2-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Torch Lake AOC

Chemical	*Facility*	*IJC Tracking Number*	*Discharge*		*City*
PHOSPHORUS, TOTAL (AS P)	PENINSULA COPPER INDS. INC. ,	49934PNNSL1700D	0		HUBBELL
			Total IJC9	**490**	
			Total Non-IJC	**9490**	
			Total	**9490**	

6.3. St. Louis River and Bay AOC, St. Louis and Carlton Counties, MN and Douglas County, WI.

The 39 miles of the St. Louis River below Cloquet, MN, constitute the St. Louis River and Bay AOC[4] (see AOC map at end of chapter and in Appendix 2).

6.3.1. Hazardous Waste Sites Relevant to the St. Louis River and Bay AOC

ATSDR evaluated data for hazardous waste sites in the counties relevant to this AOC, and reached conclusions regarding any public health threat those sites might pose. Conclusions are summarized in Table 6.3-A for sites categorized as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard at some point during their assessment history, together with information regarding the type and location of the site and the date and type of assessment document. ATSDR did not assess any waste sites in Carlton County, MN.

Table 6.3-A. Hazardous Waste Sites in St. Louis and Carlton Counties, MN, and Douglas County, WI

Site Name, City, and CERCLIS ID	*ATSDR Document Type*	*Document Year*	*ATSDR Hazard Category*	*Site Type*	*Remedial Status*
American Linen, Hibbing, St. Louis MND022817308	HA	2001	3	Non NPL	Ongoing
Arrowhead Refinery Co., St. Louis, Hermantown MND980823975	HA HA	1986 1993	3 2	NPL	Ongoing
Koppers Co. Superior Plant, Douglas, Superior WID006179493	HC HC	2001 2003	2 3	Non NPL	To be Determined
St. Louis River site, St. Louis, St. Louis County[5] MND039045430	HA HC	1989 2001	3 2	NPL	Ongoing

2 =Public Health Hazard, 3 =Indeterminate Public Health Hazard,

HA = Public Health Assessment, HC =Health Consultation, SRU=Site Review and Update

6.3.1.1 American Linen

This Hibbing (St. Louis County) MN, site currently occupies a full city block, bordered on the north by railroad tracks, to the east by 6th Avenue East, to the south by 19th Street, and to the west by 5th Avenue East. Commercial and industrial buildings are to the east and north (e.g., the

[4] The St. Louis River site comprises two sites: the Interlake/Duluth Tar Site and the U.S. Steel site

Hibbing Public Utilities steam plant and warehouses). Private residences are to the south, across 19th Street.

AmeriPride began commercial laundry operations at the site in the early 1920s in the building on the southeastern corner of the block. In 1987, three underground storage tanks (USTs) were removed from the site: two containing fuel oil and one containing gasoline.

In 1994, geotechnical drilling on the northeast portion of the site uncovered petroleum-contaminated soil. Approximately 1,400 cubic yards of soil previously removed from the site for geotechnical reasons was also suspected of petroleum-product contamination.

Investigation results showed that low levels of petroleum products remained in soil in the site's central portion. Groundwater sample analysis also revealed detectable levels of petroleum products. And volatile organic compounds (VOCs), primarily tetrachloroethylene (also known as perchloroethylene, or PCE), were also detected in soil and in groundwater at levels in excess of the MDH Health Risk Limit (HRL).

Demographic Data: The City of Hibbing is in St. Louis County and has a population of 17,720, in an estimated 7,478 households (1998 estimates; MOP 2000). The American Linen site is in a mixed use area, with commercial and industrial buildings to the east, north, and west, and residences to the south.

U.S. EPA Update: This American Linen site is a state-lead investigation site and does not appear in CERCLIS.

Minnesota Department of Health Update: Levels of VOCs in soil significantly exceed the MPCA's soil evaluation criteria for direct human contact. The contaminated soil is, however, beneath the site building, where the likelihood of human contact is minimal. The shallow groundwater beneath the site is contaminated with PCE and its breakdown products are at levels significantly in excess of the HRLs. At some locations, levels of vinyl chloride, a known human carcinogen, are over 100 times its HRL. Since monitoring began in the late 1990s, concentrations of VOCs in the shallow groundwater beneath and near the AmeriPride building have not changed significantly and show no clear upward or downward trend. Petroleum related site analyses continue to detect VOCs, although analyses for GRO and DRO have not been conducted since 1997. In the summer of 2008, however, a pilot test was conducted for an active soil venting remediation system beneath the AmeriPride building. Active remediation of the PCE contamination beneath the building is planned for the fall of 2008 (Mark Elliot, MPCA, Duluth, MN, personal communication, August 6, 2008).

Indoor air samples collected using SUMMA canisters in the basements of the AmeriPride building and Hibbing Public Utilities plant also show detectable levels of VOCs. Actual exposure to these levels of VOCs for an entire work day is likely not occurring, given the reported and observed use of the basements. The source of some of the VOCs may be other processes or products in use at the two facilities. Routine indoor air monitoring conducted on the upper floors of these buildings over the past several years has shown similar, but more variable, concentrations of PCE and other VOCs. The potential migration of gaseous VOCs along utility lines or through soil into other neighboring businesses or residences is currently under evaluation by sampling permanent soil vapor probes installed along the south side of 19th Street. The homes are 100 feet from the VOC plume's estimated boundary—but results are not yet available. For

that reason the site continues as an *Indeterminate Public Health Hazard* (Category 3). (Mark Elliot, MPCA, Duluth, MN, personal communication, 2008 Aug 6).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, no IJC-critical pollutants were identified at this site.

6.3.1.2 Arrowhead Refinery Company

The 10-acre Arrowhead Refinery site is about 8 miles northwest of Duluth in Hermantown (St. Louis County) MN. Before 1945, the facility retinned milk cans. From 1945 to 1977, Arrowhead Refinery recycled waste oil. In 1977, Arrowhead was ordered to stop onsite dumping of waste sludge from the oil refining process. Information regarding this site was taken from the 1986 and 1993 ATSDR public health assessments and the 2007 U.S. EPA NPL site Fact Sheet.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	33
Females aged 15-44	82
Adults 65 and older	56

ATSDR Conclusions: Because of potential exposures to lead-contaminated soil and waste sludge, in 1986 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In 1993, ATSDR again assessed site-related exposures and concluded that without remediation, the potential for health effects from future exposures rendered the site a *Public Health Hazard* (Category 2). ATSDR further concluded that processes resulting from onsite contamination provided a mechanism for the mobilization and transport of manganese by onsite groundwater. In the past, residents with downgradient private wells might have been exposed to manganese at levels of health concern, but municipal water was supplied to nearby residents downgradient of the site.

U.S. EPA Update: In its December 2007 Fact Sheet for the Arrowhead Refinery company site, U.S. EPA stated in part that

> A third five-year review completed in September 2007 determined that all of the issues from the second five-year review were addressed with the exception of the finalization of the property restrictive covenants. Restrictive covenants are one of several legal or administrative controls which help to minimize exposure to contaminants and are generally referred to as institutional controls. The third five-year review determined that the remedy is expected to be or is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. However, in order for the remedy to be protective in the long-term, the following actions need to be taken. A trial shut-down of the groundwater extraction system has been started and ground water monitoring will be performed for several more years to verify that groundwater clean up goals have been achieved. Groundwater will also be monitored to determine if surface water is being impacted by the site. An evaluation will also be performed to assure that institutional

controls have been implemented and that the institutional controls ensure long-term stewardship of the site.

Available at: http://www.epa.gov/region5superfund/npl/minnesota/MND980823975.htm. 2007 Dec [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutant lead, mercury, DDT, DDD, B[a]A, B[a]P, and chrysene were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

6.3.1.3 Koppers Company Superior Plant

The Koppers facility in the Town of Superior, (Douglas County) WI, contaminated the Crawford Creek basin soils and sediments with wood-treatment chemicals. Information regarding this site is from ATSDR's 2001 and 2003 health consultations.

ATSDR Conclusions: In 2001, ATSDR concluded that creosote wastes and PAHs in the soils and sediments of lower Crawford Creek posed a *Public Health Hazard* (Category 2). In 2003, ATSDR categorized the site as an *Indeterminate Public Health Hazard* (Category 3) for PCDD and PCDF contamination of fish. The Koppers facility contaminated the Crawford Creek basin with PAHs at levels of public health concern.

U.S. EPA Update: The Koppers Company Superior Plant site is a non-NPL site.

Wisconsin Department of Health and Family Services Update: Impacted flood plain soils along portions of Crawford Creek remain a public health hazard, but warning signs are annually inspected and maintained (Field & Technical Services, September 10, 2007, Summary of 2007 Sign Inspection Activities, Carnegie, PA). State and federal agencies and Beazer (Responsible Party) are discussing the details of the offsite human health risk assessment, which will be used to establish health-based cleanup goals and subsequent remedial actions. Fish surveyed and sampled during 2005 were limited to nonsport, forage fish in the creek. Subsequent laboratory tests found contaminant levels in these fish posed a no apparent human health hazard (BBL, Syracuse NY, Koppers Inc. Off-Property Investigation, 2006 Feb).

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical dioxins, furans, B[a]A, B[a]P, B[b]F, chrysene, DB[a,h]A, and I[123cd]P were identified at the site.

6.3.1.4 St. Louis River Site

St. Louis River comprises two sites: the 255-acre St. Louis River/Interlake/Duluth Tar site and the 640-acre U.S. Steel site, both within western Duluth on the St. Louis River. From about 1915 to 1979, U.S. Steel operated an integrated steel mill on the site. Soil, surface water, and groundwater are extensively contaminated with coke and tar products, which contain high concentrations of PAHs. From the late 1800s until about 1960, several companies used the Interlake Duluth Tar site for iron, steel, and tar manufacturing. This site was also extensively contaminated with PAHs. ATSDR's 1989 public health assessment, 2001 health consultation, and the U.S. EPA 2008 NPL site Fact Sheet supplied the information regarding both sites.

Demographic Data: The 2000 U.S. Census reported the following demographic profile for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	417
Females aged 15-44	934
Adults 65 and older	756

ATSDR Conclusions: In 1989, because of the risk to human health from possible exposure to hazardous substances through dermal contact, ingestion, or inhalation of contaminated soil or sediments, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In the 2001 health consultation, because of the possibility of exposure to contaminated sediments, ATSDR concluded the site was a *Public Health Hazard* (Category 2).

U.S. EPA Update: In its April 2008 Fact Sheet for the St Louis River/US Steel site, U.S. EPA stated in part with regard to the U. S. Steel site that

> ***U.S. Steel Site***
> The result of this five-year review indicated that the remedies are generally functioning as intended by the decision documents and are protective of human health and the environment in the short term. A protectiveness statement was developed for each OU and the two other response actions that were identified in the ROD with the exception of OU N and R. Protectiveness determinations were not developed for OU-N and R during this 5-year review because these areas are being evaluated as a component of an on-going sediment investigation.
>
> In order to assure the long-term protectiveness of the site, most of the remedial areas require follow-up activities. The ROD did not establish Target Clean-up Levels for soils. Therefore, the remedial actions that included removal of contaminated soil require an ecological and human health risk-based screening in order to assure long protectiveness. The operable units that had soil excavation as a component include OUs A, D, E, H and the Soil Contaminated by Above and Below Ground Petroleum Storage Tanks.
>
> With regard to the St Louis River Site, U.S. EPA stated in part that
>
> ***St. Louis River/Interlake/Duluth Tar Site***
> This Site is comprised of three Operable Units (OUs). The Tar Seep OU (TSOU), the Soil OU (SOU), and the Sediment OU (SedOU). Remedial actions have been completed at the TSOU and the SOU. A remedy has not yet been selected for the SedOU.
>
> The result of this five-year review indicated the TSOU remedy is protective of human health and the environment. The tar seeps identified in the TSOU ROD were location specific and have been removed. No further review of this remedy is recommended.
>
> The SOU remedy is protective of human health and the environment in the short term because soil above direct exposure cleanup levels for industrial land use and construction workers has been removed. However the

remedy currently is not protective in the long term. The evaluation of soil contaminant transport to ground water has not been determined and ground water monitoring over time has not been performed as specified in the SOU ROD/ESD. Ground water sampling results in support of the Sediment OU (SedOU) investigation indicate the presence of low-level contamination but there is insufficient data to establish trends. Also preventing a long-term protectiveness determination are incomplete or missing restrictive covenants, evidence of recreational trespassing, and the placement of fill in violation of the water well code. In order for the soil remedy to be protective in the long term, the institutional control issues and evaluation of contaminant migration from soil to ground water must be addressed.

A comprehensive site-wide protectiveness statement cannot be developed until the selection and implementation of the SedOU remedy.

U. S. Steel and SLRIDT Overall Protectiveness Statement
A comprehensive site-wide protectiveness statement cannot be made until the Sediment Operable Units for U. S. Steel and SLRIDT remedies have been selected and constructed. Another 5-year Review is currently underway and will be completed by September 2008.

Available at: http://www.epa.gov/region5superfund/npl/minnesota/MND039045430.htm. 2008 Apr [cited 2008 Jul 14].

IJC-critical Pollutants Identified within ATSDR Documents: During ATSDR's assessment of exposure-related issues, the IJC-critical pollutants B[a]A, B[a]P, I[1233cd]P, DB[ah]A, chrysene, furans, dioxin, mercury, and hexachlorobenzene were identified at this site. For a more complete listing of the hazardous substances found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

6.3.2. Summary and Conclusions for the St. Louis River and Bay AOC

6.3.2.1 Hazardous Waste Sites

ATSDR categorized five hazardous waste sites relevant to this AOC as either an urgent public health hazard, a public health hazard, or an indeterminate public health hazard. As of the date of this report, four sites were under remediation, and the remediation status of the remaining site was as yet to be determined.

St. Louis River Site: This site (comprising two sites on the river) has not been completely remediated and appears to have contributed significantly to the river's contaminant burden, including B(a)P.

Koppers Co. Superior Plant: ATSDR was concerned that the levels of PCDDs and PCDFs in sediment of the nearby creek could bioaccumulate to levels of concern in fish. Although as of the 2003 ATSDR health consultation, none of the site-related contaminants in the creek soil and

sediments had been cleaned up, the State of Wisconsin reports that as of the date of this report remediation discussions are active and ongoing.

6.3.2.2 TRI Data

In 2001, the TRI onsite chemical releases for St. Louis and Carlton Counties, MN, and Douglas County, WI, in 2001 totaled 1,253,524 pounds, the majority of which were released to air, followed by releases to land. St. Louis County accounted for 37%, Carlton County accounted for 46%, and Douglas County accounted for 17% of the total onsite releases.

IJC-critical pollutants accounted for 4,417 pounds (0.4 %) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air and land), lead and lead compounds (to air and land), and mercury compounds (primarily to air).

The largest release (300,000–499,999 pounds) of non-IJC-critical chemicals was of methanol (to air). The next largest release category (150,000–299,999 pounds) also had one chemical, barium compounds (primarily to land). See Table 6.3-B. Facilities that released these pollutants are listed in Table 6.3-C.

6.3.2.3 NPDES Data

The NPDES permitted discharges for St. Louis and Carlton Counties, MN and Douglas County, WI are summarized in Table 6.3-D. The average annual permitted discharges in 2004 totaled 3,468 pounds, the majority of which was phosphorus. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

6.3.2.4 Beneficial Use Impairments (BUIs)

Restrictions of fish consumption in Lake Superior and the St. Louis River have been issued by both Minnesota and Wisconsin based on mercury and polychlorinated biphenyl levels in fish tissue. Further information is available at the U.S. EPA Web site (http://www.epa.gov/glnpo/aoc/).

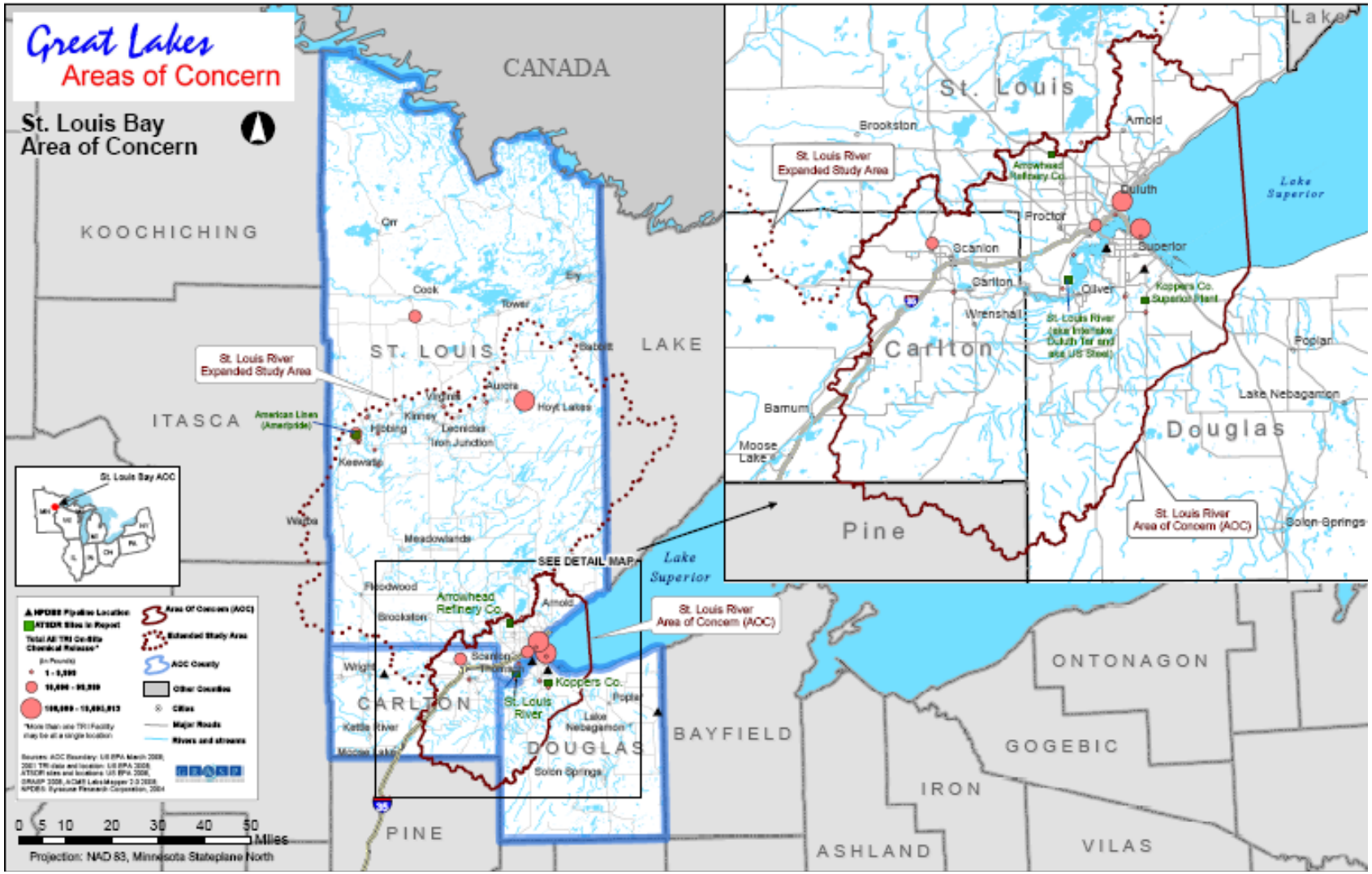

Great Lakes
Areas of Concern
St. Louis Bay
Area of Concern
CANADA
KOOCHICHING
ITASCA
ST. LOUIS
LAKE
CARLTON
DOUGLAS
PINE
BAYFIELD
ONTONAGON
GOGEBIC
IRON
ASHLAND
VILAS
St. Louis River
Expanded Study Area
St. Louis River
Area of Concern (AOC)
SEE DETAIL MAP
Arrowhead
Refinery Co.
Koppers Co.
St. Louis River
Lake Superior
Duluth
Superior
Proctor
Scanlon
Carlton
Oliver
Wrenshall
Barnum
Moose Lake
Lake Nebagamon
Poplar
Solon Springs
Cook
Orr
Tower
Eveleth
Virginia
Aurora
Hoyt Lakes
Hibbing
Kinney
Leonidas
Iron Junction
Keewatin
Nashwauk
Meadowlands
Floodwood
Brookston
Arnold
Wright
Kettle River
Moose Lake
American Lines
(Ameripride)
0 5 10 20 30 40 50
Miles
Projection: NAD 83, Minnesota Stateplane North

Table 6.3-B. TRI Releases (in pounds, 2001) for the St. Louis River and Bay AOC

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.002014709	0	0	0.001554525	0.003569234	0	0.003569234
(PCDDs and PCDFs)	3							
LEAD	8	355.3	0	0	17	372.3	16.9	389.2
LEAD COMPOUNDS	8	224.21	0.1	0	3785	4009.31	3372.65	7381.96
MERCURY	9	1.59	0	0	0	1.59	0	1.59
MERCURY COMPOUNDS	9	28.6	0	0	5.1	33.7	9.6	43.3
	Total IJC	**609.7020147**	**0.1**	**0**	**3807.101555**	**4416.903569**	**3399.15**	**7816.053569**
CHROMIUM		0	0	0	0	0	12189	12189
NICKEL COMPOUNDS		0	0	0	0	0	696	696
BENZO(G,H,I)PERYLENE		0.03	0	0	0.65	0.68	0.4	1.08
COPPER		1	0	0	0	1	21	22
CATECHOL		0	0	0	5	5	0	5
HYDROGEN FLUORIDE		5	0	0	0	5	0	5
BARIUM		10	5	0	0	15	1850	1865
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		10	5	0	0	15	4104	4119
MOLYBDENUM TRIOXIDE		10	5	0	0	15	100	115
NICKEL		10	5	0	0	15	150	165
MALEIC ANHYDRIDE		66	0	0	0	66	0	66

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
ETHYLENE		68	0	0	0	68	0	68
1,2,4-TRIMETHYLBENZENE		140	0	0	0	140	0	140
POLYCYCLIC AROMATIC COMPOUNDS		90.2	0.1	0	52	142.3	29.7	172
PHENOL		250	0	0	0	250	0	250
CYCLOHEXANE		267	0	0	0	267	0	267
CHLORINE		500	0	0	0	500	0	500
NAPHTHALENE		500	0	0	0	500	0	500
PROPYLENE OXIDE		500	0	0	0	500	0	500
CRESOL (MIXED ISOMERS)		755	0	0	5	760	0	760
TRICHLOROETHYLENE		889	0	0	0	889	0	889
NITRATE COMPOUNDS		0	0	0	1072	1072	0	1072
CREOSOTE		1280	1	0	0	1281	320	1601
TOLUENE		1302	0	0	0	1302	0	1302
BENZENE		1303	0	0	0	1303	0	1303
PROPYLENE		2088	0	0	0	2088	0	2088
METHYL ETHYL KETONE		2346	0	0	5	2351	0	2351
N-HEXANE		2485	0	0	0	2485	0	2485
ACROLEIN		13700	0	0	0	13700	0	13700
CHLORINE DIOXIDE		17124	0	0	0	17124	0	17124
ETHYLBENZENE		26588	0	0	0	26588	0	26588

Chemical	*IJC Tracking Number*	*Total Air Emissions*	*Surface Water Discharges*	*Under-ground Injection*	*Releases to Land*	*Total Onsite Releases*	*Total Offsite Releases*	*Total On- and Offsite Releases*
ACETALDEHYDE		44146	0	0	5	44151	0	44151
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		47557	0	0	0	47557	0	47557
FORMALDEHYDE		49963	0	0	5	49968	0	49968
MANGANESE COMPOUNDS		1461	15	0	89526	91002	41375	132377
XYLENE (MIXED ISOMERS)		114886	0	0	0	114886	0	114886
AMMONIA		123042	0	0	259	123301	0	123301
BARIUM COMPOUNDS		9441	12000	0	243059	264500	24599	289099
METHANOL		440294	0	0	0	440294	2033	442327
	Total Non-IJC	**903077.23**	**12036.1**	**0**	**333993.65**	**1249106.98**	**87467.1**	**1336574.08**
	Total	**903686.932**	**12036.2**	**0**	**337800.7516**	**1253523.884**	**90866.25**	**1344390.134**

Table 6.3-C. TRI Facilities Releasing IJC-critical Pollutants Onsite for the St. Louis River and Bay AOC

IJC-critical Pollutant	*Number of Facilities*	*Facility Name*	*TRIF ID*	*City*
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	1			
Carlton County, MN	1	Sappi Cloquet LLC (Formerly POTLATCH CORP.)	55720PTLTCNORTH	CLOQUET
Lead and lead compounds	11			
Carlton County, MN	1	POTLATCH CORP. MN P & P DIV.	55720PTLTCNORTH	CLOQUET
Douglas County, MN	2	CLM CORP.	54880CLMCRHILLA	SUPERIOR
		GEORGIA-PACIFIC CORP.	54880SPRRFNORTH	SUPERIOR
St. Louis County, MN	8	GEORGIA-PACIFIC CORP.	55816SPRWD14THA	DULUTH
		HIBBING PUBLIC UTILITIES COMMISSION	55749HBBNG1832S	HIBBING
		L & M RADIATOR INC.	55746LMRDT1414E	HIBBING
		LASKIN ENERGY CENTER	55705LSKNN5699C	HOYT LAKES
		ME GLOBAL INC.	55808MNTRN200EA	DULUTH
		NOBLE INDS. LTD.	55746HBBNG3430E	HIBBING
		NORTHERN CASTINGS CORP.	55746NRTHR555WE	HIBBING
		POTLATCH CORP.	55723PTLTCPOBOX	COOK
Mercury and mercury compounds	5			
Douglas County, MN	2	CLM CORP.	54880CLMCRHILLA	SUPERIOR
		MURPHY OIL USA INC.	54880MRPHY24THA	SUPERIOR
St. Louis County, MN	3	HIBBING PUBLIC UTILITIES COMMISSION	55749HBBNG1832S	HIBBING
		LASKIN ENERGY CENTER	55705LSKNN5699C	HOYT LAKES
		POTLATCH CORP.	55723PTLTCPOBOX	COOK

Table 6.3-D. NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, St. Louis River and Bay AOC

Chemical	*IJC Tracking Number*	*Discharge*
	Total IJC	**0**
CHROMIUM, HEXAVALENT TOT RECOVERABLE		47.45
CHROMIUM, TRIVALENT (AS CR)		573.05
PHENOLS		489.10
PHOSPHORUS, TOTAL (AS P)		1770.62
SULFITE (AS S)		587.65
	Total Non-IJC	**3467.87**
	Total	**3467.87**

Chapter 7. Conclusions and Recommendations

Chapter 7. Conclusions and Recommendations

7.1. Conclusions

In a December 5, 2001 letter, the International Joint Commission (IJC), which has both U.S. and Canadian members, asked ATSDR to evaluate the status of U.S. AOCs. Specifically, the letter stated

> In its 11th Biennial report, the IJC intends to comment on the hazards posed by the continuing presence of hazardous materials in the AOC's. To this end, the Commission would request that ATSDR provide to the Commission information on public health assessments that it has conducted on hazardous waste sites located within any of the 33 [*sic*] United States AOC's. It would be most helpful if ATSDR could identify evaluated sites within each AOC, the Hazard Category assigned to each site, any relevant demographic information available to ATSDR concerning populations at risk, completed exposure pathways identified, and the priority substances following these pathways.

This report responds to and extends the scope of that request and aims to provide useful information on chemical inputs from a variety of sources. Most importantly, this report provides updated summaries for waste sites ATSDR assessed in each of the 26 U.S. AOCs and the associated 54 AOC counties in the Great Lakes region. The ATSDR public health assessment products for 146 sites in the Great Lakes region are updated to make them current as of the date of this report. These data are supplemented with selected additional publicly available data that track additional pollutant discharges in the region. Taken together, although not a comprehensive view of environmental pollution in the region, we consider the compiled information to be potentially useful to researchers, policy makers, and the public.

After a review of all these data, we conclude

1. As a result of both past and ongoing releases, environmental pollution in the Great Lakes region is widespread. Of some 146 hazardous waste sites located in AOC counties and evaluated by ATSDR, many have been remediated; others are still undergoing long-term remediation. However, not all sites have been remediated, and ongoing chemical releases continue.
2. Throughout the region, fish tissue monitoring detects contaminant levels above levels thought to pose a risk to human health as determined by state and federal regulatory agencies. Monitoring efforts have led to the issuance of advisories to limit fish or wildlife consumption in all but one of the 26 AOCs—Presque Isle Bay in Pennsylvania. Fish advisories that result from chemical releases into an AOC are in some cases specific to locations within that AOC, and in other instances are regional.
3. The data reported here do not reflect the totality of chemical pollution in the region. Many sources of contamination exist that are not ATSDR-evaluated sites. For example, TRI data do not reflect the totality of toxic releases: reporting

exemptions included small firms, firms from certain industry sectors, and other categories of emitters. The NPDES data did not include information on nonpoint-source water pollutants. Thus available data even taken together do not include exposures from pesticide applications, from mobile sources, or from indoor sources, The data hence provide only a partial picture of contaminants in the environment.

4. The available information on environmental pollution provides little insight on the *exposure* of people to pollutants. TRI data on chemicals used and emitted, and NPDES data on chemicals discharged into water, do not indicate whether these chemicals reach people and enter their bodies. ATSDR assessments of hazardous waste sites do, however, include analysis of exposure pathways, and, when available, do include data on how much exposure actually occurs.
5. Current data do not allow us to draw firm conclusions about relationships between critical pollutants in the Great Lakes region and potential health effects.
    - Data that are routinely collected (such as information on cancer and birth defects) are not well matched to exposure data in time or by location and therefore cannot help to assess whether the identified environmental exposures have adverse health consequences.
    - In addition, data are not routinely collected on some important health effects that might be associated with toxic exposures such as neurobehavioral, endocrine, reproductive, and immune effects.
6. Although much research on environmental contamination and related health issues has been done, more is needed. From 1992 to 2008, ATSDR's Great Lakes Human Health Research Program has supported approximately $32 million in extramural research in the Great Lakes. This represents a tangible commitment on the part of ATSDR to public health in the region. Data from these studies have provided some useful information to important public health issues and are vital to improving and safeguarding human health in the Great Lakes region. See Appendix 4 for additional information.

The issues that motivated the IJC to request this report matter to many people. Those who live in the region, those who provide health care, and those entrusted with the public welfare, to name a few, are all interested in the quality of the Great Lakes ecosystems and environment. And given the evidence of contamination in many areas of the Great Lakes region, efforts to move toward answers in scientifically rigorous, accurate ways are well justified. Yet this report reveals that with regard to our ability to grapple with these issues, the limitations are indeed considerable.

7.2. Recommendations

Understanding environmental conditions in the Great Lakes region and protecting residents from possible health effects is a priority for ATSDR and CDC. Community members in the Great Lakes region deserve accurate environmental health information provided in a timely manner. ATSDR and CDC have a number of programs that serve these aims: ATSDR conducts a range of activities at hazardous waste sites to protect the

public from exposure to hazardous chemicals. Between January 2001 and February 2008 in the eight Great Lakes states, ATSDR worked at 528 sites, resulting in 756 health-related documents and a broad range of scientific and public health achievements.

Nevertheless, although activities are extensive and ongoing, this report underscores the need for additional work to permit scientists, decision makers, and the public to define and take action to prevent human health threats posed by pollutants in the Great Lakes region. Needed actions include

1. Collection of data on environmental contaminants, including characterization of air, water, soil, foods, consumer goods, and pathways of exposure.
2. Modeling of exposure pathways using appropriate information about historical environmental exposure especially to provide information about potential causes of health conditions with long latencies.
3. Increased biomonitoring to characterize amounts of chemicals in the bodies of people of the Great Lakes region.
4. Development of data linkages that permit joint analyses of the various environmental data sets and between health and environmental data.
5. Collection of data on a broader range of outcomes that may be associated with chemical exposure such as neurobehavioral, endocrine, reproductive, and immune functions.
6. Performance of analytical epidemiology studies to investigate specific hypotheses arising from the foregoing data sets including advanced techniques for measuring exposures and outcomes, careful consideration of individual variability in susceptibility including genetic analyses, careful control of confounders, and sophisticated data analysis.
7. Taking appropriate public health action based on the foregoing information such as developing standardized criteria for restrictions on human consumption of Great Lakes region fish.

Given the magnitude of needed actions, the needed additional work will require a coordinated, collaborative effort by the relevant state and federal agencies and partners.

ATSDR strongly supports the need for data collection and research to help elucidate the links between chemical contamination and health effects in the Great Lakes region and elsewhere. Existing efforts at ATSDR and CDC, such as the Great Lakes Human Health Effects Research Program (http://www.atsdr.cdc.gov/grtlakes/program-overview.html and Appendix 4), and the Environmental Public Health Tracking program (http://www.cdc.gov/nceh/tracking/), represent important steps toward those goals.

This report suggests that such efforts are well justified.

Chapter 8. Bibliography

ATSDR public health assessment guidance manual. 2005. Available at: http://www.atsdr.cdc.gov/HAC/PHAManual/toc.html.

Anderson HA, Falk C, Hanrahan L, Olson J, Burse V, Needham L, et al. 1998. Profiles of Great Lakes critical pollutants: a sentinel analysis of human blood and urine–The Great Lakes Consortium. Environ Health Perspect 106(5):279–89.

Baibergenova A, Kudyakov R, Zdeb M, Carpenter D. 2003. Low birth weight and residential proximity to PCB-contaminated waste sites. Environ Health Perspect 111:135–57.

Bloom MS, Vena JE, Swanson MK, Moysich KB, Olson JR. 2005. Profiles of ortho-polychlorinated biphenyl congeners, dichlorodiphenyldichloroethylene, hexachlorobenzene, and Mirex among male Lake Ontario sportfish consumers: the New York State Angler Cohort Study. Environ Res 97:178–94.

Buck GM, Vena JE, Greizerstein HB, Weiner JM, McGuinness B, Mendola PP. et al. 2002. PCB congeners and pesticides and female fecundity: New York State Angler Prospective Pregnancy Study. Environ Toxicol Pharmacol 12: 83–92.

Bureau of the Census. 2000. Demographic data. Available at: http://factfinder.census.gov/. Washington DC: US Department of Commerce.

Courval JM, DeHoog JV, Stein AD, Tay EM, He J, Humphrey HEB, and Paneth N. 1999. Sport-caught fish consumption and conception delay in licensed Michigan anglers. Environ Res 80 (Suppl 2):183–88.

Decaprio AP, Johnson GW, Tarbell AM, Carpenter DO, Chiarenzelli JR, Morse GS, Akwesasneet al. 2005. Task Force on the Environment. Polychlorinated Bipenyl (PCB) Exposure assessment by multivariate statistical analysis of congener profiles in an adult Native American population. Environ Res 98:284–302.

Dellinger JA. 2004. Exposure assessment and initial intervention regarding fish consumption of tribal members of the Upper Great Lakes Region in the United States. Environ Res 95(3):325–40.

Fein GG, Jacobson JL, Jacobson SW, Schwartz PM, Dowler JK. 1984. Prenatal exposure to polychlorinated biphenyls, effects on birth size and gestational age. J Pediatr 105:315320–20.

Fitzgerald EF, Hwanf SA, Lamvert G, Gomez M, Tarbell A. 2005. PCB Exposure and in vivo CYP1A2 activity among Native Americans. Environ Health Perspect 113(3):1–6.

Gardiner JC. 2001. Impairments memory and learning in older adults exposed to polychlorinated biphenyls via consumption of Great Lakes Fish. Environ Health Perspect 109:605–11.

HazDat. Agency for Toxic Substances and Disease Registry Hazardous Substance Release and Health Effects Database. Available at: http://www.atsdr.cdc.gov/hazdat.html [cited 2008 Dec 5].

Lonky E, Reihman J, Darvill T, Mather JS, Daly H. 1996. Neonatal behavioral assessment scale performance in humans influenced by maternal consumption of environmentally contaminated Lake Ontario fish. J Great Lakes Res 22 (2):198–221.

Mendola P, Buck GM, Sever LE, Zielezny M, Vena JE. 1997. Consumption of PCB-contaminated freshwater fish and shortened menstrual cycle length. Am J Epidemiol; 146: 55–60.

Mendola P, Robinson LK, Buck GM, Druschel CM, Fitzgerald EF, Sever LE, et al. 2005. Birth defects associated with maternal sport fish consumption: potential effect modification by offspring. Environ Res 97(2):133–140.

Schantz SL, Gasior DM, Polverejan E, McCaffrey RJ, Sweeney AM, Humphrey HEB, Gardineret al. 2001. Impairments of memory and learning in older adults exposed to poly-chlorinated biphenyls via consumption of Great Lakes fish. Environ Health Perspect 109(6):605–11.

Smith B.J. 1984. PCB levels in human fluids: Sheboygan Case Study. TR WIS-SG-83-240. Madison, Wisconsin: University of Wisconsin Sea Grant Institute.

Stewart PW, Sargent DM, Reihman J, Gump BB, Lonkey E, Darvill T, et al. 2006. Reinforcement inhibition during differential reinforcement of low rates (DRL) schedules may be sensitive to low-level PCB, MeHg, and Pb exposure in children. Environ Health Perspect 114:1923–29.

Stewart P, Fitzgerald S, Reihman J, Gump B, Lonky E, Darvill T, et al. 2003. Prenatal PCB exposure, the corpus callosum and response inhibition. Environ Health Perspect 111(13):1670–77.

Stewart P, Reihman J, Lonky E, Darvill T, Pagano J. 2000. Prenatal PCB exposure and neonatal behavioral assessment scale (NBAS) performance. Neurotoxicol Teratol 22:21–9.

Tilden J, Hanrahan LP, Anderson H, Palit C, Olson J, Kenzie WM. 1997. Health advisories for consumers of Great Lakes Sport fish: is the message being received? Environ Health Perspect 105(12):13601365–65.

Turyk M, Anderson HA, Hanrahan LP, Falk C, Steenport DN, Needham LL Jr. 2006. Relationship serum levels of individual PCB, dioxin, and furan congeners and DDE with Great Lakes sport-caught fish consumption. Environ Res 100:173–83.

US E.P.A. US Environmental Protection Agency. Great Lakes National Program Office . Available at: http://www.epa.gov/glnpo/aoc/ (for AOC location information)).

US E.P.A. US Environmental Protection Agency Toxics Release Inventory (TRI). Available at: ,http://www.epa.gov/tri/. 2003 Public Data Release data set (frozen March 3, 2003 and released to the public June 30, 2003).

US E.P.A. 2003. NPL Fact Sheets. Available at: http://www.epa.gov/epahome/whereyoulive.htm#regiontext.

Vasiliu O, Cameron L, Gardiner J, DeGuire P, and Karmaus W. 2006. Polybrominated biphenyls, polychlorinated biphenyls, body weight, and incidence of adult-onset diabetes mellitus. Epidemiol 17(4):352–59.

Xhu F, Holzman C, Rahbar MH, Trosko K, and Fischer L. 2006. Maternal fish consumption, mercury levels and risk of preterm delivery. Environ Health Perspect;115(1):42–7.

Appendix 1. ATSDR Glossary of Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-800-CDC-INFO (1-800-232-4636).

Absorption
The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute
Occurring over a short time [compare with chronic].

Acute exposure
Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Additive effect
A biologic response to exposure to multiple substances that equals the sum of responses of all the individual substances added together [compare with antagonistic effect and synergistic effect].

Adverse health effect
A change in body function or cell structure that might lead to disease or health problems

Aerobic
Requiring oxygen [compare with anaerobic].

Ambient
Surrounding (for example, ambient air).

Anaerobic
Requiring the absence of oxygen [compare with aerobic].

Background level
An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biodegradation
Decomposition or breakdown of a substance through the action of microorganisms (such as bacteria or fungi) or other natural physical processes (such as sunlight).

Biologic indicators of exposure study
A study that uses (a) biomedical testing or (b) the measurement of a substance [an

analyte], its metabolite, or another marker of exposure in human body fluids or tissues to confirm human exposure to a hazardous substance [also see exposure investigation].

Biologic monitoring
Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred. A blood test for lead is an example of biologic monitoring.

Biologic uptake
The transfer of substances from the environment to plants, animals, and humans.

Biomedical testing
Testing of persons to find out whether a change in a body function might have occurred because of exposure to a hazardous substance.

Biota
Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

Body burden
The total amount of a substance in the body. Some substances build up in the body because they are stored in fat or bone or because they leave the body very slowly.

Brownfields
With certain legal exclusions and additions, the term "brownfields" or "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

CAP [see Community Assistance Panel.]

Cancer
Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk
A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen
A substance that causes cancer.

Case study
A medical or epidemiologic evaluation of one person or a small group of people to gather information about specific health conditions and past exposures.

Case-control study
A study that compares exposures of people who have a disease or condition (cases) with people who do not have the disease or condition (controls). Exposures that are more common among the cases may be considered as possible risk factors for the disease.

CERCLA [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

Chronic
Occurring over a long time [compare with acute].

Chronic exposure
Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Cluster investigation
A review of an unusual number, real or perceived, of health events (for example, reports of cancer) grouped together in time and location. Cluster investigations are designed to confirm case reports; determine whether they represent an unusual disease occurrence; and, if possible, explore possible causes and contributing environmental factors.

Community Assistance Panel (CAP)
A group of people from a community and from health and environmental agencies who work with ATSDR to resolve issues and problems related to hazardous substances in the community. CAP members work with ATSDR to gather and review community health concerns, provide information on how people might have been or might now be exposed to hazardous substances, and inform ATSDR on ways to involve the community in its activities.

Comparison value (CV)
Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see exposure pathway].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)
CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Concentration
The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant
A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Delayed health effect
A disease or an injury that happens as a result of exposures that might have occurred in the past.

Dermal
Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact
Contact with (touching) the skin [see route of exposure].

Detection limit
The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Disease prevention
Measures used to prevent a disease or reduce its severity.

Disease registry
A system of ongoing registration of all cases of a particular disease or health condition in a defined population.

DOD
United States Department of Defense.

DOE
United States Department of Energy.

Dose (for chemicals that are not radioactive)
The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An "exposure dose" is how much of a substance is encountered in the environment. An "absorbed dose" is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Environmental media
Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

Environmental media and transport mechanism
Environmental media include water, air, soil, and biota (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The environmental media and transport mechanism is the second part of an exposure pathway.

U.S. EPA
United States Environmental Protection Agency.

Epidemiologic surveillance [see Public health surveillance].

Epidemiology
The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Exposure
Contact with a substance by swallowing, breathing, or touching the skin or eyes.

Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure assessment
The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

Exposure-dose reconstruction
A method of estimating the amount of people's past exposure to hazardous substances. Computer and approximation methods are used when past information is limited, not available, or missing.

Exposure investigation
The collection and analysis of site-specific information and biologic tests (when appropriate) to determine whether people have been exposed to hazardous substances.

Exposure pathway
The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Exposure registry
A system of ongoing followup of people who have had documented environmental exposures.

Feasibility study
A study by EPA to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well.

Geographic information system (GIS)
A mapping system that uses computers to collect, store, manipulate, analyze, and display data. For example, GIS can show the concentration of a contaminant within a community in relation to points of reference such as streets and homes.

Groundwater
Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

Hazard
A source of potential harm from past, current, or future exposures.

Hazardous Substance Release and Health Effects Database (HazDat)
The scientific and administrative database system developed by ATSDR to manage data collection, retrieval, and analysis of site-specific information on hazardous substances, community health concerns, and public health activities.

Hazardous waste
Potentially harmful substances that have been released or discarded into the environment.

Health consultation
A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical [compare with public health assessment].

Health education
Programs designed with a community to help it know about health risks and how to reduce these risks.

Health investigation
The collection and evaluation of information about the health of community residents. This information is used to describe or count the occurrence of a disease, symptom, or clinical measure and to evaluate the possible association between the occurrence and exposure to hazardous substances.

Health statistics review
The analysis of existing health information (i.e., from death certificates, birth defects registries, and cancer registries) to determine if there is excess disease in a specific population, geographic area, and time period. A health statistics review is a descriptive epidemiologic study.

Indeterminate public health hazard
The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

Incidence
The number of new cases of disease in a defined population over a specific time period [contrast with prevalence].

Ingestion
The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].

Inhalation
The act of breathing. A hazardous substance can enter the body this way [see route of exposure].

Intermediate duration exposure
Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].

Medical monitoring
A set of medical tests and physical exams specifically designed to evaluate whether an individual's exposure could negatively affect that person's health.

mg/kg
Milligram per kilogram.

mg/cm^2
Milligram per square centimeter (of a surface).

mg/m^3
Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.

Migration
Moving from one location to another.

Minimal risk level (MRL)
An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].

Morbidity
State of being ill or diseased. Morbidity is the occurrence of a disease or condition that alters health and quality of life.

Mortality
Death. Usually the cause (a specific disease, a condition, or an injury) is stated.

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)
EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

National Toxicology Program (NTP)
Part of the Department of Health and Human Services. NTP develops and carries out tests to predict whether a chemical will cause harm to humans.

No apparent public health hazard
A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No public health hazard
A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see National Priorities List for Uncontrolled Hazardous Waste Sites]

Pica
A craving to eat nonfood items, such as dirt, paint chips, and clay. Some children exhibit pica-related behavior.

Plume
A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the

direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure
The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population
A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially responsible party (PRP)
A company, government, or person legally responsible for cleaning up the pollution at a hazardous waste site under Superfund. There may be more than one PRP for a particular site.

ppb
Parts per billion.

ppm
Parts per million.

Prevalence
The number of existing disease cases in a defined population during a specific time period [contrast with incidence].

Prevalence survey
The measure of the current level of disease(s) or symptoms and exposures through a questionnaire that collects self-reported information from a defined population.

Prevention
Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

Public availability session
An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.

Public comment period
An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

Public health action
A list of steps to protect public health.

Public health advisory
A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

Public health assessment (PHA)
An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be

harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with health consultation].

Public health hazard
A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.

Public health hazard categories
Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

Public Health Outcome Data

Health outcome data are counts and rates of health-related events in a population. Examples of health-related events are hospitalizations for diseases such as asthma or cardiovascular disease, births of infants with low birth weight, and new diagnoses of cancer.

Public health surveillance
The ongoing, systematic collection, analysis, and interpretation of health data. This activity also involves timely dissemination of the data and use for public health programs.

Public meeting
A public forum with community members for communication about a site.

RCRA [see Resource Conservation and Recovery Act (1976, 1984)]

Receptor population
People who could come into contact with hazardous substances [see exposure pathway].

Record of Decision

The Record of Decision (ROD) is a public document that explains which cleanup alternatives will be used to clean up a Superfund site. The ROD for sites listed on the NPL is created from information generated during the RI/FS.

Reference dose (RfD)
An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Registry
A systematic collection of information on persons exposed to a specific substance or having specific diseases [see exposure registry and disease registry].

Remedial investigation
The CERCLA process of determining the type and extent of hazardous material contamination at a site.

Resource Conservation and Recovery Act (1976, 1984) (RCRA)
This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

RFA
RCRA Facility Assessment. An assessment required by RCRA to identify potential and actual releases of hazardous chemicals.

RfD [see reference dose]

RI/FS

After a site is listed on the NPL, a remedial investigation/feasibility study (RI/FS) is performed at the site. The RI serves as the mechanism for collecting data, while the FS is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The RI and FS are conducted concurrently. Data collected in the RI influence the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations.

Risk
The probability that something will cause injury or harm.

Risk reduction
Actions that can decrease the likelihood that individuals, groups, or communities will experience disease or other health conditions.

Risk communication
The exchange of information to increase understanding of health risks.

Route of exposure
The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Safety factor [see uncertainty factor]

SARA [see Superfund Amendments and Reauthorization Act]

Sample
A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size
The number of units chosen from a population or an environment.

Solvent
A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

Source of contamination
The place where a hazardous substance comes from, such as a landfill, waste pond,

incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Special populations
People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Stakeholder
A person, group, or community who has an interest in activities at a hazardous waste site.

Statistics
A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance
A chemical.

Superfund [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)]

Superfund Amendments and Reauthorization Act (SARA)
In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface water
Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

Surveillance [see public health surveillance]

Survey
A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people [see prevalence survey].

Toxic agent
Chemical or physical (for example, radiation, heat, cold, microwaves) agents that, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile
An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology
The study of the harmful effects of substances on humans or animals.

Tumor
An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).

Urgent public health hazard
A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

Volatile organic compounds (VOCs)
Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

Other glossaries and dictionaries:
Environmental Protection Agency (http://www.epa.gov/ocepaterms/)
National Library of Medicine (NIH)
(http://www.nlm.nih.gov/medlineplus/mplusdictionary.html

For more information on the work of ATSDR, please contact:
Office of Policy and External Affairs
Agency for Toxic Substances and Disease Registry
1600 Clifton Road, N.E. (MS E-60)
Atlanta, GA 30333
Telephone: (404) 498-0080

Appendix 2. 11 x 17 AOC Maps

See:

http://www.atsdr.cdc.gov/grtlakes/2008.html

Appendix 3. Additional Resources.

To address connections between environmental contamination and residents' health in the Great Lakes' Areas of Concern (AOCs), public health researchers must identify and evaluate detailed environmental contamination and human health data. Initially, associations between environmental toxins and health are evaluated by conducting descriptive assessments of ecologic (grouped) data. This involves the use of environmental contamination and health outcome data from large populations within a geographic area such as an AOC or AOC county. These initial assessments use readily available, population-based datasets and are useful for hypothesis generation, monitoring of general trends, and identification of specific scenarios that merit further analytical evaluation.

Grouped analyses depend on summary measures of both an exposure and a health outcome for each geographic area in the analyses. Analyses of grouped data can sometimes provide useful information that generate further research questions. However, we did not feel that the data available for use in this report supported these types of analyses. First, much of the exposure to pollutants in this area is localized and does not apply to a whole AOC or AOC county, making summary measures of exposure potentially misleading. Second, the available health data does not necessarily measure outcomes of greatest interest relating to exposure to IJC-critical contaminants.

Regardless of whether grouped analyses are appropriate for particular research questions, they are generally followed by more refined, individual analyses. To conduct individual-level analyses that further evaluate relationships between environmental contaminants and health effects within AOCs, public health researchers must identify or collect specific, linkable, individual-level data on environmental contaminants and potential health effects. Unfortunately, linkable environmental contamination and health data at the individual level are not readily available. Relevant data on environmental contaminants include concentrations, spatial distribution within different environmental media, and the time frames associated with their presence in environmental media. For health effects data, necessary elements include information on the persons at risk (that is, who lived in AOCs during periods of significant contamination) and the adverse health effects experienced by those people.

Many limitations are associated with the current methods used to collect health data and the utility of this information for evaluating associations with the environment. A primary limitation is the dearth of health data for many adverse effects potentially associated with low-level, environmental contaminants. Consider residents who suffer from the broad range of behavioral, reproductive, developmental, neurologic, endocrinologic, and immunologic conditions. These conditions are all associated with the myriad of contaminants contained within the AOCs, yet most of these health effects are not captured by public health surveillance systems. Individual-level data for the majority of these conditions, such as a patient's medical records, reside with a patient's doctors, medical care facilities, or insurers. This makes uniform collection and assessment of this data prohibitive.

When quality data are available, the task is still difficult. Cancer registries have existed in most of the Great Lakes states since the 1990s. In terms of data quality and completeness, cancer incidence data collected by state cancer registries are considered a gold standard for chronic disease surveillance. Yet, even with available cancer data, environmental health research is hampered by data gaps in equally important areas such as the ability to link the cancer data with information on the person's exposure history or the measurement of other lifestyle characteristics that could confound or modify a potential association.

Similar to the inherent difficulties in evaluating health effects data, no comprehensive data source describes contaminant levels, their location in space and time, and their potential interface with human populations. Many separate environmental data sources describe industrial facilities and their environmental releases or historically contaminated sites and their associated impacts. However, none of these sources provide sufficient information on the contaminant, the process by which the contaminant was released, the geographic location of the release, or the duration of the release. As a result, researchers struggle to link disparate health and environmental data while also recognizing and considering other important influences such as disease latency, residential in and out migration, and lifestyle.

While no single comprehensive source of environmental or health data exists within the Great Lakes states, some examples of data sources provide quality information on specific causes of morbidity and mortality. This is true for environmental contamination as well. A few of these health and environmental datasets even overlap in time and space. However, proximity to environmental contamination does not imply exposure or effect. Exposure assessment is the process that uses environmental and health data, along with other important predictor variables, to determine a person's likelihood and level of exposure. The exposure assessment process provides a quantitative interface for evaluating environmental contamination and health data. This interface may use assumptions on water consumption, air inhalation, or soil contact to model the estimated exposures for persons or specific populations. Preferably, it will include more robust evaluations of exposure via biomonitoring.

The process of collecting, analyzing, and interpreting information for the AOCs should be clear and transparent. When relying on disparate datasets across the eight states containing the 26 U.S. AOCs, the task of evaluating and linking environmental and health data for these unique locations is a considerable challenge. In most cases, the contaminants are many, the current threats varied, and the potentially exposed population difficult to identify. Combined with the numerous, potentially associated health effects that are broad in their own characteristics, this becomes a daunting task.

When prioritizing public health research projects and applied public health actions, the primary decision criteria often relate to data quality, availability, and accessibility. Data quality refers to both the systematic collection procedures used to obtain the information as well as the specific details captured in this process. Systematic collection may include environmental and health data grouped at some geographic level within an AOC such as a county or zip code, or it may consist of more specific information describing persons with an adverse health effect or detailed environmental sampling results. The specific minutiae captured in this process must somehow be linked to each other through

geographic location and time. Availability and accessibility of data bespeak the presence of systematic collection procedures and to the degree in which a researcher can obtain this information in a useable and timely fashion. Preferably, these data are representative of the population at risk. Only by identifying or collecting quality data, can researchers make substantial progress in making the connection between the environment within each AOC and the health of the area residents.

ATSDR has compiled a list of data sources or datasets that are potentially useful in evaluating AOCs on a broad scale (Annex 1). The list includes both sources of health and environmental data. Some health data, including birth and death data as well as cancer incidence, are available for all AOCs. Other health data are specific to only some AOCs, such as birth defects and hospital admissions or discharge data. Similarly, some environmental data sources provide data for all AOCs while some are specific to AOCs or smaller units within these areas. Refer to Annex 1 for specific sources and a description of data that they capture.

While there are numerous health and environmental data sources listed, this is not an exhaustive list. It is likely that there are other health and environmental data sources, particularly for specific AOCs or smaller areas within an AOC, which could further assist in any evaluations. This list identifies only some of the more relevant data sources available across most areas. The methodology and limitations of each data source are varied and are important issues to consider prior to intended use.

It is evident that linking environmental and health data in a meaningful way, even when both are collected at the same time and in the same place, is a difficult task. But it is a necessity if we are to evaluate effectively the relationships between them. Most environmentally mediated health effects are chronic conditions that take years to develop following low-level exposures. In light of such challenges, public health researchers must address the disparate nature of these data sources. The CDC's National Environmental Public Health Tracking Program is leading the initiative to address many of the problems encountered in the evaluation of environment and health data, such as those seen in the Great Lakes region. The program's goal is to create a nationwide network of integrated health and environmental data—the National Environmental Public Health Tracking Network. Information from this network will increase the effectiveness of government agencies and academic researchers in evaluating public health actions and in preventing environmentally mediated diseases.

Annex 1.

Health Data

Birth Defects Statistics –

- State health departments collect data on the frequency of children born with adverse pregnancy related outcomes, including birth defects.
- The following state health departments collect this information.
  - IL - http://www.idph.state.il.us/about/epi/apors.htm
  - MI - http://www.michigan.gov/mdch/0,1607,7-132-2944_4670---,00.html
  - MN- http://www.health.state.mn.us/divs/eh/birthdefects/
  - NY- http://www.health.state.ny.us/diseases/congenital_malformations/cmrhome.htm

Birth and Death Statistics –

- National birth and death data are compiled by the National Center for Health Statistics and are publicly available via the Centers for Disease Control and Prevention (CDC) Wonder http://wonder.cdc.gov/
- State vital statistics offices also house this information.
  - IN - http://www.in.gov/isdh/19096.htm
  - IL - http://www.idph.state.il.us/vitalrecords/death_research.htm
  - MI - http://www.michigan.gov/mdch/0,1607,7-132-2944_4669---,00.html
  - MN- http://www.health.state.mn.us/stats.html#birthstats
  - NY- http://www.health.state.ny.us/vital_records/death.htm
  - OH- http://www.odh.ohio.gov/healthStats/vitalstats/deathstat.aspx
  - PA - http://www.dsf.health.state.pa.us/health/cwp/view.asp?a=175&Q=201638
  - WI - http://dhs.wisconsin.gov/deaths/index.htm
    http://dhs.wisconsin.gov/births/index.htm

Cancer Statistics –

- National cancer statistics are compiled by the National Center for Health Statistics and are publicly available via CDC Wonder http://wonder.cdc.gov/
- State health departments collect cancer incidence data from (at least) 1997 onward.
  - IN - http://www.in.gov/isdh/23456.htm
  - IL - http://www.idph.state.il.us/cancer/statistics.htm
  - MI - http://www.michigancancer.org/resources/CancerData.cfm#midata
  - MN- http://www.health.state.mn.us/divs/hpcd/cdee/mcss/index.html
  - NY- http://www.health.state.ny.us/statistics/cancer/registry/
  - OH- http://www.odh.ohio.gov/odhPrograms/svio/ci_surv/ci_surv1.aspx
  - PA - http://sedac.ciesin.org/ozone/regs/pennsylvania.html
  - WI - http://dhs.wisconsin.gov/wcrs/index.htm
- National cancer incidence data are available from the Surveillance, Epidemiology (SEER) database through the National Cancer Institute. SEER collects information on incidence, survival, and prevalence from specific geographic areas representing 26 percent of the U.S. population and compiles reports on these measures as well as cancer mortality for the entire U.S. http://seer.cancer.gov/canques/

Hospital, Health Care, and Public Health Clinic Statistics –

- These data describe hospital admissions and discharges and contain information on the reason for the hospital visit, treatment obtained, and services rendered.
- The following state health departments collect this information.
  - IN - http://www.in.gov/isdh/20624.htm
  - IL - http://app.idph.state.il.us/emsrpt/hospitalization.asp
  - MI - http://www.michigan.gov/mdch/0,1607,7-132-2944_5324---,00.html
  - NY - The Statewide Planning and Research Cooperative System collects patient level data on patient characteristics, diagnoses and treatments, services, and charges for every hospital discharge, ambulatory surgery patient, and emergency department admission in New York State. http://www.health.state.ny.us/statistics/sparcs/operations/overview.htm
  - WI - http://dhs.wisconsin.gov/provider/hospitals.htm

NHANES –

- The National Health and Nutrition Examination Survey (NHANES) assesses the health and nutritional status of adults and children in the United States. An interview and physical exam are conducted. The NHANES interview includes demographic, socioeconomic, dietary, and health-related questions. The examination consists of medical, dental, physiological measurements, and laboratory tests. http://www.cdc.gov/nchs/nhanes.htm

BRFSS –

- Behavioral Risk Factor Surveillance System collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. http://www.cdc.gov/brfss/

Environmental Data

ATSDR Health Assessments and Consultations –

- The Agency for Toxic Substances and Disease Registry (ATSDR) conducts health consultations and health assessments to provide information on the health risks associated to a specific site, a chemical release, or the presence of a hazardous material. A health assessment is conducted for every proposed National Priorities List site. http://www.atsdr.cdc.gov/hac/PHA/index.asp

Fish Advisories –

- Fish advisories provide information on contaminants in fish. The U.S. Environmental Protection Agency (EPA) maintains a database of fish advisories reported by states, tribes, territories and Canada. http://www.epa.gov/waterscience/fish/advisories/index.html

EPA Great Lakes Environmental Database –

- The Great Lakes Environmental Database (GLENDA) includes regional environmental data on a wide variety of constituents in water, biota, sediment, and air. http://www.epa.gov/glnpo/monitoring/data_proj/glenda/index.html

EPA Air Data Sources –

- Ambient Air Monitoring Program. Collects air quality samples for one or more of the following purposes: judge compliance in meeting ambient air quality standards, activate emergency control procedures that prevent or alleviate air pollution episodes, observe pollution trends throughout the region. http://www.epa.gov/air/oaqps/qa/monprog.html
- Air Data. AirData presents annual summaries of air pollution data from two EPA databases. Air Quality System database provides data on ambient concentrations of criteria and hazardous air pollutants at monitoring sites. The National Emission Inventory database provides estimates of annual emissions on criteria and hazardous air pollutants from all types of sources. http://www.epa.gov/air/data/index.html

EPA Toxic Release Inventory (TRI) Program –

- TRI is a publicly available EPA database that contains information on toxic chemical releases and waste management activities that are voluntarily reported annually by certain industries and federal facilities. http://www.epa.gov/tri/

EPA Remedial Investigations –

- A remedial investigation is conducted for all National Priorities List sites. The investigation characterizes the site; determines the nature of the waste; assesses risk to human health and the environment; and conducts treatability testing. http://www.epa.gov/superfund/cleanup/rifs.htm
- Reports for specific sites can be viewed at:
    - Region V states - http://www.epa.gov/region5/superfund/index.html
    - NY - http://www.epa.gov/region02/cleanup/sites/nytoc_sitename.htm
    - PA - http://www.epa.gov/reg3hwmd/super/pa.htm

EPA Safe Drinking Water Information System –

- The Safe Drinking Water Information System contains information about public water systems and their violations of EPA's drinking water regulations. http://www.epa.gov/enviro/html/sdwis/index.html
- EPA provides drinking water quality reports by states annually. http://www.epa.gov/ogwdw/ccr/whereyoulive.html?OpenView#map

EPA National Pollutant Discharge Elimination System –

- The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into U.S. waters. http://cfpub.epa.gov/npdes/
- Information on NPDES compliance and enforcement are available through EPA's Enforcement and Compliance History Online system. http://www.epa-echo.gov/echo/

USGS Real-time Water Retrieval Data –

- The Real-time water data retrieval map is a portal to all U.S. Geological Survey (USGS) hydrologic monitoring stations that transmit data in real- or near real-time, including surface water, ground water, and water quality sites. http://water.usgs.gov/waterwatch/uvmap/

Potable Groundwater Data –

- The USGS provides water-quality data for both surface and ground water. Examples of water-quality data collected are temperature, specific conductance, pH, nutrients, pesticides, and volatile organic compounds. http://waterdata.usgs.gov/nwis/
- Some states may also have useful ground water data
    - MN- http://www.health.state.mn.us/divs/eh/cwi/
    - PA - http://www.dcnr.state.pa.us/topogeo/groundwater/PaGWIS/help.aspx#Intro
    - WI - http://wi.water.usgs.gov/gwcomp/find/vilas/index.html

National Response Center –

- National Response Center is the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the U.S. environment. http://www.nrc.uscg.mil/

Appendix 4. Great Lakes Human Health Effects Research Program

Overview

The Great Lakes—Superior, Michigan, Huron, Erie, and Ontario—occupy a special place in North America's physical and cultural heritage.

Consider first their sheer size. The Great Lakes comprise 5,500 cubic miles of surface water. This is the earth's largest fresh water system—only the polar ice caps contain more. And the lakes cover an area of some 94,000 square miles, with a shoreline of over 10,000 miles. Eight states have borders that include Great Lakes shoreline.

Next, for almost two centuries the Great Lakes have been among the largest contributors to the national economy. After the 1825 completion of the Erie Canal, settlers from the eastern United States poured into the lakes region, where they became farmers, loggers, fishers, and miners. Eventually, however, heavy industry became the region's dominant commercial activity. By the middle and late 1800s, manufacturers began to locate around the lakes to take advantage of easy access to iron ore, copper, coal, salt, and limestone—availability of water transport meant the mine operators in, for example, northern Michigan or Minnesota could easily ship raw materials to the foundries, mills, and factories that had sprung up along the lakes' more southern shores.

The Great Lakes region especially benefitted from the United States' age of invention: roughly from 1870 to 1910. By the 1880s, chemists had learned how to extract chlorine from salt brine to make commercially viable bleach. More importantly, however, that and other discoveries gave rise to the chemical industry in Michigan and elsewhere in the region. The invention of the refrigerated rail car in 1881 meant that meat processors could ship market-ready products directly from the Chicago slaughterhouses to the eastern United States. In 1903, Henry Ford made his third and ultimately successful effort at founding an automobile company in Detroit, thus paving the way for that city to become the nation's automotive center.

But all of this industrial activity, accelerated and intensified by defense production during two world wars and by an expanding national economy, took its toll on the lakes. By the early 1960s, overfishing, pollution, and eutrophication—wherein water becomes enriched with dissolved nutrients (e.g., fertilizer runoff, animal waste, sewage) and thus becomes oxygen-depleted—caused the lakes' aquatic life to decline seriously. The physical nature of the basin and the accumulation of persistent pollutants made this huge freshwater resource a storehouse for toxic chemicals. The lakes are—despite their size—especially sensitive to pollution; each year less than 1% of their total volume flows out of the St. Lawrence River. This means toxic substances accumulate in the lake sediment where they then contaminate fish and other aquatic life.

Yet as alarming as these developments were, even more important was the fact that approximately 10% of the U.S. population and 25% of the Canadian population lived in the region. The persistence and widespread occurrence of Great Lakes pollutants had evident toxic effects in wildlife. Now, however, epidemiologic investigations suggested that exposure to Great Lakes pollutants could result in adverse human health effects, (e.g., reproductive, developmental, behavioral, neurologic, and immunologic disorders).

Given the implications of the association between persistent toxic substances in the Great Lakes and the potential for adverse human health outcomes, Congress passed the Great Lakes Critical Programs Act of 1990, which, among other things, created the ATSDR Great Lakes Human Health Research Program (GLHHERP). In establishing GLHHERP, Congress mandated ATSDR "To assess the adverse effects of water pollutants in the Great Lakes on the health of persons in the Great Lakes states." This mandate has resulted in a program designed to characterize exposure to toxic chemicals and investigate the potential for short- and long-term health outcomes from that exposure in vulnerable populations.

More specifically, GLHHERP's six objectives are to

1. Build upon and extend the results from past and ongoing research.
2. Develop information databases or research methodology that will provide long-term benefits to the human health effects research efforts in the Great Lakes region.
3. Provide direction for future health effects research.
4. Provide health information to state and local health officials, the concerned public, and their medical health care professionals.
5. In concert with state and local health officials, increase public awareness regarding the potential health implications of toxic pollution in Great Lakes region.
6. Coordinate as necessary with relevant U.S. Department of Health and Human Services research programs and activities, including those of FDA, CDC, NIH, and IHS, as well as the U.S. EPA and state and local health departments to ameliorate adverse public health effects of persistent toxic substances in the Great Lakes region.

If so indicated by additional research or by new information, ATSDR might update or revise these GLHHERP objectives.

GLHHERP Strategy

In support of the research program's goals, GLHHERP implemented the following strategy, built on the five traditional elements of disease prevention:

1. Identification of patterns of morbidity and mortality (through use of surveillance systems, exposure registries, and reports from state/local health agencies)
2. Evaluation of causal factors accountable for the observed pattern of morbidity or mortality (through epidemiologic investigations and experimental research)
3. Control of the factors found or thought to be accountable for the observed morbidity or mortality (through health advisories, regulatory actions, and medical interventions)
4. Dissemination of information about the identification, evaluation, and control of the observed patterns of morbidity/mortality (through local advisories, publications, state programs, and local, state, and national media)

5. Development of infrastructure to support the elements of disease prevention - identification, evaluation, control, and dissemination (through institutional mechanisms that involve staffing, budgets, and organizational arrangements)

To identify human populations who may be at special risk of adverse health effects, particularly from consumption of Great Lakes sport fish, ATSDR is funding research to better characterize exposure, pathways, associated body burdens, and potential human health effects from exposure to persistent toxic substances in the Great Lakes region, with special emphasis on at-risk populations. ATSDR is working with state and local health agencies in the Great Lakes region to obtain any surveillance data, reports of morbidity, and other information that might help identify populations at health risk.

Organizations at Work in the Great Lakes

- ATSDR,
- Centers for Disease Control (CDC),
- Food and Drug Administration (FDA),
- Great Lakes National Program Office (GLNPO),
- Great Lakes States,
- Health Canada,
- Health Effects Research Laboratory (HERL) EPA,
- Indian Health Service (IHS),
- International Joint Commission (IJC),
- Local authorities,
- National Institutes of Health (NIH),
- Other federal agencies,
- Tribal Governments, and
- United States Environmental Protection Agency (USEPA) Regions II, III, V.

Lakewide Management Plans (LaMPs)

The Great Lakes Water Quality Agreement of 1978, as amended (GLWQA), is a binational agreement between the United States and Canada that calls for the restoration and maintenance of the chemical, physical, and biological integrity of the waters of the Great Lakes region Ecosystem. GLWQA also calls for the development of lakewide management plans (LaMPs) for open waters in the Great Lakes. The plans are designed to reduce loadings of Critical Pollutants (e.g., PCBs, mercury) that interfere with the lakes' beneficial uses (i.e., drinking water, fishing, and swimming) and to define threats Critical Pollutants pose to human health.

In 2000, ATSDR participated in the development and the writing of the human health sections for the Lake Erie, Lake Michigan, and Lake Superior LaMPs and participated in human health activities for the LaMP Workgroups. More recently, ATSDR has been involved in the creation and development of the U.S.EPA-led Human Health Network composed of members from Canada and the United States. This group acts as a resource for current, peer-reviewed documents that the LaMP Workgroups may use in their reports. The ATSDR GLHHERP Web site (http://www.atsdr.cdc.gov/grtlakes/) helps the Network members keep abreast of recent research findings from the Program's investigators. Through contribution to LaMP activities, ATSDR has participated

indirectly in the Remedial Action Plan (RAP) Workgroups. The RAPs describe remedial actions for Areas of Concern in which beneficial uses have been impaired.

Fish Advisories

ATSDR's GLHHERP has also been involved in fish advisory activities for the Great Lakes region. ATSDR and U.S. EPA have developed brochures alerting the public about safe fish consumption guidelines and have developed a display informing the public about fish advisories. The display and the educational brochures have been shown at conferences and meetings where fish advisories are the topic of interest. Because many minorities consume Great Lakes sport fish, the brochures have been translated into English and into other languages such as Chinese and Spanish.

The ATSDR-funded consortium of Great Lakes state health departments developed uniform fish advisory materials that the Great Lakes states disseminate at women and infant clinics, physician's offices, fairs, and other public gatherings. They also distribute the materials at meetings of health professionals, including physicians, and at public health agencies. Initially, the consortium organized fish advisory workshops to develop the materials and then refine them at subsequent workshop sessions. The materials alert the public about safe fish consumption and include brochures in appropriate languages. Also distributed are refrigerator magnets, note pads, recipe cards, drinking cups, T-shirts, and other items designed to catch the interest of the public and of risk groups (e.g., women of child-bearing age). These items also contain a toll free telephone number where more information may be obtained.

Sensitive Subpopulations

GLHHERP has identified several human populations who may be at particular risk because of greatest exposure to Great Lakes pollutants via fish consumption. Such predisposition to toxic injury in these populations can be due to behavior (e.g., degree of contaminated fish consumption), nutritional status, physiology (e.g., developing fetuses), or other factors.

The vulnerable populations include

- African-Americans,
- American Indians,
- Asian Americans,
- elderly,
- fetuses, nursing infants, and children;
- persons with compromised immune function,
- pregnant and nursing females,
- sport anglers, and
- urban poor.

Ongoing work

Over time, the GLHHERP has contributed to an understanding of human exposures to environmental pollutants in the Great Lakes region and to the health effects that may be attributed to those exposures. The references below illustrate the contributions. But as noted elsewhere in this report, much more work is needed. In FY 2008, ATSDR funded four research grant applications in the Great Lakes:

1. P.I. Bonner, State University of New York at Buffalo is investigating the association between long-term fish consumption and chronic disease risk in an established large cohort of anglers and their spouses. Funding for 2008: $199,879.
2. P.I. Schantz, University of Illinois at Urbana-Champaign is investigating neuropsychological outcomes in adolescents from Southeast Asian (Hmong) and from the general population of sport anglers in Wisconsin who have been exposed to polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), methyl mercury and other contaminants via fish consumption. Funding for 2008: $198,737.
3. P.I. Osuch, Michigan State University at East Lansing is studying a multigenerational cohort of fisheaters to determine 1) in the F0 generation the association between organochlorine exposure from fish meals and the expression of key genes involved in sex steroid metabolism and 2) in the F1 generation, to examine key gene expression and to determine whether altered gene expression is due to transgenerational inheritance of epigenetic phenomena, inherited polymorphisms, or both. Funding for 2008: $199,016.
4. P.I. Stewart, State University of New York at Oswego is working with children from the Oswego area to determine the impact of PCBs, mercury, and lead on neurodevelopment. Earlier work predicted that prenatal PCB exposure predicts impulsive behavior and impaired inhibitory control from ages 4 years through 13 years of age. As these investigators continue to work in this area other chemicals such as MeHg and Pb have begun to emerge as endpoints in their work. The researchers will focus on all three chemicals to determine the mixture of these toxic chemicals on behavior in children. Funding for 2008: $200,000.

References

Bloom MS, Vena JE, Swanson MK, Moysich KB, Olsen JR. 2005. Profiles of ortho-polychlorinated biphenyl congeners, dichlorodiphenyldichloroethylene, hexachlorobenzene, and Mirex among male Lake Ontario sport fish consumers: the New York state angler cohort study. Environ Res 97(2):177–93.

Buck GM, Vena JE, Schisterman EF, Dmochowski J, Mendola P, Sever L et al. 2000. Parental consumption of contaminated sport fish from Lake Ontario and predicted fecundability. Epidemiol 11(4):388–93.

Darvill T, Lonky E, Reihman, J, Stewart P, and Pagano J. 2000. Prenatal exposure to PCBs and infants' performance on the Fagan Test of Intelligence. Neurotoxicol 21(6):1029–38.

Fitzgerald E, Belanger EE, Gomez MI, Jansing RL, Hwang S, and Hicks HE. 2007. Environmental exposures to polychlorinated biphenyls (PCBs) among older residents of the Upper Hudson River communities. Environ Res. 104:352–60.

Humphrey HEB, Gardiner JC, Pandya JR, Schantz SL. 2000. PCB congener profile in the serum of humans consuming Great Lakes fish. Environ Health Perspect 108(2)1–6.

Imm P, Knobeloch L, Anderson HE, and the Great Lakes Sport Fish Consortium. 2005. Fish consumption and advisory awareness in the Great Lakes basin. Environ Health Perspectives: 113(10):1325–329.

Karmaus W. 2002. Growth in girls exposed in utero and postnatnatally to polybrominated biphenyls and polychlorinated biphenyls. Epidemiol 13:604–5.

Karmaus W, Zhu X. 2004. Maternal concentration of polychlorinated biphenyls and dichlorodiphenyl-dichlorethylene and birth weight in Michigan Fish Eaters: a cohort study. Environ Health 3:1

Mendola P, Robinson LK, Buck GM, Vena JE. 2005. Birth defects associated with maternal sport fish consumption: potential effect modification by sex of offspring. Environ Res 97:133–40.

Persky V, Turyk M, Anderson HA, Hanrahan LP, Falk C, Steenport DN, et al and the Great Lakes Consortium. 2001. The effects of PCB exposure and fish consumption on endogenous hormones. Environ Health Perspect 109(12):1275–283.

Schantz, SL, Gasior DM, Polverejan E, McCaffrey RJ et al. 2001. Impaired memory and learning in older adults exposed to polychlorinated biphenyls via consumption of Great Lakes fish. Environ Health Perspect 109: 605–11.

Stewart P, Reihman J, Gump B, Lonky E, Darvill T, Pagano J. 2005. Response inhibition at 8 and 9 ½ years of age in children prenatally exposed to PCBs. Neurotoxicol Teratol 27:771–81.

Stewart P, Reihman J, Lonky E, Darvill T, Pagano J. 2000. Prenatal PCB exposure and neonatal behavioral assessment scale (NBAS) performance. Neurotoxicol Teratol 22: 21–9.

Stewart PW, Fitzgerald S, Reihman J, Gump B, Lonky E, Darvill T, et al. 2003. Prenatal PCB exposure, the corpus callosum, and response inhibition. Environ Health Perspect 111(13):1670–77.

Vasiliu O, Cameron L, Gardiner J, DeGuire P, and Karmaus W. 2006. Polybrominated biphenyls, polychlorinated biphenyls, body weight, and incidence of adult-onset diabetes mellitus. Epidemiology 17(4):352–59.

Weisskopf MG, Anderson HA, Hanrahan LP. Decreased sex ratio following maternal exposure to polychlorinated biphenyls from contaminated Great Lakes sport-caught fish: a retrospective cohort study. Environ Health 2003; 2–14.

Xue F, Holzman C, Rahbar MH, Trosko K, and Fischer L. 2007. Maternal fish consumption, mercury levels and risk of preterm delivery. Environ Health Perspect. 115(1):42–7.

Appendix 5. Great Lakes AOCs Included in this Report

Total Listed Sites within the 26 AOCs

New York Sites

Oswego River AOC

Sites in Oswego County:

1. Fulton Terminals
2. Pollution Abatement Services
3. Volney Municipal Landfill

Rochester Embayment AOC

Site in Monroe County:

4. Rochester City APCO

Eighteen Mile Creek AOC

Sites in Niagara County:

5. Barker Chemical

New York Sites within Lake Erie AOCs

Buffalo River AOC

Sites within Erie County:

6. Abby Street Hickory Woods Subdivision
7. Diarsenol Company
8. Ernst Steel
9. Newstead Site
10. NL Industries Inc – Depew
11. Pfohl Brothers Landfill

Pennsylvania Sites located within Lake Erie AOCs

Presque Isle Bay AOC

Sites within Erie County:

12. Foamex Products
13. Hammermill-Scott Run
14. Lord Shope Landfill
15. Mill Creek Dump

Ohio Sites located within Lake Erie AOCs

Ashtabula River AOC

Sites within Ashtabula County:

16. Big D Campground
17. Fields Brook
18. Laskin/Poplar Oil
19. New Lyme Landfill

Cuyahoga River AOC

Site within Cuyahoga County:

20. Cady Road

Site within Summit County:

21. Copley Square

Black River AOC

Sites within Lorain County:

22. Ford Road Industrial Landfill
23. Forest City Technologies
24. Republic Steel Corp. Quarry

Maumee River AOC*

Site within Ottawa County:

25. Brush Wellman Inc.

Michigan Sites located within Lake Erie AOCs

Raisin River AOC

Site within Monroe County:

26. Consolidated Packaging Corp.

Rouge River AOC

Sites within Wayne County:

27. Carter Industrials, Inc.
28. EQ resource Recovery Fire
29. Federal Marine Terminal
30. Ford Motor Company Allen Park Clay Mine
31. FWS-Detroit River International Wildlife
32. Globe Building Property
33. Grand Haven Area Lead Contamination
34. Gratiot Avenue Trailer Park

35. Joy Road Dump/Holiday Park
36. Lower Ecorse Creek Dump
37. Master Metals Incorporated
38. Michigan Industrial Finishes
39. Mill Street Plant Brownfields Redevelopment
40. Old World Trade Center
41. Packard Plant
42. Proposed Beard Street School
43. Wholesale Russell/Mack
44. World Med Mercury Spill
45. Zonolite Company/WR Grace

Sites within Oakland County:

46. Cemetery Dump
47. Continental Aluminum
48. Hil-Mill Manufacturing Company
49. J & L landfill
50. Rose Township Dump
51. Springfield Township Dump

Clinton River AOC

Sites within Oakland County[6]

Cemetery Dump

Continental Aluminum

Hi-Mill Manufacturing Company

J & L landfill

Rose Township Dump

Springfield Township Dump

Sites within Macomb County:

52. G&H Disposal
53. Liquid Disposal Inc.
54. South Macomb Disposal Authority

[6] note: these sites in Oakland county also applied to the Rouge river AOC and are listed twice but only counted once.

55. Ten Mile Drainage System PCB Spill

Michigan Sites located within Lake Huron AOCs

Saginaw River and Bay AOC*

Sites within Bay County:

56. Bay City Middlegrounds
57. Keit Property

Site within Clare County:

58. Clare Water Supply

Sites within Genesee County:

59. Berlin & Farro
60. Forest Waste Products

Sites within Gratiot County:

61. Gratiot County Landfill
62. Velsicol Chemical Corp.

Sites within Iosco County:

63. Hedblum Industries
64. Wurtsmith Air Force Base

Site within Lapeer County:

65. Metamora Landfill

Sites within Livingston County:

66. Rasmussen's Dump
67. Shiawassee River
68. Spiegelberg Landfill

Sites within Midland County:

69. Dow Chemical Company, Midland
70. Tittabawassee River

Sites within Saginaw County:

71. Lufkin Rule
72. Peet Packing

Site in Shiawassee County:

73. Laingsburg

Michigan Sites located within Lake Michigan AOCs

Muskegon Lake AOC and White Lake AOC

Sites within Muskegon County:

74. Bofors Nobel, Inc.
75. Duell & Gardner Landfill
76. E.I. Du Pont De Nemours & Co.
77. Hooker (Montague Plant)
78. Muskegon Chemical Co.
79. Ott/Story/Cordova Chemical Co.
80. Peerless Plating Co.
81. Ruddiman Drain Area
82. SCA Independent Landfill
83. Thermo-Chem, Inc.
84. Whitehall Municipal Wells

Kalamazoo River AOC

Sites within Kalamazoo County:

85. Allied Paper, Inc Portage Creek
86. Auto Ion Chemicals, Inc.
87. K&L Avenue Landfill
88. Michigan Disposal Service
89. Roto-Finish Co., Inc.

Sites within Allegan County:

90. Former Miro Golf Course
91. Rockwell International Corp.

Indiana Sites located within Lake Michigan AOCs

Grand Calumet AOC

Sites within Lake County:

92. American Chemical Service, Inc.
93. Calumet Container
94. Keil Chemical
95. Lake Sandy Jo (M&M Landfill)
96. MIDCO I
97. MIDCO II
98. Ninth Avenue Dump
99. U.S. Smelter and Lead Refinery, Inc.

Illinois Sites located within Lake Michigan AOCs

Grand Calumet AOC

Sites within Cook County:

100. Acme Steel Coke Plant
101. Celotex Corporation
102. Double A Metals
103. Electron Finishers Inc.
104. Elizabeth Street Foundry
105. Estech General Chemical Company
106. Hartz Construction
107. Lincoln Limited Landfill
108. Stauffer Chemical Co. (Chicago Heights)
109. West Pullman Iron & Metal

Waukegan Harbor AOC

Sites within Lake County:

110. Diamond Scrap Yard
111. H.O.D. Landfill
112. Johns-Manville Corp.
113. Nicor Mercury Sites
114. Outboard Marine Corp.
115. Precision Chrome, Inc.
116. Yeoman Creek Landfill

Wisconsin Sites located within Lake Michigan AOCs

Milwaukee Estuary AOC

Sites within Milwaukee County:

117. Boerke Property
118. Fadrowski Drum Disposal
119. Former Johnson Property
120. Former Tannery
121. Johnson Controls-Badger Facility
122. Moss American Co., Inc.
123. Northwestern Barrel
124. P&G School Bus Service

125. Redi-Quick Dry Cleaners
126. Robert Betz Trust Property
127. Schlitz Park Office Building
128. Solvay Coke and Gas Company
129. St. Francis Auto Wreckers
130. Try Chemical Corp.

Sheboygan River AOC

Sites within Sheboygan County

131. Kohler Landfill
132. Sheboygan River and Harbor

Lower Green Bay and Fox River AOC

Sites within Brown County:

133. Better Bright Plating Co.
134. Econo Care Cleaners
135. Fox River NRDA/PCB Releases
136. Scray's Hill
137. V&L Stripping

Menominee River AOC

Sites within Marinette County:

138. Ansul Company Division of Wormald
139. Marinette Sewage Treatment Plant

Manistique River AOC*

*No sites meeting the criteria were within Schoolcraft County, MI.

Michigan Sites located within Lake Superior AOCs

Deer Lake AOC

Site within Marquette County:

140. Cliff/Dow Dump

Torch Lake AOC

Sites within Houghton County:

141. Torch Lake

Minnesota Sites located within Lake Superior AOCs

St. Louis River and Bay AOC*

Sites within St. Louis County:

142. American Linen (Ameripride)

143. Arrowhead Refinery Co.

St. Louis River Site:

144. Inter Lake Duluth Tar site

145. U.S. Steel

Wisconsin Sites located within Lake Superior AOCs

St. Louis River and Bay AOC

Sites located within Douglas County:

146. Koppers Co. Superior Plant