Chapter 5. Lake Michigan

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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.

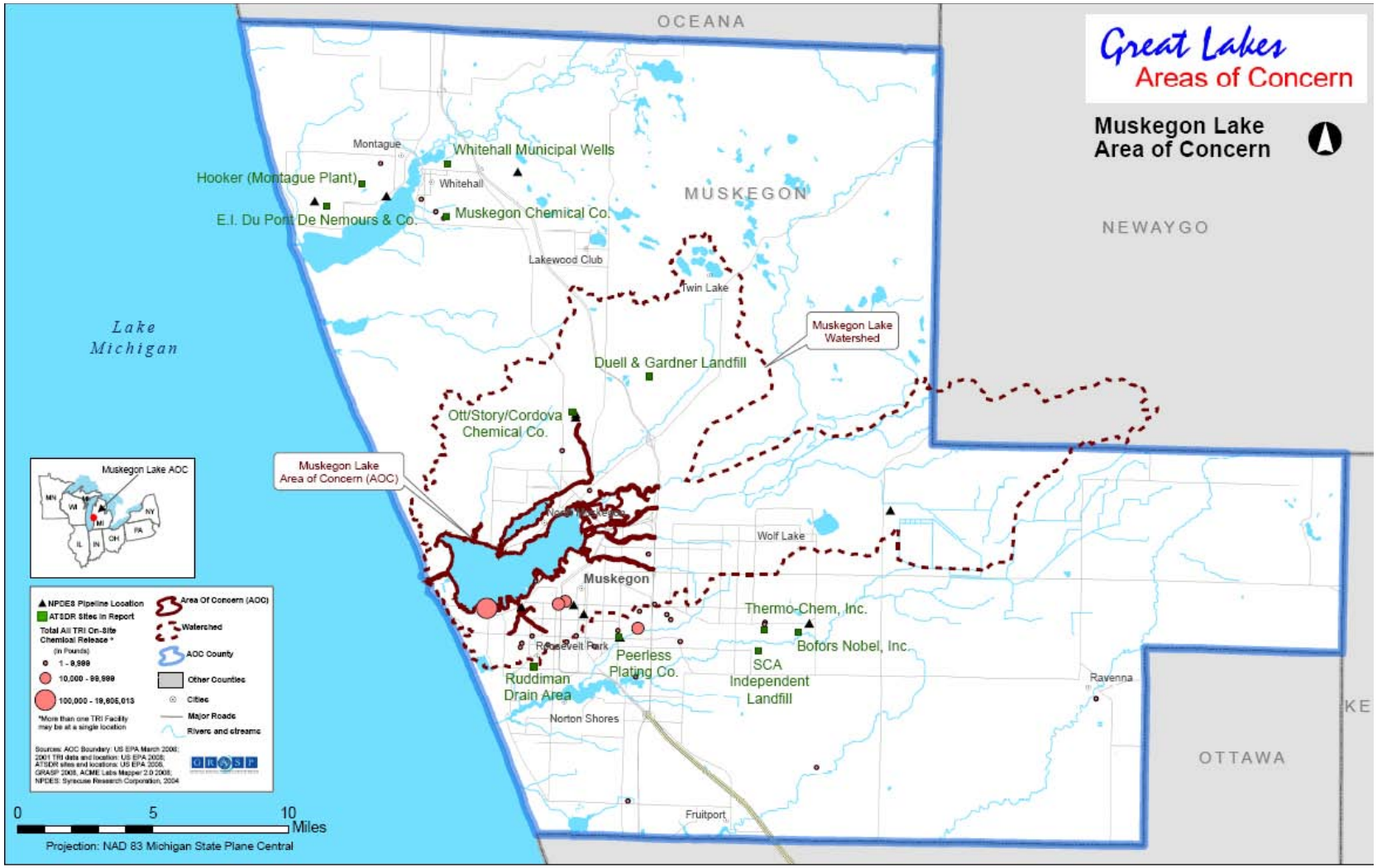
5.1.2.4 County Demographic Data

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 Municipal Wells
Hooker (Montague Plant)
Whitehall
E.I. Du Pont De Nemours & Co.
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

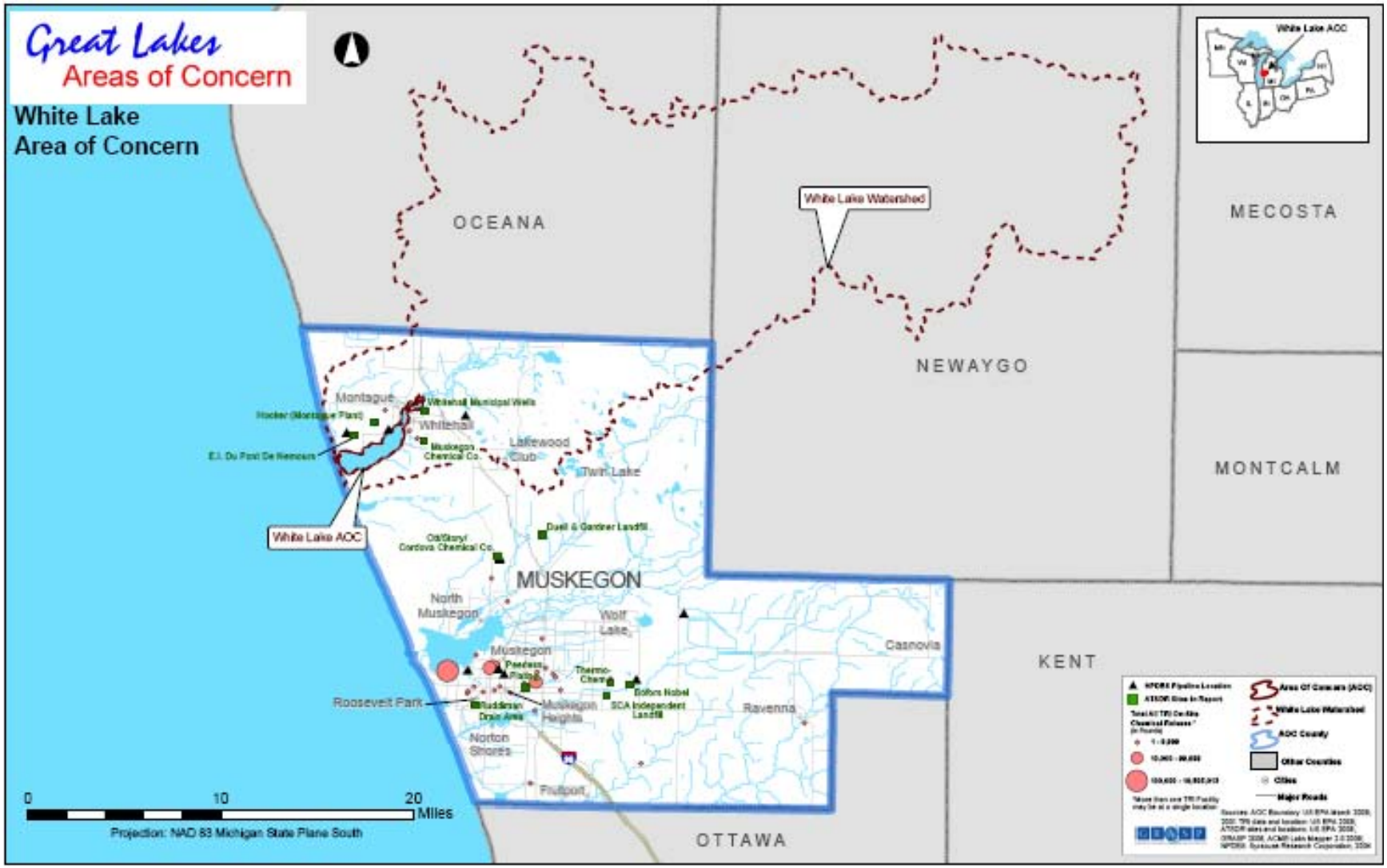

Great Lakes
Areas of Concern
White Lake
Area of Concern
OCEANA
NEWAYGO
MECOSTA
MONTCALM
KENT
OTTAWA
MUSKEGON
White Lake Watershed
White Lake AOC
Montague
Whitehall
Lakewood Club
Twin Lake
North Muskegon
Wolf Lake
Muskegon Heights
Norton Shores
Roosevelt Park
Ravenna
Casnovia
Fruitport
0
10
20
Miles
Projection: 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			No data	0	0	236	0	236
1,2-DICHLOROETHANE		22	No data	0	0	22	0	22
3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE	236	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)			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	15244	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			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	33418	630	No data	0	0	630	0	630
METHYL ISOBUTYL KETONE		81	No data	0	0	81	0	81
N,N-DIMETHYLFORMAMIDE			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	244	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			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	261	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)			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
	3471 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/.

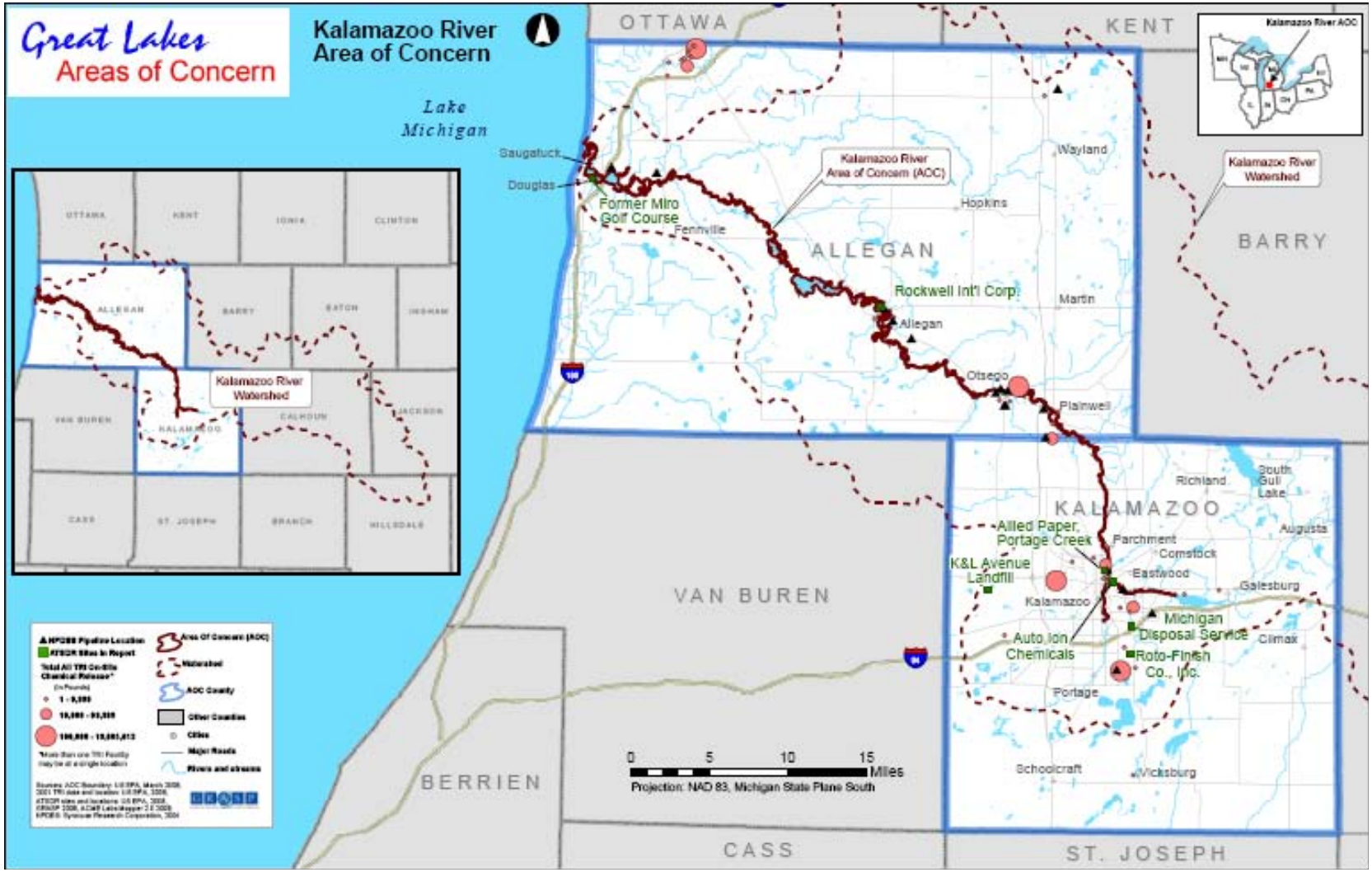

Great Lakes
Areas of Concern
Kalamazoo River
Area of Concern
Lake
Michigan
OTTAWA
KENT
Kalamazoo River AOC
Saugatuck
Douglas
Former Miro
Golf Course
Fennville
Kalamazoo River
Area of Concern (AOC)
Wayland
Hopkins
Kalamazoo River
Watershed
ALLEGAN
BARRY
Rockwell Int'l Corp
Martin
Allegan
Otsego
Plainwell
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
Kalamazoo River
Watershed
OTTAWA
KENT
IONIA
CLINTON
ALLEGAN
BARRY
EATON
INGHAM
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
CASS
ST. JOSEPH
BRANCH
HILLSDALE

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
		1798266.943	52404.65	223090	9687	2083448.593	93253.26	2176701.853

Total

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/.

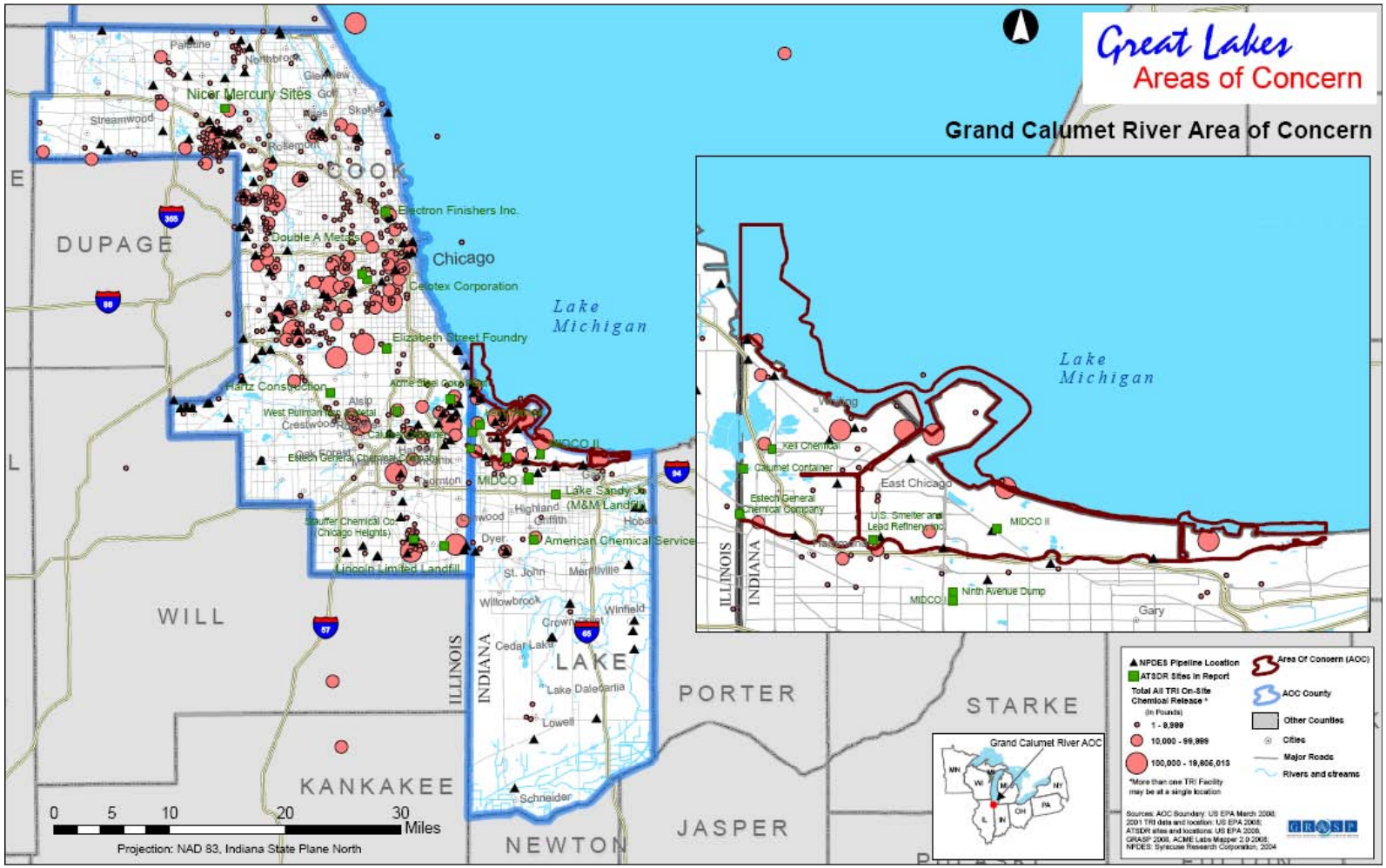

Great Lakes
Areas of Concern
Grand Calumet River Area of Concern
Nicer Mercury Sites
Electron Finishers Inc.
Double A Metals
Chicago
Celotex Corporation
Lake Michigan
Elizabeth Street Foundry
Hartz Construction
MIDCO II
MIDCO I
Lake Sandy Jo (M&M Landfill)
American Chemical Service
Lincoln Limited Landfill
Xell Chemical
Calumet Container
East Chicago
Estech General Chemical Company
U.S. Smelter and Lead Refinery Inc.
Ninth Avenue Dump
Gary
COOK
DUPAGE
WILL
KANKAKEE
LAKE
PORTER
STARKE
JASPER
NEWTON
ILLINOIS
INDIANA
0 5 10 20 30 Miles
Projection: NAD 83, Indiana State Plane North
Grand Calumet 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

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/.

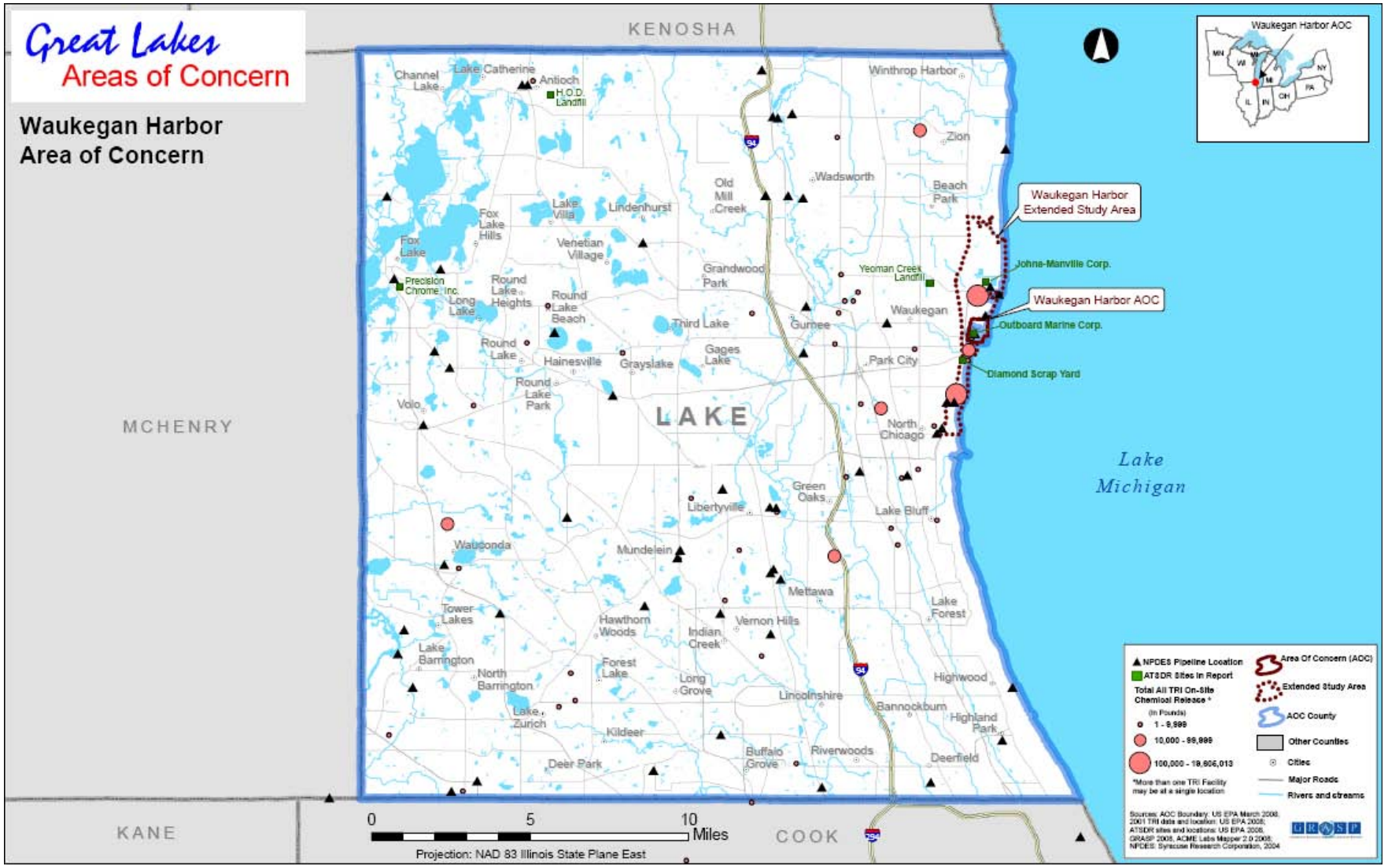

Great Lakes
Areas of Concern
Waukegan Harbor
Area of Concern
KENOSHA
MCHENRY
KANE
COOK
LAKE
Lake
Michigan
Waukegan Harbor AOC
Waukegan Harbor
Extended Study Area
Johns-Manville Corp.
Waukegan Harbor AOC
Outboard Marine Corp.
Diamond Scrap Yard
Yeoman Creek
Landfill
Precision
Chrome, Inc.
H.O.D.
Landfill
Antioch
Channel
Lake
Lake Catherine
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
Lincolnshire
Highwood
Bannockburn
Highland
Park
Lake
Zurich
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 (PCDDs and PCDFs)	2 3	0.002568825	No data	0	0	0.002568825	0	0.002568825
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)			No data	0	0	2009	4500	6509
AMMONIA		1595	100	0	0	1695	0	1695
ANTIMONY	2009	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			No data	0	0	91	5	96
N,N-DIMETHYLFORMAMIDE		735	No data	0	0	735	0	735
NAPHTHALENE	91	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/).

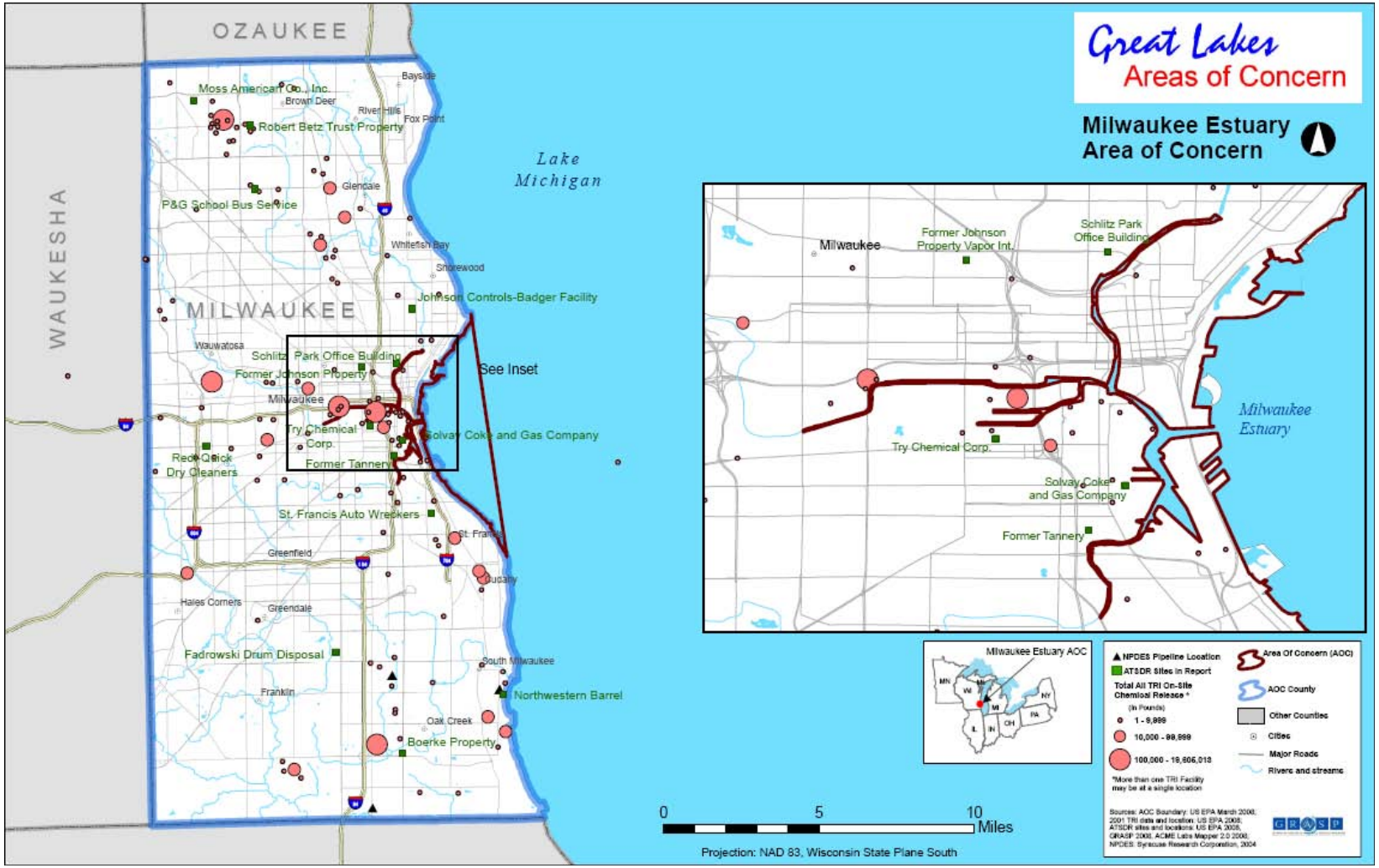

Great Lakes
Areas of Concern
Milwaukee Estuary
Area of Concern
OZAUKEE
WAUKESHA
MILWAUKEE
Lake
Michigan
Moss American Co., Inc.
Brown Deer
Bayside
River Hills
Fox Point
Robert Betz Trust Property
Glendale
P&G School Bus Service
Whitefish Bay
Shorewood
Johnson Controls-Badger Facility
Wauwatosa
Schlitz Park Office Building
Former Johnson Property
See Inset
Milwaukee
Try Chemical Corp.
Solvay Coke and Gas Company
Former Tannery
Rock Glick 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
Former Johnson Property Vapor Int.
Schlitz Park Office Building
Milwaukee Estuary
Try Chemical Corp.
Solvay Coke and Gas Company
Former Tannery
Milwaukee Estuary AOC
MN
WI
MI
NY
PA
IL
IN
OH
NPDES Pipeline Location
AT5DR 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; AT5DR 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/).

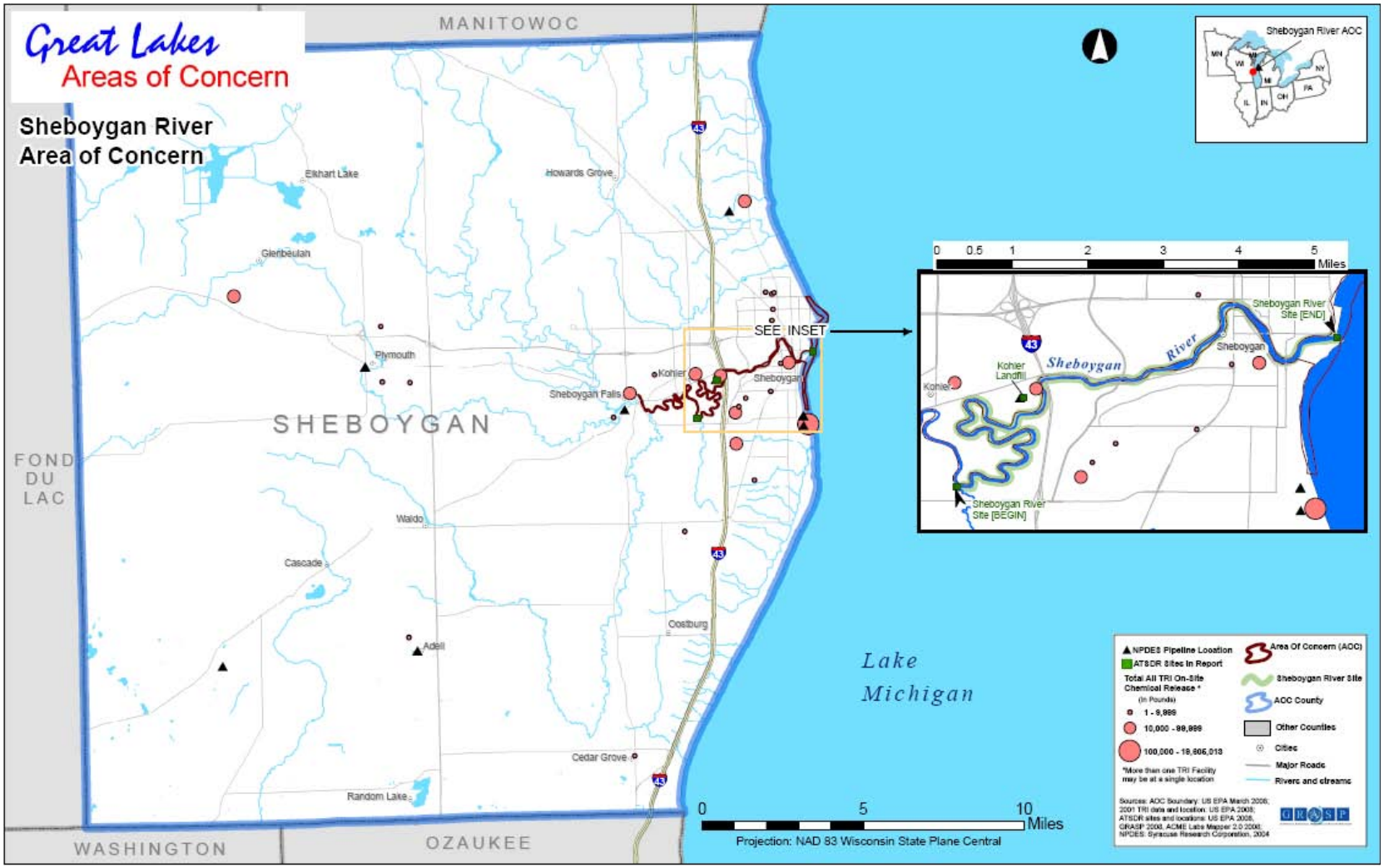

Great Lakes
Areas of Concern
Sheboygan River
Area of Concern
MANITOWOC
SHEBOYGAN
FOND DU LAC
WASHINGTON
OZAUKEE
Elkhart Lake
Howards Grove
Glenbeulah
Plymouth
Sheboygan Falls
Kohler
Sheboygan
SEE INSET
Waldo
Cascade
Adell
Oostburg
Cedar Grove
Random Lake
Lake Michigan
0 5 10 Miles
Projection: NAD 83 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/).

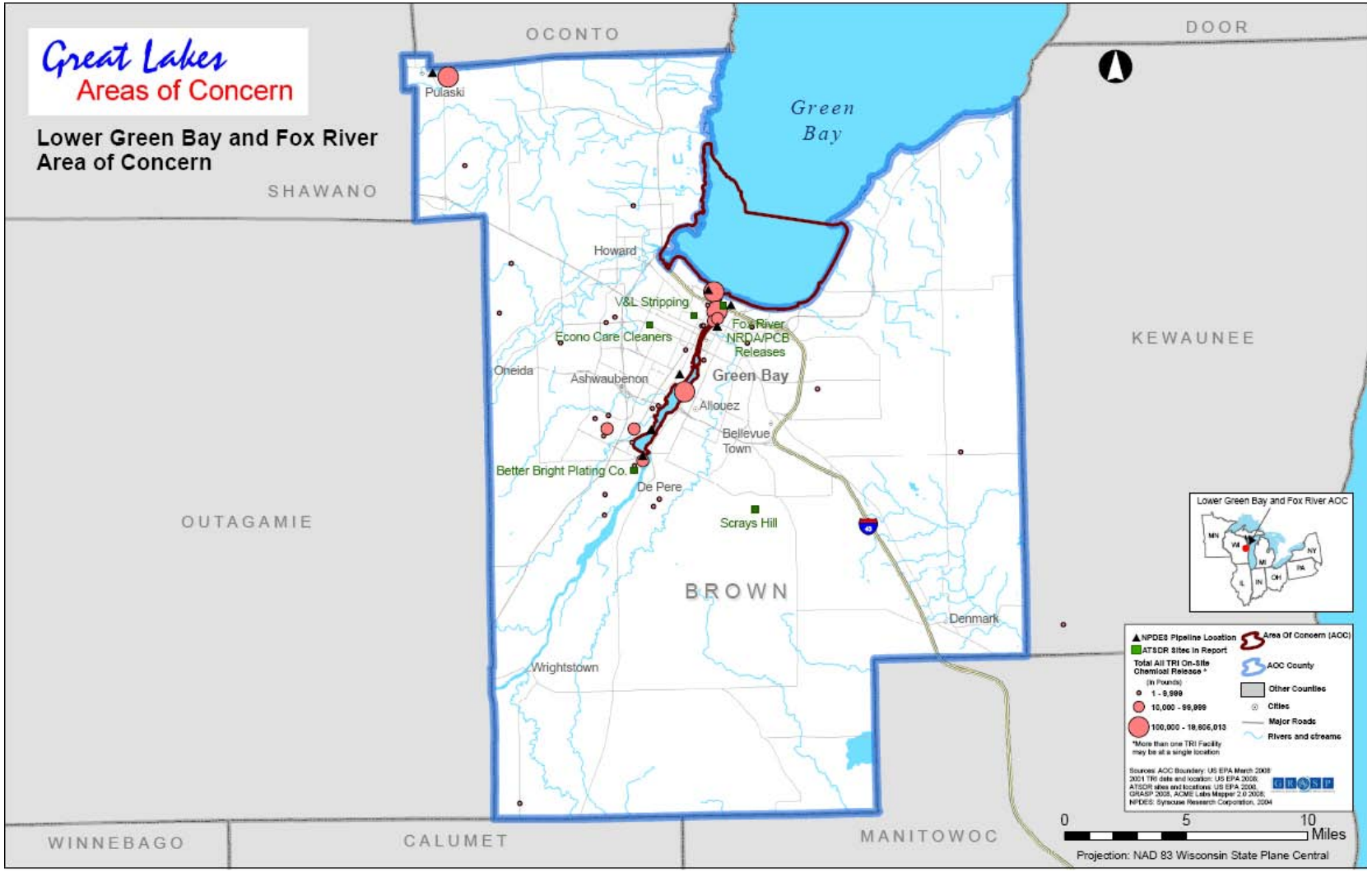

Great Lakes
Areas of Concern
Lower Green Bay and Fox River
Area of Concern
OCONTO
DOOR
Pulaski
Green
Bay
SHAWANO
Howard
V&L Stripping
Fox River
NRDA/PCB
Releases
Econo Care Cleaners
KEWAUNEE
Oneida
Ashwaubenon
Green Bay
Allouez
Bellevue
Town
Better Bright Plating Co.
De Pere
OUTAGAMIE
Scrays Hill
BROWN
Denmark
Wrightstown
WINNEBAGO
CALUMET
MANITOWOC
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 - 18,606,013
*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			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	186	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			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	500	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)			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

2209

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/).

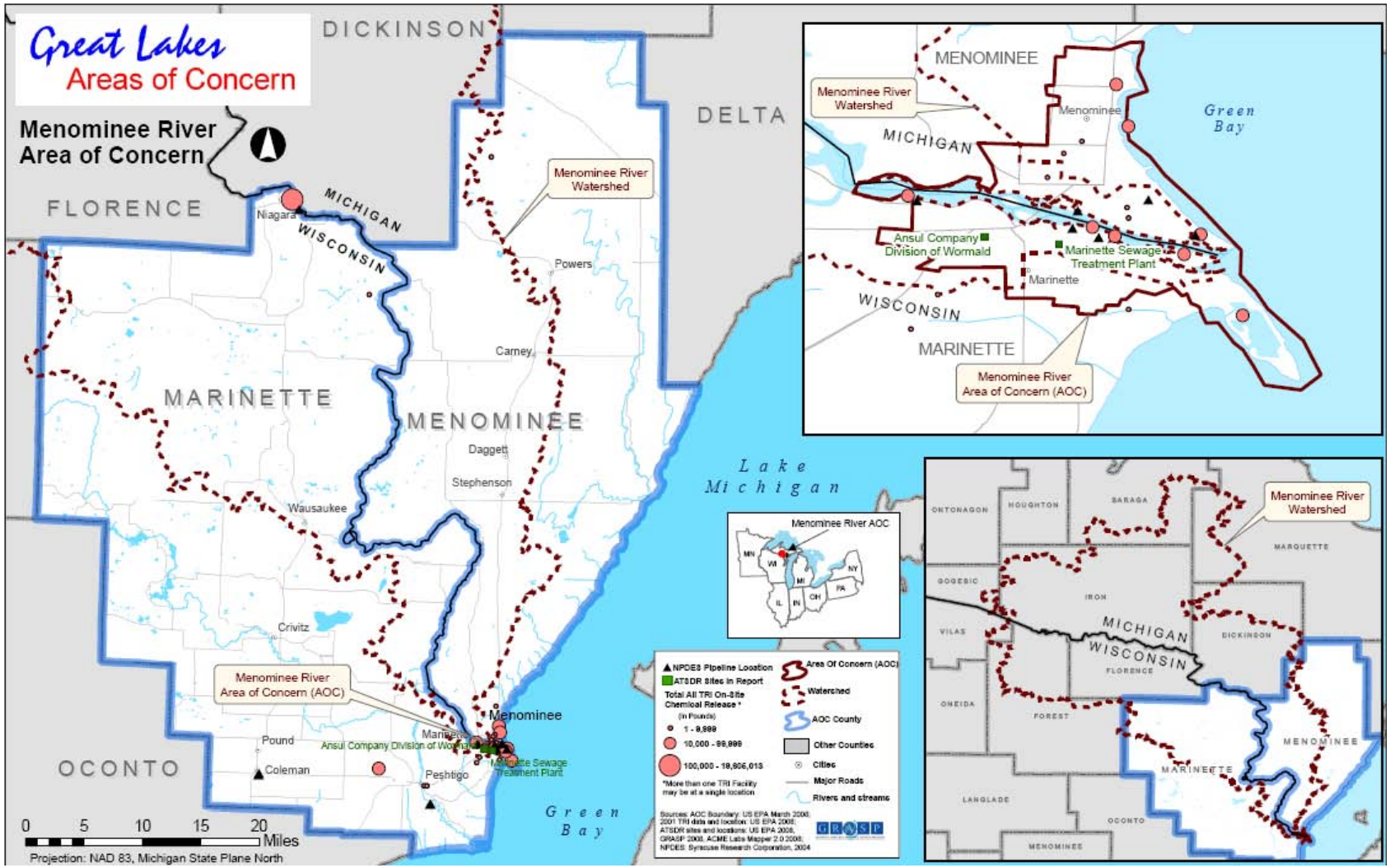

Great Lakes
Areas of Concern
Menominee River
Area of Concern
DICKINSON
DELTA
FLORENCE
MARINETTE
MENOMINEE
OCONTO
MICHIGAN
WISCONSIN
Niagara
Powers
Carney
Daggett
Stephenson
Wausaukee
Crivitz
Pound
Coleman
Peshtigo
Menominee
Menominee River Watershed
Menominee River Area of Concern (AOC)
Ansul Company 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
Marinette
MARINETTE
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
ONTONAGON
HOUGHTON
BARAGA
MARQUETTE
GOGEBIC
IRON
VILAS
DICKINSON
ONEIDA
FOREST
LANGLADE
OCONTO

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/).

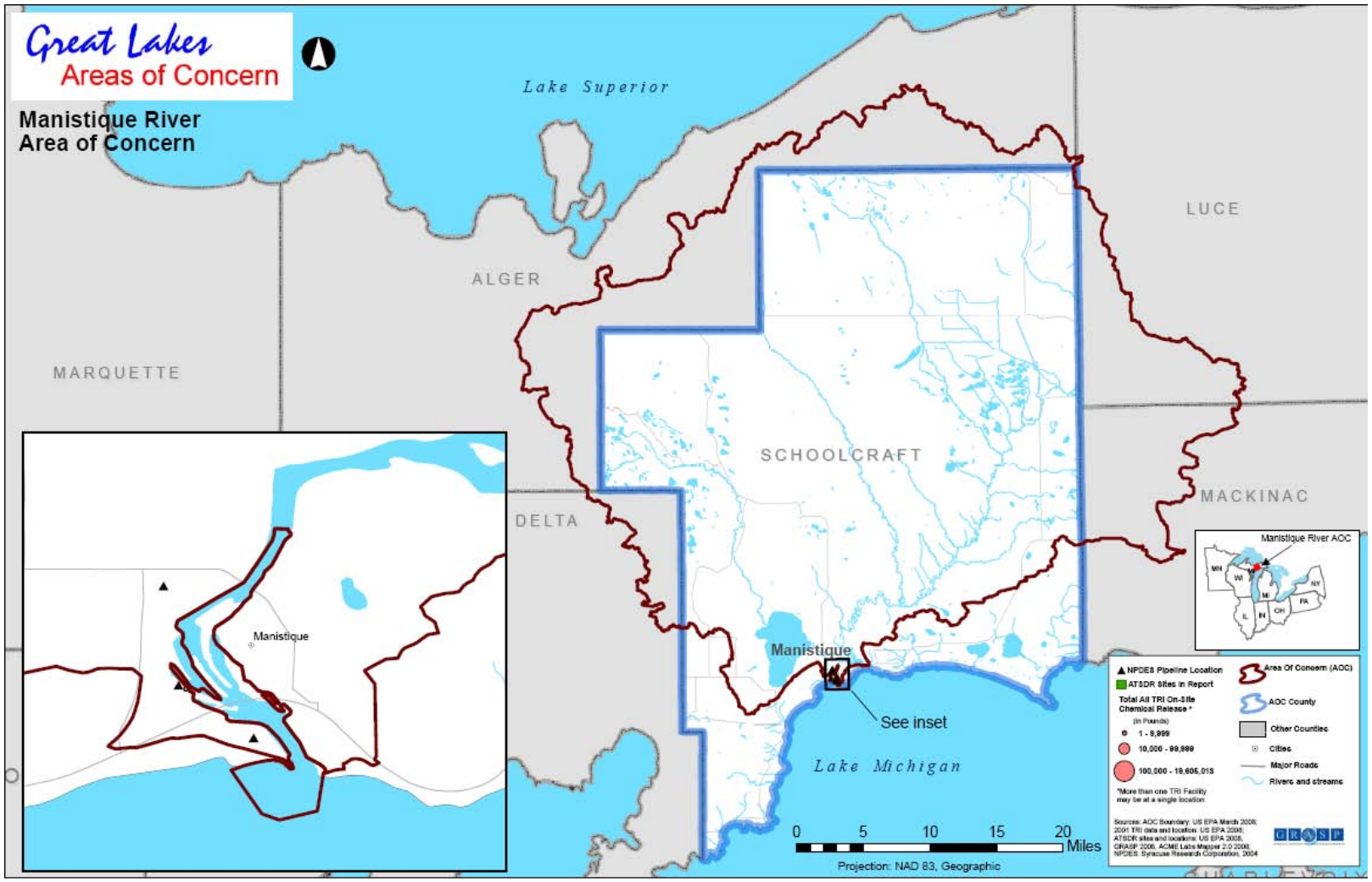

Great Lakes
Areas of Concern
Manistique River
Area of Concern
Lake Superior
ALGER
LUCE
MARQUETTE
SCHOOLCRAFT
MACKINAC
DELTA
Manistique
See inset
Lake Michigan
0 5 10 15 20
Miles
Projection: NAD 83, Geographic
Manistique River AOC
NPDES Pipeline Location
ATSDR Sites in Report
Total All TRI On-Site Chemical 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
		6935

Total