Health Consultation

OUTBOARD MARINE CORPORATION/WAUKEGAN HARBOR:
DUNES AREA CONTAMINATION

WAUKEGAN, LAKE COUNTY, ILLINOIS

EPA FACILITY ID: ILD000802827

SEPTEMBER 13, 2007

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

HEALTH CONSULTATION

OUTBOARD MARINE CORPORATION/WAUKEGAN HARBOR: DUNES AREA CONTAMINATION

WAUKEGAN, LAKE COUNTY, ILLINOIS

EPA FACILITY ID: ILD000802827

Prepared By:

Illinois Department of Public Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Purpose

On April 4, 2006, the Agency for Toxic Substances and Disease Registry (ATSDR) provided the Illinois Department of Public Health with two U.S. Environmental Protection Agency (USEPA) Action Memoranda for the Outboard Marine Corporation (OMC) Dunes Contamination Area, dated November 14, 2005 (Theisen 2005) and March 7, 2006 (Theisen 2006c). This health consultation documents our initial evaluation of the Dunes Contamination Area, as well as the nearby North Ditch and South Ditch.

Background and Statement of Issues

The OMC/Waukegan Harbor site (Figure 1) contains three operable units (sections of the site) designated by USEPA: 1) Waukegan Harbor, 2) the Waukegan Manufactured Gas and Coke Plant (WCP), and 3) the polychlorinated biphenyl (PCB) containment cells. USEPA anticipates adding the abandoned OMC Plant 2 as a fourth Operable Unit.

The OMC Dunes Contamination Area is about 13 acres in size and is in the dunes area of a public beach, immediately east of the eastern PCB containment cell and OMC Plant 2 (Figure 2). The South Ditch (formerly called OMC Outfall 007) drains the land on the southern side of OMC Plant 2 and discharges into the North Ditch, just before the North Ditch discharges into Lake Michigan (Theisen 2006a, Theisen 2006c, Tetra Tech EM, Inc. 2005, Theisen 2005). The North Ditch, a small tributary of Lake Michigan, drains a small, primarily industrial watershed of 0.11 square miles (Thomann and Kontaxis 1981). Impervious surfaces cover about 40% of the drainage area, but the portion between Pershing Road and the Elgin, Joliet, and Eastern Railroad (EJ&E) tracks is grassy and wooded. This portion also has been used for the disposal of "urban debris" (Noehre and Graf 1980). The North Shore Sanitary District is north of the North Ditch.

Under a cooperative agreement with ATSDR, IDPH prepared an initial public health assessment (PHA) for the OMC/Waukegan Harbor site in 1989 and a final PHA for the site in 1994. In 1998, ATSDR released a site review and update for the OMC/Waukegan Harbor site. In these documents, IDPH concluded that the site was a public health hazard because people had probably been exposed to polychlorinated biphenyls (PCBs) in fish at levels that could result in adverse health effects. For the public, the consumption of contaminated fish was the main route of exposure. In 2004, IDPH prepared separate health consultations for the various parts of the site, one for the OMC Plant 2 and the PCB containment cells (IDPH 2004a), one for Waukegan Harbor (IDPH 2004b), and another for the Waukegan Manufactured Gas and Coke Plant (IDPH 2004c).

Previous assessments of the OMC sites have not included the OMC Dunes Contamination Area because the contamination was unknown at the time. In 2004, the City of Waukegan hired Deigan and Associates, LLC, to sample soil east of OMC Plant 2 and the eastern PCB containment cell, as well as sediments of the North Ditch and South Ditch. This sampling found PCB contamination in the OMC Dunes Contamination Area and the North Ditch and South Ditch.

On August 17, 2005, Tetra Tech EM, Inc. collected soil and sediment samples to confirm the findings of Deigen and Associates, LLC. In the OMC Dunes Contamination Area, Tetra Tech found high levels of PCBs in the surface soil of the Dunes Area, but lower levels in the South Ditch.

On November 14, 2005 and March 7, 2006, USEPA issued action memoranda (Theisen 2006c, Theisen 2005). These documents requested funds for the immediate removal of PCB contamination from the OMC Dunes Contamination Area. In December 2005 and January 2006, USEPA had the contaminated material in the OMC Dunes Contamination Area and South Ditch excavated and placed inside the site fence of OMC Plant 2 for temporary storage. Between May 8 and May 19, 2006, USEPA shipped approximately 9,750 tons of contaminated soil and sediment to a landfill for disposal (Theisen 2006a; Theisen 2006b).

Demographics

Currently, land use around the harbor is commercial and industrial. The harbor serves commercial shipping, including raw materials and cement delivery, and barge and tug mooring. It also provides access to marinas and maintenance facilities for recreational boating. A public beach is east of the site. Charter boats for anglers also operate out of the harbor.

The nearest homes are about 0.3 miles from the site. According to the 2000 U.S. Census, 10,492 people live within 1 mile of the site. Hispanic persons comprise 47% and African-Americans comprise 19% of this population. USEPA reported low-income levels for 44% of the residents within 1 mile of Waukegan Harbor (Theisen 2003).

The city has rezoned the WCP property for use as residential housing and plans to use some WCP property for affordable housing. Some housing also may be for people with pleasure boats in Waukegan Harbor (Blazer 2003a, Blazer 2003b).

On August 25, 2003, the Waukegan City Council accepted a master redevelopment plan by Skidmore Owings and Merrill, LLP (City of Waukegan 2003a). Details of the plan have yet to be developed (Blazer 2003a). To date, the plan calls for the OMC Plant 2 to be replaced with smaller buildings. The Waukegan Lakefront Development Corporation proposed future development of OMC Plant 2 as an automobile museum, with room for 3,000 to 5,000 automobiles (City of Waukegan, 2003c). Other possible development plans near Waukegan Harbor include:

- establishing a permanent, continuous, parkland edge to the lakefront, including the harbor
- relocating industry along the harbor to an area near Interstate 94
- developing a marina village with housing for boat owners
- adding 2,500 residential housing units
- developing 100,000 square feet of retail services
- building a new hotel with meeting rooms
- building a modern train station, and

- linking the downtown with the lakefront property in a pedestrian friendly manner.

The city projected that residential development near the harbor would begin within 5 years. Of the estimated $1 billion cost of the proposed redevelopment plan, 70 to 80% would come from individual developers. The rest would come from public funding through an existing tax (City of Waukegan 2003b, City of Waukegan 2003c). Beyond cleanups of contaminated properties, implementing this plan requires financial commitments from private developers.

Although residential developments near the harbor would likely increase use of the public beach, the contamination in the OMC Dunes Contamination Area has been removed. This action has eliminated future exposure to contamination.

Community Concerns

IDPH is not aware of any community concerns specifically regarding the OMC Dunes Contamination Area; however, during the second 5-year site review, USEPA requested comments from the Waukegan Community Advisory Group, and placed notices in English and Spanish in local newspapers. The following comment was received regarding OMC Plant 2:

- With PCB levels in fish still elevated, the Waukegan Community Advisory Group was concerned there may still be a source of PCB contamination moving from OMC Plant 2 into the harbor.

The contamination of the OMC Dunes Contamination Area was a potential source of PCBs that could have been transported into Lake Michigan, most likely by erosion and transport through the North Ditch. The removal of the contaminated media from the OMC Dunes Contamination Area has eliminated this possibility. The remaining contamination in the North Ditch is at low levels. Any contribution to contamination in Lake Michigan would be negligible.

Discussion

Chemicals of Interest

IDPH compared the maximum level of each contaminant detected during environmental sampling with appropriate screening comparison values. This was to select contaminants for further evaluation for both carcinogenic and noncarcinogenic health effects. Chemicals that exceeded comparison values were selected for further evaluation. A description of each of the comparison values is found in Attachment 1.

IDPH used the comparison values to screen for contaminants that warranted further evaluation. These comparison values do not represent thresholds of toxicity. Although some of these chemicals may exist at levels greater than comparison values, the contaminants can affect only someone exposed to sufficient doses. The amount of the contaminant, the duration and route of

exposure, and the health status of exposed individuals are important factors in determining the potential for adverse health effects.

Sediment

Before an extensive cleanup of the OMC site in the early 1990s, the North Ditch had extremely high PCB levels in sediment (more than 5,000 ppm), but levels greater than 50 ppm were restricted to the OMC site (Mason and Hanger-Silas Mason Co. 1981).

In 2004, the City of Waukegan contracted Deigan and Associates, LLC, to sample sediments of the North Ditch and South Ditch. This sampling found PCBs in the South Ditch at levels up to 150 ppm (Table 1).

On August 17, 2005, Tetra Tech EM, Inc. collected sediment samples for USEPA to confirm the findings of Deigen and Associates, LLC. They found lower concentrations in the South Ditch (Table 1).

Soil

In 2004, the City of Waukegan contracted Deigan and Associates, LLC, to sample soil east of OMC Plant 2 and the eastern PCB Containment Cell. This sampling found soil PCB concentrations in the Dunes Area up to 14,000 ppm, with the highest concentration immediately east of the Eastern PCB Containment Cell (Table 2 and Figure 3).

On August 17, 2005, Tetra Tech EM, Inc. collected soil samples for USEPA to confirm the findings of Deigen and Associates, LLC. This sampling confirmed high levels of PCBs in surface soil in the OMC Dunes Contamination Area (Table 2).

Exposure Pathways

People can be affected by hazardous chemicals only if they come into contact with them through an exposure pathway at a sufficient concentration to cause a toxic effect. This requires (1) a source of exposure, (2) an environmental transport medium, (3) a route of exposure, (4) point of exposure, and (5) a receptor population.

A pathway is complete if all its components are present and exposure of people occurred in the past, is occurring, or will occur in the future. If parts of a pathway are absent, if data are insufficient to decide whether the pathway is complete, or if exposure may have occurred at some time in the past, may be occurring in the present, or may occur in the future, then it is considered to be a potential pathway. If part of a pathway is not present and will never exist, the pathway is considered to be incomplete and is not given further consideration.

Fish

In the past, contaminated soil and sediment at the OMC Dunes Contamination Area was a potential source of PCBs in fish of Lake Michigan. In the past, some of this material may have eroded into Lake Michigan through the North Ditch. Removal of the contaminated material eliminated this potential movement of contaminants. A separate health consultation on OMC/Waukegan Harbor discusses PCBs in fish from Waukegan Harbor and Lake Michigan (ATSDR 2004a).

The 2007 fish advisory for Waukegan North Harbor is the same as the fish advisory for Lake Michigan, with the exception of white sucker and sunfish. If caught in the harbor, these two species of fish should be limited to 1 meal per month (IDNR 2007).

Groundwater

No one drinks groundwater in the vicinity of the site. The City of Waukegan uses water from Lake Michigan. The consumption of any contaminants in groundwater should not occur and is an incomplete exposure pathway.

Sediments of the North Ditch and South Ditch

Before an extensive OMC cleanup in the early 1990s, the North Ditch had extremely high levels of PCBs. The high PCB levels were restricted to the OMC site. People using the public beach were not exposed to those extremely high PCB concentrations.

Sediment in the North Ditch and South Ditch contain PCBs. USEPA removed contaminated sediments from the South Ditch, eliminating future exposure to these sediments. Human exposures to sediment in the North Ditch and South Ditch would be infrequent, resulting in negligible exposure. The North Ditch and South Ditch are potential sources of PCBs for Lake Michigan and fish in the lake; however, the low remaining levels probably would be diluted upon reaching the lake, resulting in negligible increases in the PCB concentrations of Lake Michigan fish.

Surface Soil

Possible sources of the PCB contamination in the OMC Dunes Contamination Area include spills or leaks during the years of OMC Plant 2 operation. OMC used PCB-containing hydraulic fluids from 1951 to 1977. Spills also may have occurred during the placement of materials in the eastern PCB containment cell, or leakage of the eastern PCB containment cell. Because there were other leaks of PCBs at OMC Plant 2, leaks during the years of operation are the most likely source. The transport of PCBs to the containment cells was under USEPA oversight, which should have ensured adequate safe transport measures. Water is periodically pumped from the PCB containment cells, so if a side wall were to develop a leak, groundwater should flow into the containment cell. This should prevent the dispersal of PCBs outside of the containment cell.

Surface soil in the area is sandy and highly permeable. People may have been exposed to PCBs in surface soil at the OMC Dunes Contamination Area by inhalation (dust), incidental ingestion, or skin contact. Exposure was more likely in areas of bare soil. Vegetation or pavement minimizes exposure to contaminated soil. The public beach near the OMC Dunes Contamination Area is heavily used in the summer, and some people probably entered the OMC Dunes Contamination Area, which is on public land.

The removal of PCB contamination from the OMC Dunes Contamination Area eliminated possible future exposure to PCBs in this area. For past exposure, IDPH assumed a worst-case exposure scenario of a person being exposed to 100 milligrams per day of surface soil with the highest level of PCBs detected for 2 days per week, 20 weeks per year, for 30 years.

Based on this worst-case exposure scenario, past exposures to PCB-contaminated soil in the OMC Dunes Contamination Area would have exceeded the ATSDR minimal risk level (MRL) for PCBs. In addition, past exposures to PCBs in surface soil may have posed a moderate increased risk of cancer. However, few, if any, persons would be exposed to the maximum levels of PCBs in soil on a regular basis. For a casual park user who crossed the formerly contaminated area, exposure likely was negligible.

Using the same worst case exposure scenario, past exposure to PCBs in sediment in the South Ditch and North Ditch would not exceed the MRL. Non-cancerous adverse health effects would not be expected. Past exposure to sediments of the North Ditch and South Ditch would have posed no apparent increased risk of cancer. Few persons would have been exposed to the most contaminated sediments. For a casual park user who contacted sediments, exposure likely was negligible, resulting in no increased risk of cancer.

Public Health Implications

Polychlorinated Biphenyls

PCBs are the only known contaminant in the OMC Dunes Contamination Area. PCBs can cause liver cancer in rats and are considered probable human carcinogens by the USEPA (ATSDR 2000). Cancers caused by chemical exposure typically do not appear until 10 or more years after exposure. Cancers caused by chemicals, however, cannot be distinguished from cancers that occur spontaneously.

Most health studies of PCBs have been in people who ingested large quantities of PCB-contaminated fish. Subtle neurological effects may occur in the infants of women who eat large quantities of PCB-contaminated fish or have high body burdens of PCBs. A study of people 50 to 90 years of age who ate more than 24 pounds of Great Lakes fish per year found that PCB exposure had no effect on fine motor coordination (ATSDR 2000). However, a subsequent study associated increased PCB exposure with slight decreases in long-term memory (Schantz, et al. 2001). In animals that consumed fish with PCB levels similar to some fish from Waukegan Harbor and Lake Michigan, studies have observed immunological depression and more serious

reproductive effects. PCBs can decrease reproductive success in animals, but human studies have been less clear (ATSDR 2000).

The contaminated materials in the OMC Dunes Contamination Area and the South Ditch have been removed. These actions have eliminated exposure to site contaminants in those areas.

Child Health Considerations

IDPH recognizes that children are especially sensitive to some contaminants. Given the same contaminant concentrations, children are more likely to receive larger doses than adults. This is because children play in soil, wash hands less frequently than adults, and commonly exhibit hand-to-mouth behavior. Children also have a smaller body size, meaning that they receive a greater dose from the same amount of absorbed contaminant.

In the past, children may have been exposed to PCBs in soil in the OMC Dunes Contamination Area and sediments in the North Ditch and South Ditch. Most information on the health effects of PCBs on children comes from studies where mothers ate PCB-contaminated fish during pregnancy. Subtle neurological effects may occur in the infants of women who eat large quantities of PCB-contaminated fish. Health effects have included decreased reflexes, motor immaturity, and lower psychomotor scores in children between 6 months and 2 years of age. Some of these neurological effects may persist into later childhood. The observed effects were almost certainly too small to be observed in any given individual. In one study, statistical analyses suggested that PCBs rather than other contaminants in the fish caused the observed neurological effects. Human studies of birth weight and infant growth after maternal PCB consumption have been inconsistent (ATSDR 2000).

Few, if any children would have been exposed regularly to the contaminated area. For a casual park user who contacted contaminated sediments, exposure likely was negligible. Removal of the contaminated soil and sediments has eliminated PCB exposure for the future.

Conclusions

In the past, the OMC Dunes Contamination Area posed a public health hazard for persons who may have been routinely exposed to the highest levels of PCBs in soil. Such exposures may have posed a moderate increased risk of cancer and also may have increased the risk of non-cancer health effects. However, the contamination would have posed no increased risk of cancer for a casual park user.

PCB-contaminated soil and sediment have been removed from the OMC Dunes Contamination Area, so the site currently poses no public health hazard.

Recommendations

Because the PCB contamination at the OMC Dunes Contamination Area has been removed and the hazard no longer exists, IDPH has no further recommendations for this site.

Preparer of Report

Thomas A. Baughman, Ph.D.
Environmental Toxicologist
Illinois Department of Public Health

References

Adler K. 2003. E-mail to T. Baughman, Illinois Department of Public Health. U.S. Environmental Protection Agency. March 13.

Blazer MS. 2003a. Phone log sheet of August 7. The Jeff Diver Group, L.L.C.

Blazer MS. 2003b. E-mail of August 7 to Thomas Baughman, Illinois Dept. of Public Health. The Jeff Diver Group, L.L.C.

City of Waukegan. 2003a. Waukegan City Council takes first step toward comprehensive lakefront cleanup; rejects proposal to dump at Yeoman Creek Landfill Superfund Site. October 8.

City of Waukegan. 2003b. Minutes of special meeting, August 25. Accessed October 2003.Available at URL: www.waukeganweb.net/miutes08-25-03.htm.

City of Waukegan. 2003c. WaukeganVision.com. Accessed October 2003. Available at URL: http://www.waukeganvision.com/DraftPrincipals/DefaultJune23.asp.

Illinois Department of Natural Resources (IDNR). 2007 Illinois Fishing Information.

Illinois Department of Public Health (IDPH). 2004a. Outboard Marine Corporation/Waukegan Harbor, Lake County, Illinois: OMC Plant 2, Health Consultation. Atlanta: U.S. Department of Health and Human Services. April 20, 2004.

Illinois Department of Public Health (IDPH). 2004b. Outboard Marine Corporation/Waukegan Harbor, Lake County, Illinois,: Waukegan Harbor. Health Consultation. Atlanta: U.S. Department of Health and Human Services. April 20, 2004.

Illinois Department of Public Health (IDPH). 2004c. Outboard Marine Corporation/Waukegan Harbor: Waukegan Manufactured Gas and Coke Plant, Waukegan, Lake County, Illinois, Health Consultation. Atlanta: U.S. Department of Health and Human Services. May 18, 2004.

Illinois Environmental Protection Agency. 1994. A summary of selected background conditions for inorganics in soil. IEPA/ENV/94-161.

Noehre, A. W. and J. B. Graf. 1980. An estimate of sediment movement in North Ditch, Waukegan, Illinois.

Schantz, S.L.; D.M. Gasior; E. Polverejan; R.J. McCaffrey; A.M. Sweeny; H.E.B. Humphrey; J.C. Gardiner. 2001. Impairments of memory and learning in older adults exposed to polychlorinated biphenyls via consumption of Great Lakes fish. Environmental Health Perspectives 109:605-11.

Tetra Tech EM, Inc. 2005. U.S. Environmental Protection Agency Site Assessment Report, Outboard Marine Corporation Plant #2, Waukegan, Lake County, Illinois. October 7.

Theisen, K. 2006a. Final POLREP, OMC Plant 2, 200 Seahorse Drive, Waukegan, IL. May 30.

Theisen, K. 2006b. Email to Thomas A. Baughman, Illinois Dept. of Public Health. U.S. Environmental Protection Agency. April 20.

Theisen, K. 2006c. Action Memorandum: Request for a Ceiling Increase for the Second Emergency Removal at the Outboard Marine Corporation (OMC) Site, Waukegan, Lake County, IL, Site ID# 0528. U.S. Environmental Protection Agency. March 7.

Theisen, K. 2005. Action Memorandum: Request for a Second Emergency Removal at the Outboard Marine Corporation (OMC) Site, Waukegan, Lake County, IL, Site ID# 0528. U.S. Environmental Protection Agency. November 14.

Theisen K. 2003. Action Memorandum: Request for a [sic] emergency removal action at the Outboard Marine (OMC) Site, Waukegan, Lake County, IL, Site ID# 0528. U.S. Environmental Protection Agency. January 23.

Thomann, R. V. and M. T. Kontaxis. 1981. Mathematical modeling estimate of environmental exposure due to PCB-contaminated harbor sediments of Waukegan Harbor and North Ditch. HydroQual, Inc.

U.S. Environmental Protection Agency. 2002a. Five-year Review Report: Second Five-year Review Report for Outboard Marine Corporation Superfund Site, Waukegan, Lake County, IL. September. Accessed April 2003. Available at URL:http://www.epa.gov/R5Super/fiveyear/reviews_pdf/illinois/outboard_marine.pdf.

U.S. Environmental Protection Agency. 2002b. Joint federal/state settlement with bankrupt. Outboard Marine Corp. requires interim cleanup. July 25. Accessed October 2003. Available at URL: http://www.dakotacg.com/releases/pa/jul02/50726b.htm.

U.S. Environmental Protection Agency. 2002c. Outboard Marine Corporation, Waukegan, Lake County, Illinois: discovery site visit report. Prepared by Tetra Tech EM, Inc. May 10.

U.S. Environmental Protection Agency. 2003a. Great Lakes: Waukegan Harbor area of concern. April 9. Accessed May 14, 2003. Available at URL:http://www.epa.gov/grtlakes/aoc/waukegan.html.

U.S. Environmental Protection Agency. 2003b. NPL fact sheets for Illinois: Outboard Marine Corp., EPA ID# ILD000802827. October. Accessed November 25, 2003. Available at URL: http://www.epa.gov/R5Super/npl/illinois/ILD000802827.htm.

U.S. Environmental Protection Agency. 2003c. NPL fact sheets for Illinois: Outboard Marine Corp., EPA ID# ILD000802827. January. Accessed May 14, 2003. Available at URL: http://www.epa.gov/R5Super/npl/illinois/ILD000802827.htm.

Waukegan Harbor Citizens Advisory Group. 2003. Minutes of the January 16, 2003, Citizens Advisory Group meeting. Submitted by Penny Bouchard, Secretary of the Waukegan Harbor Citizens' Advisory Group. Accessed October 2003. Available at URL: http://wkkhome.northstarnet.org/iepa/012003MinutesFINAL.PDF.

Table 1. Concentrations of PCBs in Sediments of the North Ditch and South Ditch (Tetra Tech EM, Inc. 2005, Deigan and Associates 2004).

Location	PCB Concentration (ppm)	Comparison Value (ppm)	Source of Comparison Value
Deigan and Associates (2004)			
North Ditch	0.0068-12	0.4	CREG
South Ditch	4.9-150	0.4	CREG
Tetra Tech EM, Inc. (2005)			
North Ditch	1.67	0.4	CREG
South Ditch	1.70-4.90	0.4	CREG

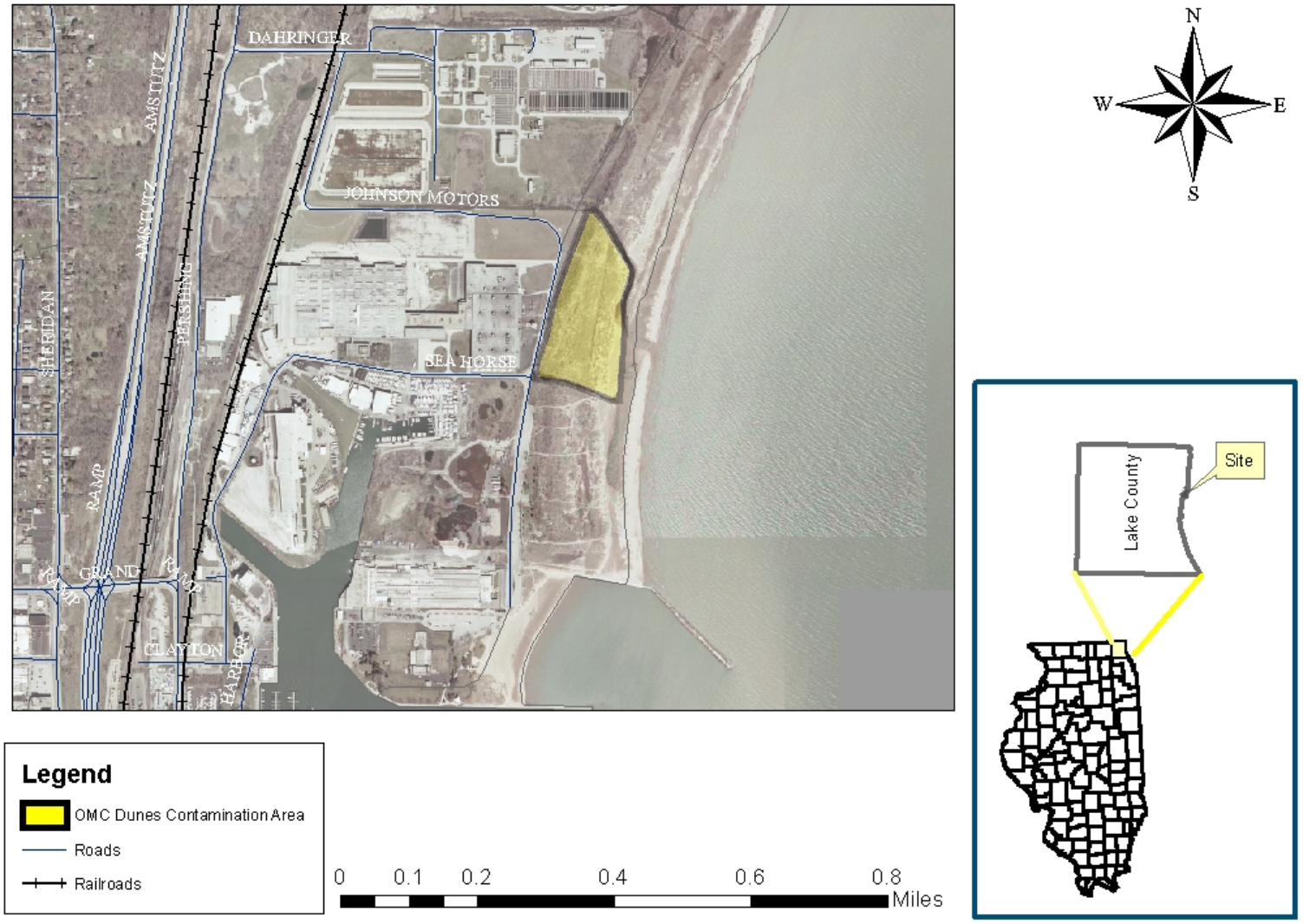
ppm = Parts per million.

Table 2. Concentrations of PCBs in soil of the OMC Dunes Contamination Area (Tetra Tech EM, Inc. 2005, Deigan and Associates 2004).

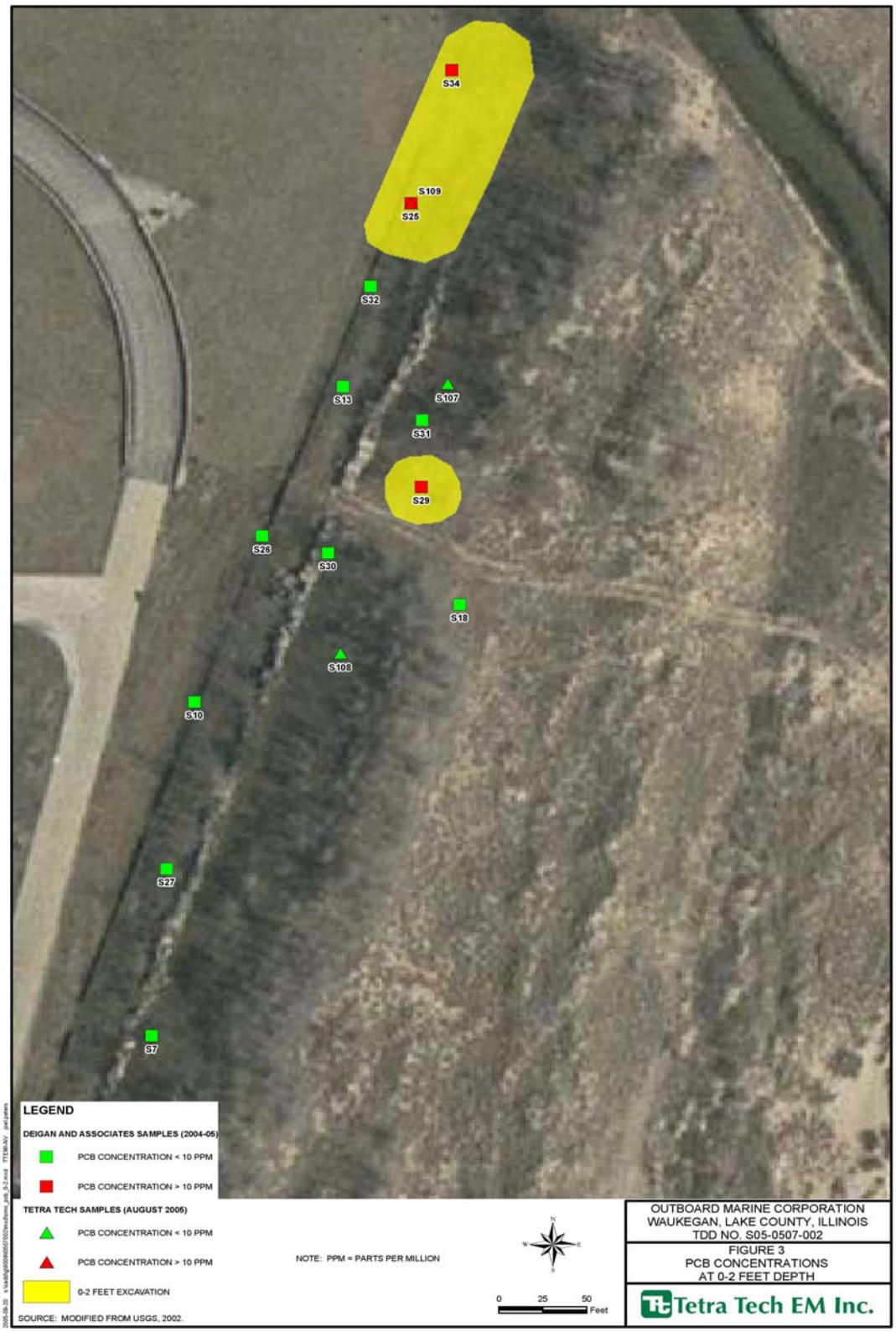
Depth (feet)	PCB Concentration (ppm)	Comparison Value (ppm)	Source of Comparison Value
Deigan and Associates (2004)			
0-2	1.2-14,000	0.4	CREG
0-3	1.7-730	0.4	CREG
4-6	1.3-17.0	0.4	CREG
5-8	1.2-280	0.4	CREG
Tetra Tech EM, Inc. (2005)			
0-0.5	1.4-1.9	0.4	CREG
0-2	1.18-36.6	0.4	CREG
2-4	N.D.-7,180	0.4	CREG
4-6	0.5-37.5	0.4	CREG
6-8	N.D.-2.8	0.4	CREG

ppm = Parts per million.
N.D. = Not detected.

Figure 1. OMC Dunes Contamination Area Site Location Map




LEGEND
TETRA TECH SAMPLES
DIEGAN AND ASSOCIATES SAMPLES (2004-2005)
OMC BEACHFRONT PROPERTY BOUNDARY
East Sediment Containment Cell
SOURCE: MODIFIED FROM USGS, 2002.
0 62.5 125
Feet
OUTBOARD MARINE CORPORATION
WAUKEGAN, LAKE COUNTY, ILLINOIS
TDD NO. S05-0507-002
FIGURE 2
SOIL AND SEDIMENT
SAMPLING LOCATIONS
Tetra Tech EM Inc.


S34
S109
S25
S32
S13
S107
S31
S29
S26
S30
S18
S108
S10
S27
S7
LEGEND
DEIGAN AND ASSOCIATES SAMPLES (2004-05)
PCB CONCENTRATION < 10 PPM
PCB CONCENTRATION > 10 PPM
TETRA TECH SAMPLES (AUGUST 2005)
PCB CONCENTRATION < 10 PPM
PCB CONCENTRATION > 10 PPM
0-2 FEET EXCAVATION
SOURCE: MODIFIED FROM USGS, 2002.
NOTE: PPM = PARTS PER MILLION
0 25 50
Feet
OUTBOARD MARINE CORPORATION
WAUKEGAN, LAKE COUNTY, ILLINOIS
TDD NO. S05-0507-002
FIGURE 3
PCB CONCENTRATIONS
AT 0-2 FEET DEPTH
Tetra Tech EM Inc.

Attachment 1

Comparison Values Used In Screening Contaminants for Further Evaluation

Environmental media evaluation guides (EMEGs) are developed for chemicals on the basis of their toxicity, frequency of occurrence at National Priorities List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not action levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference dose media evaluation guides (RMEGs) are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer risk evaluation guides (CREGs) are estimated contaminant concentrations that are based on a probability of 1 excess cancer in 1 million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Maximum contaminant levels (MCLs) have been established by USEPA for public water supplies to reduce the chances of adverse health effects from contaminated drinking water. These standards are well below levels for which health effects have been observed and take into account the financial feasibility of achieving specific contaminant levels. These are enforceable limits that public water supplies must meet.

Lifetime health advisories for drinking water (LTHAs) have been established by USEPA for drinking water and are the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects over a lifetime of exposure. These are conservative values that incorporate a margin of safety.

Certification

This OMC/Waukegan Harbor public health consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

Charisse J. Walcott
Technical Project Officer, CAT, CAPEB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Alan Yarbrough
Team Lead, CAT, CAPEB, DHAC, ATSDR