Five-Year Review Report

First Five-Year Review Report
For
The Sheboygan River and Harbor Superfund Site

Sheboygan, Wisconsin

September 2009

Prepared By:
The United States Environmental Protection Agency
Region 5
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Approved by: Date:

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9-1-09

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Five-Year Review Report

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List of Acronyms

Agencies	Wisconsin Department of Natural Resources and United States Environmental Protection Agency
AOC	Administrative Order on Consent
ARAR	Applicable or relevant and appropriate requirement
ASRI	Alternative Specific Remedial Investigation
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
C&NW	Chicago & Northwestern
EPA	United States Environmental Protection Agency
ES	enforcement standard
GMIT	Groundwater Monitoring/ Interceptor Trench
ICs	Institutional Controls
ICP	Institutional Controls Plan
ICWP	Institutional Controls Work Plan
lbs	pounds
MCL	maximum contaminant level
NCP	National Contingency Plan
NPL	National Priorities List
OMP	Operation and Monitoring Plan
PAHs	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated biphenyl
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
PRS	Pollution Risk Services
RA	Remedial Action
RAOs	Remedial Action Objectives
RI	Remedial Investigation
RI/FS	Remedial Investigation/ Feasibility Study
RMU	Remedial management unit
ROD	Record of Decision
Site	Sheboygan River and Harbor Superfund Site
SWAC	Surface Weighted Average Concentration
Tecumseh	Tecumseh Products Company
UCL	upper confidence level
µg/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
UU/UE	unlimited use or unrestricted exposure
VOCs	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources

Executive Summary

The Sheboygan River and Harbor Superfund Site (Site) includes the lower 14 miles of the Sheboygan River from the Sheboygan Falls Dam downstream to, and including, the Inner Harbor. In addition to polychlorinated biphenyl (PCB)-contaminated sediment in the river and harbor, some floodplain soils are contaminated with PCBs, and groundwater and additional PCB sources associated with the former Tecumseh Products Company (Tecumseh) Plant are also part of the Site. Site risks include risks to humans and ecological receptors via consumption of PCB-contaminated fish, and fish and waterfowl consumption advisories have been in effect since 1987.

The response actions at the Site are being led by a potentially responsible party (PRP) with oversight by the United States Environmental Protection Agency (EPA). A Record of Decision (ROD) was issued on May 12, 2000, for dredging/disposal of PCB-contaminated sediments.

There have been three PRPs identified. The PRPs are Tecumseh, Kohler Company, and Thomas Industries. In 2003, Tecumseh entered into a Consent Decree (CD) with EPA. Tecumseh transferred the Site liability to Pollution Risk Services (PRS) and funded an insurance policy for the work to be performed at the Site in 2004. As a result, EPA initiated a modification of the 2003 CD to include PRS as the PRP performing the work. The amended CD was finalized in 2006. This Consent Decree was for the work to be performed in the Upper River, the former Tecumseh plant and the floodplains. In 2009 PRS entered into an Administrative Order on Consent (AOC) with EPA to perform characterization and remedial design activities for the Middle River, Lower River, and Inner Harbor.

In 2004, PRS started the cleanup at the Site. Cleanup actions included construction and installation of a groundwater monitoring/ interceptor trench (GMIT), excavation of source materials, river bank excavation, removal of preferential pathways, and installation of monitoring wells. These activities took place at the former Tecumseh Plant location in Sheboygan Falls. In 2006 and 2007, PRS performed dredging of PCB-contaminated sediment in the Upper River. Remedial design activities are currently ongoing at the remainder of the Site (Middle River, Lower River, and Inner Harbor).

The remedial action being implemented at the Sheboygan River and Harbor Site is expected to be protective, although it may take some time after completion of remedial action construction activities for the Site to achieve the Site-wide surface weighted average concentration (SWAC) specified in the ROD and for fish tissue concentrations to decrease. It is expected that site-wide remediation activities will be completed in 2014. Following the completion of the remedial

action and after evaluation of additional information, including the results of long-term monitoring, EPA will make a site-wide protectiveness determination.

Long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: SHEBOYGAN RIVER AND HARBOR SUPERFUND SITE		
EPA ID *(from WasteLAN)*: WID980996367		
Region: 5	**State:** Wisconsin	**City/County:** Sheboygan / Sheboygan
SITE STATUS		
NPL status: : X Final __Deleted __Other (specify)		
Remediation status (choose all that apply): X Under Construction __Operating __Complete		
Multiple OUs?* __YES X NO	**Construction completion date:** Not Complete	
Has site been put into reuse? __ YES X NO __ Portions		
REVIEW STATUS		
Lead agency: X EPA __State __Tribe __Other Federal Agency		
Author name: Pablo N. Valentín		
Author title: Remedial Project Manager	**Author affiliation:** EPA, Region 5	
Review period:** 10/24/2008 to September 2009		
Date(s) of site inspection: 05/14/2009		
Type of review: X Post-SARA __Pre-SARA __NPL-Removal only __Non-NPL Remedial Action Site __NPL State/Tribe-lead __Regional Discretion)		
Review number: : X 1 (first) __2 (second) __3 (third) __Other (specify)		
Triggering action: X Actual RA On-site Construction at OU #__ __Actual RA Start at OU# ___ __Construction Completion __Previous Five-Year Review Report __Other (specify)		
Triggering action date *(from WasteLAN)*: 09/07/2004		
Due date *(five years after triggering action date)*: 09/07/2009		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Remedy is not yet complete.

Long-term monitoring of fish and soft sediment needs to be conducted to evaluate remedy protectiveness and environmental recovery.

Existing ICs have not been formally evaluated and some required ICs have not been implemented.

Recommendations and Follow-up Actions:

Complete remedial actions and conduct follow-up construction confirmation monitoring.

Conduct long-term monitoring of fish and soft sediment.

Develop an Institutional Controls Work Plan (ICWP), or Institutional Controls Plan (ICP) if necessary, to ensure long-term stewardship.

Protectiveness Statement(s):

The remedial action being implemented at the Sheboygan River and Harbor Site is expected to be protective, although it may take some time after completion of remedial action construction activities for the Site to achieve the Site-wide surface weighted average concentration (SWAC) specified in the ROD and for fish tissue concentrations to decrease. It is expected that site-wide remediation activities will be completed in 2014. Following the completion of the remedial action and after evaluation of additional information, including the results of long-term monitoring, EPA will make a site-wide protectiveness determination.

Long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Other Comments: none.

Fill in the data below:

Date of last Regional review of Human Exposure Indicator (from WasteLAN): 04/30/2009
Human Exposure Survey Status (from WasteLAN): Current Human Exposure Not Controlled
Date of last Regional review of Groundwater Migration Indicator (from WasteLAN): 05/27/2009
Groundwater Migration Survey Status (from WasteLAN): Contaminated Groundwater Migration Under Control
Ready for Reuse Determination Status (from WasteLAN): N/A

Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings and conclusions of such reviews are documented in site-specific five-year review reports. In addition, five-year review reports identify issues or deficiencies, if any, found during the review process for the site and provide recommendations to address or correct them.

The United States Environmental Protection Agency (EPA) prepared this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with Section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA has now conducted the first five-year review of the remedial actions being implemented at the Sheboygan River and Harbor Superfund Site (the Site) located in Sheboygan, Wisconsin. The review was conducted for this Site from October 2008 through September 2009 by the EPA Remedial Project Manager. This report documents the results of the review. As part of this review, the Remedial Project Manager determined that no additional data collection was necessary to evaluate the current Site status, since regular monitoring and data reporting is required by the Operation and Monitoring Plan (OMP) for the Site.

This is the first five-year review for the Sheboygan River and Harbor Site which was triggered by the start of on-site construction on September 7, 2004. This five-year review is required due to the fact that hazardous substances, pollutants or contaminants will remain at the Site above levels that allow for unlimited use and unrestricted exposure once all of the remedial action work required by the May 2000 Record of Decision for the Site has been implemented.

II. Site Chronology

Table 1: Chronology of Site Events

EVENT	DATE
Sheboygan Harbor constructed at mouth of the river	Early 1920's
Lower Sheboygan River (channel upstream of Eighth Street Bridge) added as a portion of Sheboygan Harbor for maintenance dredging	1954
404,000 cubic yards of sediment dredged by the U.S. Army Corps of Engineers (USACE) downstream of Eighth Street Bridge	1956 through 1969
USACE disposes of dredged material from harbor in deep water disposal area in Lake Michigan	Prior to 1969
Tecumseh voluntarily excavates and replaces a dike constructed prior to issuance of PCB governing regulations with PCB contaminated soils	Late 1970's
USACE sediment sampling indicates moderate to high levels of lead, zinc, PCBs, and chromium as well as moderate levels of arsenic	1979
Examination of sediment profile samples collected by the USACE shows presence of PCBs in surface of harbor sediments	December 1982
EPA places Sheboygan River and Harbor Site on the National Priorities List (NPL)	1986
EPA requests that Tecumseh conduct actions to remove about 5,000 cubic yards of contaminated sediments	1989 and 1990
Remedial Investigation completed	05/31/1990
Feasibility Study completed	01/11/1999
EPA issues Site-Wide ROD	May 2000
EPA enters into CD with Tecumseh for the Upper River	May 2004
Tecumseh transfers liability to PRS and funds insurance policy	May 2004
PRS starts Phase I of Upper River cleanup	September 2004
Upper River CD is amended to include PRS as responsible party	2006
PRS starts Phase II of Upper River Cleanup by initiating dredging in Upper River	May 15, 2006

EVENT	DATE
PRS concludes Phase II of Upper River Cleanup by finalizing dredging in Upper River	October 2007
EPA enters into AOC with PRS for recharacterization and Remedial Design of Middle River, Lower River, and Inner Harbor	February 2009
First Five-Year Review Site Inspection	May 2009

III. Background

Physical Characteristics

The Sheboygan River and Harbor Site is located on the western shore of Lake Michigan approximately 55 miles north of Milwaukee, Wisconsin, in Sheboygan County (see Figure 1 below).

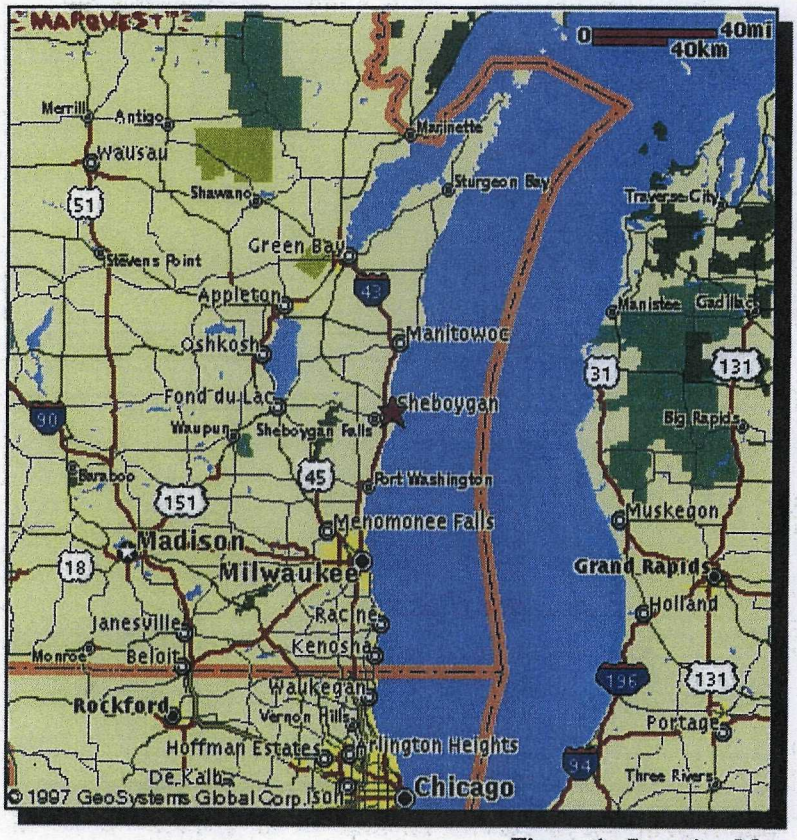


Figure 1 - Location Map

The Sheboygan River and Harbor Site includes the lower 14 miles of the river from the Sheboygan Falls Dam downstream to, and including, the Inner Harbor (see Figure 2, Site Map). This segment of the river flows through Sheboygan

Falls, Kohler, and Sheboygan before entering Lake Michigan. The Sheboygan River runs from west to east through east central Wisconsin, emptying into Lake Michigan.

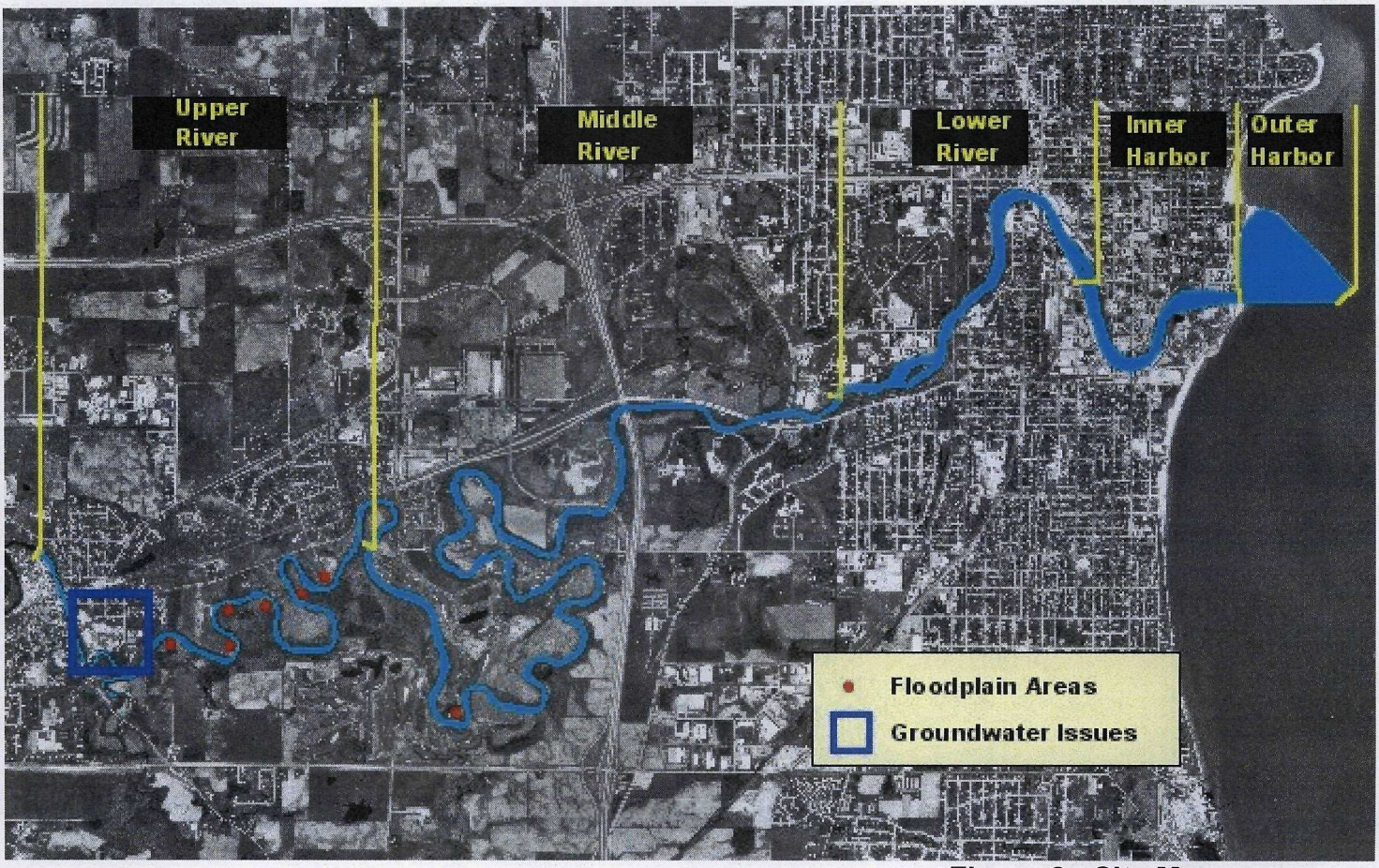


Figure 2 - Site Map

EPA divided the river into three sections during the remedial investigations (RI) based on physical characteristics such as average depth, width, and level of polychlorinated biphenyl (PCB) sediment contamination. The Upper River extends from the Sheboygan Falls Dam downstream 4 miles to the Waelderhaus Dam in Kohler. The Middle River extends 7 miles from the Waelderhaus Dam to the former Chicago & Northwestern (C&NW) railroad bridge. The Lower River extends 3 miles from the C&NW railroad bridge to the Pennsylvania Avenue Bridge in downtown Sheboygan. The Inner Harbor includes the Sheboygan River from the Pennsylvania Avenue Bridge to the river's outlet to the Outer Harbor. The Outer Harbor is defined as the area formed by the two break-walls.

The river is generally characterized by fast, rocky stretches in the upper reaches and slower, more sediment-laden stretches in the lower reaches. The width of the Upper River averages 120 feet and the depth ranges from 1 to 4 feet. The river widens as it approaches the harbor. Harbor water quality is a combination of near-shore lake water and water from the Sheboygan River.

Land Use and Resources

Land Uses

Land use along the Upper River is industrial, residential and recreational in Sheboygan Falls. The Kohler Company owns land adjacent to the Middle River in the Village of Kohler. Land use in the Middle River consists of a horse farm, tree nursery, the company's historic River Bend property and the Black Wolf Run golf course. The 800-acre, Kohler-owned River Wildlife Area is on the south side of the river adjacent to the Upper and Middle River. The wildlife area is used as a private hunting and fishing club. Land use adjacent to the Lower River and Inner Harbor is recreational, commercial and industrial with some residential areas. The City of Sheboygan's central business district is on the north bank of the river in the harbor area. The City has revitalized the harbor area. Offices, restaurants, marinas, parks and a boardwalk are located within this area.

Surface Water / Groundwater Uses

There are no public beaches along the river or harbor. The Lower River and Harbor are navigable, but the Upper and Middle River traffic is typically restricted to smaller craft (i.e. canoes and kayaks) which can be portaged around the dams in Kohler and Sheboygan Falls, as well as shallow areas. Public and recreational boat access is available at a number of locations within the city of Sheboygan in the Lower River and Harbor. There is considerable seasonal fishing in the Middle River, Lower River and Inner Harbor. Fishing is more limited in the Upper River. According to Wisconsin Department of Natural Resources (WDNR) surveys, most fishing occurs during spring and fall salmon and trout runs. A fish consumption advisory is in effect for Sheboygan River and Lake Michigan fish.

The Sheboygan River is not used as a public water supply, but it drains into Lake Michigan which is used as a drinking water source by Sheboygan, Sheboygan Falls, and Kohler. The three cities regularly test the public water and it is safe to drink. Contaminated groundwater near the Tecumseh Products Company's (Tecumseh's) Sheboygan Falls Plant is not used as a drinking water source.

History of Contamination

The Sheboygan Harbor was constructed at the mouth of the Sheboygan River in the early 1920's. In 1954, the lower Sheboygan River, namely the channel upstream of the Eighth Street Bridge, was added as a portion of the Sheboygan Harbor for USACE maintenance dredging. Between 1956 and 1969, a total of 404,000 cubic yards of sediment were dredged downstream of the Eighth Street Bridge. The channel above Eighth Street has not been dredged since it was first dredged in 1956.

Prior to 1969, the USACE disposed of the dredged material from the harbor in an authorized deep water disposal area in Lake Michigan. However, there has been no dredging within the Sheboygan Harbor since EPA and WDNR determined that the sediment was unsuitable for open-water disposal. Sediment sampling done by the USACE in 1979 indicated moderate to high levels of lead, zinc, PCBs, and chromium and moderate levels of arsenic present in sediment at all locations sampled. The USACE routinely removed lake sand from a sandbar that forms at the outer entrance of the harbor. The USACE last dredged the harbor mouth in the fall of 1991. In June 1979, the USACE collected 11 sediment cores from the harbor area ranging in depth from 1.5 to 9 feet. The USACE analyzed samples for lead, zinc, copper, chromium, and PCBs. The study revealed greater PCB and metal levels in the sediment of the Inner Harbor than in sediment from the Outer Harbor. In October 1979, the USACE collected a second round of samples consisting of 21 sediment cores. The USACE's analysis of these cores generally indicated an increase in PCB concentrations with the distance upstream from the harbor and with the depth of the sediment. The Sheboygan River and Harbor are both located within the Sheboygan River Area of Concern, so designated by the International Joint Commission on the Great Lakes due to impairment of the beneficial uses of the waterway.

Examination of 98 sediment profile samples collected by the USACE from the Sheboygan Harbor in December 1982 indicated the presence of PCBs in the surface sediment of the harbor.

Tecumseh, a manufacturer of refrigeration and air conditioning compressors and gasoline engines, was located adjacent to the Sheboygan River in Sheboygan Falls. Tecumseh is considered a potentially responsible party (PRP) because PCBs were found in sewer lines that lead to the river from the former Tecumseh facility and in hydraulic fluids used in Tecumseh's Die Cast Division manufacturing processes. The contamination level was high in the sediments immediately surrounding the former Tecumseh Plant, but decreased in concentration downstream. Tecumseh, prior to the issuance of regulations governing PCBs, used PCB-contaminated soils to construct a dike located along the river downstream of the Sheboygan Falls Dam. Tecumseh voluntarily excavated and replaced the dike following the EPA's issuance of regulations governing PCBs in the late 1970's. Tecumseh undertook cleanup actions, but not before PCBs were released into the Sheboygan River.

In 1978, the WDNR conducted a survey that found numerous industries that discharge contaminants to the Sheboygan River. A handful had some level of PCB discharge to the river. A number of industries had heavy metals in their discharge. While heavy metals were an environmental concern, PCBs were a more significant problem and any PCB-driven cleanup would likely also address the heavy metals in the river.

Initial Response

EPA placed the Sheboygan River and Harbor site on the NPL in 1986.

In 1989 and 1990, EPA requested that Tecumseh conduct actions to remove about 5,000 cubic yards of contaminated sediment. This sediment was stored in two containment facilities at Tecumseh's Sheboygan Falls Plant. In addition, approximately 1,200 square yards of highly contaminated sediment were capped or "armored" in place to prevent contaminants in the sediment from entering the river. Information developed during these activities is described in a document called an Alternative Specific Remedial Investigation (ASRI) report.

Basis for Taking Remedial Action

Investigations performed by Tecumseh between 1987 and 1990 defined the nature and extent of contamination at the Site and described the extent of the threat that contaminants pose to human health and the environment. Tecumseh obtained additional data in June 1999. The primary compounds of concern were determined to be PCBs and several heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). (See Table 2 for a list of heavy metals contamination.) The PCB contamination drove the risk and, therefore, the cleanup, which primarily focused on removing PCB-contaminated sediments and soils. However, metals, volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) were also detected at varying concentrations. Over the course of the investigations, Tecumseh, WDNR and the National Oceanic and Atmospheric Administration have all collected samples from the Sheboygan River.

Table 2 - Metals Contamination (ppm)

	Upper, Middle and Lower River		Inner Harbor	
	Minimum	**Maximum**	**Minimum**	**Maximum**
Arsenic	1.2	16	0.7	20.4
Cadmium	ND*	3.1	ND	3.7
Chromium	ND	143	2.2	414
Copper	ND	102	ND	140
Lead	3.6	293	1.1	783
Mercury	ND	0.3	ND	0.1
Nickel	ND	90	ND	354
Zinc	ND	300	ND	369

*ND – Not Detected

Eight metals including cadmium, chromium, copper, lead, mercury, nickel and zinc were targeted as part of the RI. Generally, the metals occurred at relatively low concentrations in the upstream sediments and increased in the downstream sediments.

Common natural elements such as aluminum, calcium, iron, magnesium, potassium and sodium were also present.

Sampling detected five VOCs, including methylene chloride, acetone, chloroform, methyl ethyl ketone, and toluene, in the river sediments. VOCs were generally found in low concentrations in the river sediment. However, acetone was detected at levels up to 270 parts per billion (ppb), while toluene was detected at levels up to 740 ppb.

PAHs are commonly associated with petroleum products, waste oil, and coal tars. During the RI the total estimated PAH concentrations were at or below 2.0 parts per million (ppm) for nine of the ten river samples obtained. The tenth sample had a PAH concentration of 4 ppm. In 1998, PAH sampling conducted by the Wisconsin Public Service Corporation for a project managed by WDNR showed total PAH concentrations from non-detect to 9,294 ppm near the former Manufactured Gas Plant site in the Lower River, just upstream of the Pennsylvania Avenue Bridge. Additional investigations and future potential remediation of PAH-contaminated sediments related to that effort is being managed separately by EPA and was not a part of the May 2000 Record of Decision (ROD) for the Sheboygan River and Harbor Site.

No pesticides or dioxin/dibenzofurans were detected in the river sediments.

Figure 3 shows the potential exposure pathways for the Site.

PCB-Contaminated Sediment

Upper River

PCB sampling results from the Upper River in 1989 and 1990 showed concentrations ranging from 1.4 to 4,500 ppm. Tecumseh removed PCB-contaminated sediment near its facility in 1990 and 1991. PCB sampling conducted in December 1997 from the same soft sediment areas sampled in 1989 and 1990 showed concentrations ranging from non-detect to 170 ppm. Soft sediment sampling in 1999 near Tecumseh's Sheboygan Falls Plant revealed PCB concentrations as high as 840 ppm. River bank sampling in 1999 near Tecumseh's Sheboygan Falls Plant revealed PCB concentrations as high as 1,100 ppm. PCB-contaminated sediment in this segment of the river migrates downstream due to the dynamic nature of this river reach.

Middle River

Information obtained from the Middle River during the RI showed PCB concentrations ranging from non-detect to 8.8 ppm. WDNR sediment trap data showed PCB concentrations ranging from 1.4 to 3.0 ppm. The WDNR obtained sediment trap data between 1990 and 1996. Samples obtained in 1997 by WDNR show PCB concentrations ranging from 0.6 ppm to 37 ppm. Like the

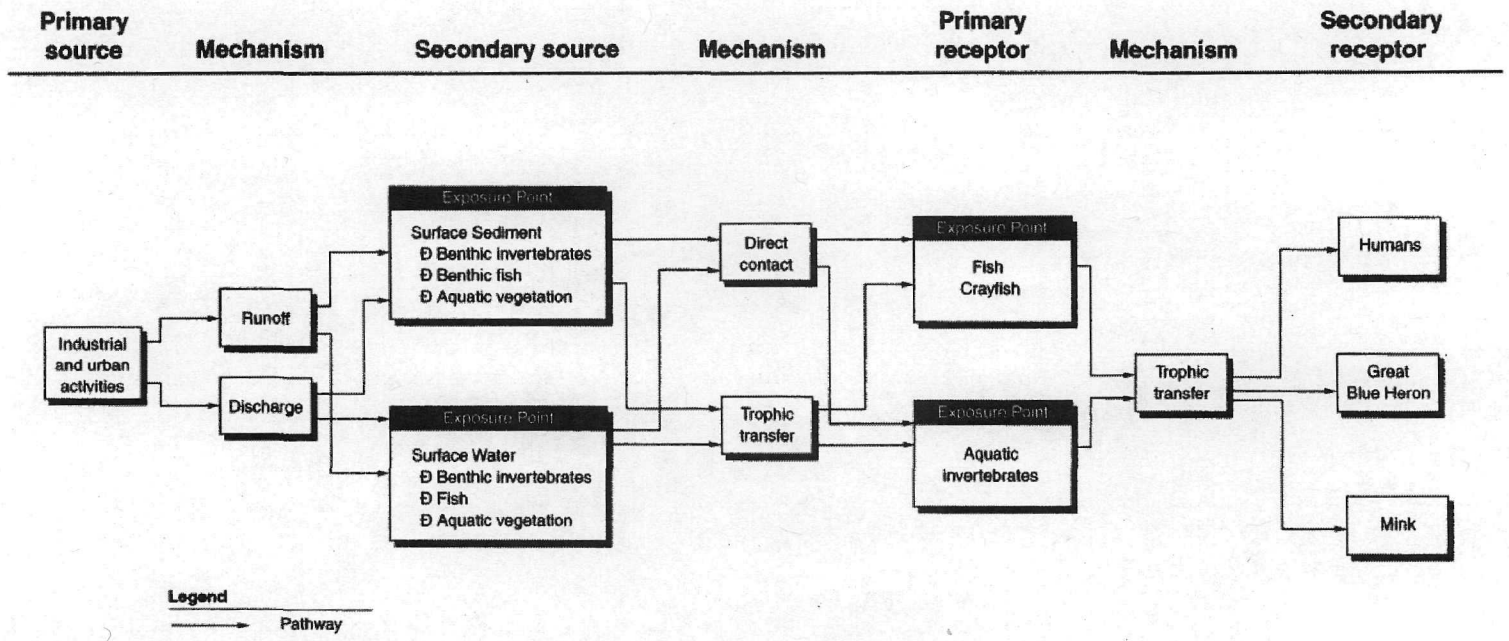


Figure 3. Sheboygan River and Harbor Potential exposure pathways

Upper River, sediment in the Middle River is likely to be disturbed due to the dynamic nature of this river reach.

Lower River

During the original site investigations, sampling in the Lower River showed PCB concentrations as high at 67 ppm in the Camp Marina area just a couple of feet below the sediment surface. Contaminated sediments within the top two feet may be disturbed by high flow events and/or boating. WDNR sediment trap data collected from 1994 to 1996 showed PCB concentrations ranging from 1.9 to 4.2 ppm in the Lower River.

Inner Harbor

RI sampling detected PCB concentrations as high as 220 ppm in the Inner Harbor, however these levels were detected in 1979 and remain many feet below the surface. PCB surface sampling results (from the top 6 inches of sediment) in 1987 ranged from 0.17 to 5.8 ppm. PCB surface sampling results in 1999 ranged from 0.38 to 5.3 ppm. Table 3 shows the average, minimum and maximum concentration of PCBs in the top 6 feet of sediment based on all sediment data adjusted to the 1999 bathymetry and extrapolated by Earth Vision software.

Table 3 – Inner Harbor Sediment PCB Concentrations (ppm)

Sediment Depth	Average	Minimum	Maximum
Top 1 foot	5.6	ND	117.4
1 to 2 feet	7.9	ND	89.1
2 to 4 feet	10.7	ND	103.2
4 to 6 feet	13.6	ND	82.49

As a general rule, PCB concentrations increase with depth between the 8th Street Bridge and the Inner Harbor mouth. This, however, is not the case for certain areas between the Pennsylvania Avenue and 8th Street Bridges.

Soil

Tecumseh collected soil samples from within the 10-year floodplain of the Sheboygan River during the investigation phase of the project. Floodplain samples collected in 1990 showed PCB concentrations ranging from non-detect to 71 ppm. In 1990 and 1992, Tecumseh took additional rounds of samples as part of the Alternative Specific Remedial Investigation. PCB concentrations exceeded 50 ppm in two samples and 10 ppm in six samples. Sampling in floodplain area 11 showed a concentration of 220 ppm. Floodplain area 11 was resampled in 1992 and showed PCB concentrations of 330 and 320 ppm. Due to disturbances of the floodplain caused by golf course construction by the land

owner, PCB concentrations have decreased in floodplain area 11 since the ASRI sampling.

Surface Water

PCB concentrations were detected in surface water prior to, during and after implementation of the PCB removal action in 1989 and 1990. The results are shown in Table 4 below.

Table 4 - PCB Concentrations in Surface Water

	PCB Concentration (ppb)	
	Minimum	Maximum
April 1989	0.044	0.127
July 1989	< 0.05	0.52
November 1990	< 0.05	0.77
April 1991	< 0.05	0.08
July 1991	< 0.05	0.32
September 1991	< 0.05	0.22
October 1991	< 0.05	< 0.05
April 1992	< 0.05	< 0.05
July 1992	< 0.05	0.36
October 1992	< 0.05	0.13
May 1993	< 0.05	0.08

Groundwater

PCB contamination was also present in groundwater at the former Tecumseh plant. Groundwater sampling conducted in September 1992 and May 1993 by Tecumseh indicated that PCBs were locally present in the groundwater at Tecumseh's former Sheboygan Falls Plant in concentrations that ranged from 0.10 micrograms per liter (µg/L) to 7.4 µg/L in unfiltered samples, and from below the detection limit (0.05 µg/L) to 0.98 µg/L in filtered samples. These concentrations are above the 0.03 µg/L WDNR enforcement standard (ES) for groundwater.

IV. Remedial Actions

Remedy Selection

EPA issued a ROD for the Site on May 12, 2000. The remedy outlined specific actions to address PCB-contaminated sediment, PCB-contaminated floodplain soil, and groundwater contamination.

The major components of the selected remedy included:

- Upper River sediment characterization, removal of approximately 20,774 cubic yards of PCB-contaminated sediment to achieve a soft sediment surface weighted average concentration (SWAC) of 0.5 ppm in the Upper River, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Middle River sediment characterization, removal of sediment if necessary to achieve a soft sediment SWAC of 0.5 ppm in the Middle River, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Lower River sediment characterization, removal of sediment if necessary to achieve a soft sediment SWAC of 0.5 ppm in the Lower River, annual bathymetry surveys to identify areas susceptible to scour, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Inner Harbor sediment characterization, removal of approximately 53,000 cubic yards of PCB-contaminated sediment to achieve a SWAC of 0.5 ppm in the Inner Harbor, annual bathymetry surveys to identify areas susceptible to scour, fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less, and maintenance of the outer harbor break-walls.

- Removal of floodplain soils containing PCB concentrations above 10 ppm.

- Investigation and mitigation of potential groundwater contamination and possible continuing sources at the former Tecumseh Plant in Sheboygan Falls.

- Placement of institutional controls (ICs) to limit access to Tecumseh's Sheboygan Falls plant groundwater as a drinking water source.

The remedy consists of three primary Remedial Action Objectives (RAOs):

1. Protect human health and the environment from imminent and substantial endangerment due to PCBs attributed to the Site. To achieve this remediation objective, PCB-contaminated soft sediment will be removed so that the entire river will reach an average PCB sediment concentration of 0.5 ppm or less over time. An average PCB sediment concentration of 0.5 ppm

results in an excess human health carcinogenic risk of 1.0×10^{-4} or less over time through the consumption of PCB-contaminated fish.

Based on site-specific biota to sediment accumulation factors, the corresponding PCB tissue levels for resident fish are:

Sport Fish		Bottom Feeders	
Small Mouth Bass	0.31 ppm	Carp	2.58 ppm
Walleye	0.63 ppm	Catfish	2.53 ppm
Trout	0.09 ppm		

For PCB contaminated floodplain areas, this remediation objective will be achieved by removing sufficient contaminated soil to reach an average PCB soil concentration of 10 ppm or less.

2. Mitigate potential PCB sources to the Sheboygan River/Harbor system and reduce PCB transport within the river system.

3. Remove and dispose of Confined Treatment Facility/Sediment Management Facility sediments and previously armored/capped PCB-contaminated soft sediment deposits.

Remedy Implementation

A Consent Decree (CD) between the United States and Tecumseh for the Upper River portion of the remedy was entered and became effective on May 12, 2004. Pursuant to the Upper River CD, Tecumseh's alleged liability was resolved for a portion of the Site. Under the terms of the Upper River CD, Tecumseh was required to: 1) implement EPA's selected remedy for the cleanup of the Upper River section of the Site; 2) pay at least $2.1 million toward EPA's past response costs; and 3) pay all Upper River future response costs incurred by the United States. On March 25, 2003, Tecumseh and PRS entered into a "Liability Transfer and Assumption Agreement" under which PRS assumed specified obligations and liabilities for remediation of the Site and associated costs for which Tecumseh is responsible under the Upper River CD, which included the obligation to perform the Upper River work under the CD. PRS performed the remedial design/remedial action for the Upper River. Following completion of the remedial design, the remedial action for the Upper River was implemented in two phases from September 2004 to October 2007. The final site inspection of the Upper River Phase II remedial action was conducted on November 7, 2007. The floodplain soil removal work which also was required under the Upper River CD is not completed yet; EPA is in the process of negotiating with the adjacent property owner for access to the floodplains for remediation.

EPA and WDNR determined that the following remedial action activities were completed according to the ROD and design specifications:

- Construction and Installation of Groundwater Monitoring/ Interceptor Trench (GMIT);
- Excavation of source materials;
- Riverbank excavation;
- Removal of preferential pathways which included the removal of soil in a 10-foot radius from two outfall locations at the former Tecumseh plant that could pose a threat of continued PCB loadings to the river system;
- Installation of monitoring wells;
- Removal of 20,727 cubic yards of sediment which included 552.45 pounds of PCBs from the upper portion of the Sheboygan River from the Sheboygan Falls Dam down to Waelderhaus Dam; and
- Site restoration.

Currently, PRS is under an Administrative Order on Consent (AOC) with EPA to perform recharacterization and remedial design activities for the Middle River, Lower River, and Inner Harbor. The AOC became effective February 6, 2009. There is not yet an enforcement instrument in place for the remediation of the Middle River, Lower River, and Inner Harbor, but based on the current schedule for remedial design activities, EPA currently anticipates that cleanup activities in those areas of the site are likely to be completed by 2014.

Institutional Controls

Institutional Controls are required to ensure the protectiveness of the remedy as described in the ROD and summarized below. ICs are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE).

The May 2000 ROD specifically required that ICs be implemented to limit access to Tecumseh's Sheboygan Falls plant groundwater as a drinking water source. Also, there are requirements to maintain the Inner Harbor break-walls as part of the remedy. Additionally, the ROD requires that fish and waterfowl advisories be

maintained throughout the river to ensure the public is aware of the concern for ingesting fish and waterfowl.[1]

The table below summarizes institutional controls for these restricted areas.

Table 5 - Institutional Controls Summary Table

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions	IC Objective	Title of Institutional Control Instrument Implemented (note if planned)
Former Tecumseh Sheboygan Falls Plant Location	Prohibit interference with GMIT, prohibit groundwater consumption, and prohibit inconsistent uses	Unknown – to be determined. ICWP being developed.
Upper River, Middle River, Lower River, and Inner Harbor	Limit fish and waterfowl consumption	Fish and water fowl advisories (in place; effectiveness under review)
Upper River, Middle River, Lower River, and Inner Harbor	Restrictions on dredging in federal navigational channels	Clean Water Act Permits (401/404) (required for navigational dredging)
Lower River and Inner Harbor	Prohibit interference with covered area and prohibit inconsistent uses	Unknown – to be determined. ICWP being developed.
Outer Harbor Break-walls	Maintain and prohibit inconsistent uses	Unknown – to be determined. ICWP being developed.

Besides the fish and waterfowl consumption advisories, the required ICs have not been implemented as the remedy is not yet complete. However an Institutional Controls Work Plan (ICWP), or Institutional Controls Plan (ICP) if necessary, will be developed and will be implemented upon construction completion. The ICWP will be submitted to EPA and WDNR for review and approval. The ICWP will specify the types and details for the ICs including a schedule for implementation and will include a monitoring plan to ensure long-term stewardship. Additionally, fish advisories and water fowl advisories, which are in place, would likely be required until contaminant concentrations in fish are reduced such that unrestricted consumption would not present a risk. The effectiveness of the fish and waterfowl advisories will be reviewed in the ICWP along with any recommendations to ensure that the advisories are noticed by the general public. Compliance with ICs will be required to assure long-term protectiveness for any areas which do not allow for UU/UE to assure the remedy continues to function as intended. Once effective ICs are implemented, long-term stewardship procedures will be developed to ensure that the ICs are maintained, monitored and enforced. The long-term stewardship plan will be included in the ICWP. The plan should include regular inspections of the engineering and access controls at the Site and review of the ICs for the Site.

[1] The ROD, p. 11, states "fish taken from the Sheboygan River between the Sheboygan Falls dam and the mouth of the river fall into the "do not eat" consumption advisory category, and waterfowl consumption advisories are in place for some waterfowl species from the Sheboygan River below Sheboygan Falls dam to the Sheboygan harbor. PCB concentrations in wild birds collected between 1976 and 1980 ranged from 2 to 213 ppm. In 1985 and 1986, Tecumseh monitored wildlife again for PCBs including several species of waterfowl. These analyses resulted in consumption advisories for mallards and lesser scaup in the Sheboygan River area of concern in 1987. Fish and waterfowl advisories are for the entire 14-mile stretch from Sheboygan Falls to Lake Michigan. "

For example, the plan should include a requirement for an annual certification to EPA that ICs are in place and effective. Finally, development of a communications plan and use of the State's one call system shall be explored.

Operation and Monitoring

After construction completion and verification that the Upper River Phase I and Phase II construction activities were completed, groundwater monitoring of the GMIT was initiated and a Long-Term OMP was developed by PRS. Fish tissue and soft sediment will also be monitored for PCB concentrations as part of the Long-Term OMP, as required by the 2000 ROD. In 2008, PRS performed the initial baseline fish monitoring event for the Upper River as well as for the Middle River, Lower River, and Inner Harbor. The baseline fish monitoring event for the Upper River took place in 2008 after the dredging of the soft sediment deposits had been completed.

V. Progress Since the Last Five-Year Review

This is the first five-year review for the Site. The triggering action was the initiation of the remedial action on September 7, 2004, the start of the Phase I Upper River construction activities. Since 2004, 20,727 cubic yards of PCB-contaminated sediment have been removed from the Site and 552.45 pounds of PCBs have been removed from the Upper River. During the Phase I activities construction and installation of the GMIT was accomplished, source materials were excavated from the former Tecumseh Sheboygan Falls plant, and upper riverbank excavation, removal of preferential pathways, and installation of monitoring wells were all completed in 2005. In 2006 and 2007, dredging of PCB-contaminated sediments took place in the Upper River as part of the Phase II Upper River construction activities. This five-year review is required because hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure.

VI. Five-Year Review Process

Administrative Components

During October 2008, EPA notified the PRPs that it was undertaking a five-year review. EPA also sent a letter to WDNR to notify the state agency that EPA was initiating a five-year review.

From October 2008 to May 2009, the EPA Remedial Project Manager established a review schedule whose components included:

- Community Involvement;
- Document Review;

- Data Review;
- Site Inspection; and
- Five-Year Review Report Development and Review.

Community Involvement

Activities to involve the community in the five-year review were initiated with a public notice prepared by the EPA and published in The Sheboygan Press newspaper on October 24, 2008, informing people that a five-year review was to be conducted at the Sheboygan River and Harbor Superfund Site (see Attachment 9). The notice informed members of the public about the initiation of the five-year review process and provided the opportunity to request additional information from or provide information to EPA. There were no information requests about the five-year review process, and no one provided information to EPA.

Since the issuance of the 2000 ROD, staff from EPA and WDNR have also made presentations at or attended several meetings or community events to discuss Site cleanup progress, restoration or other Site-relate issues, as requested by local officials, citizen groups, and universities.

Further information regarding recent Site construction and remediation-related activities can be found at the following website, maintained and updated by Region 5's Community Involvement Section:
http://www.epa.gov/region5/sites/sheboygan/index.html

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data. Applicable groundwater cleanup standards, as listed in the May 2000 ROD, also were reviewed. A comprehensive list of documents reviewed is included as Attachment 2.

Data Review

Groundwater Monitoring

Groundwater sampling completed in September 1992 and May 1993 indicated that PCBs were locally present in the groundwater at Tecumseh's former Sheboygan Falls Plant. Unfiltered concentrations ranged from 0.10 ppb or µg/L to 7.4 ppb. Filtered concentrations ranged from below the detection limit (0.05 ppb) to 0.98 ppb. Although low, these concentrations were above the 0.03 ppb WDNR enforcement standard for PCBs in groundwater. It should be noted that the ES is less than the method detection limit achievable with current technology.

The Design Basis for the Phase I Design was to remove additional source material from the former Tecumseh Sheboygan Falls plant site and construct a GMIT. The GMIT was designed to collect and intercept dissolved phase PCBs in groundwater from the former Tecumseh facility to the Sheboygan River. The GMIT was not designed to remediate existing PCB-impacted groundwater that may be present and/or located between the GMIT and the river. PRS decided to proceed directly with the construction of the GMIT and forego the groundwater flux study for monitored natural attenuation.

The monitoring wells located downgradient of the GMIT are required to be sampled semi-annually for the first five years to measure the overall efficiency of the former Tecumseh plant site source removal. If the sample results for the downgradient wells indicate that dissolved phase PCB concentrations in groundwater are decreasing, the GMIT will not be operated. If dissolved phase PCB concentrations in groundwater are increasing (two consecutive statistically significant monitoring events), then the GMIT will be operated until sample results for any given well continue to decrease.

A PCB baseline sampling event of all site monitoring wells (see Attachment 1 for Site Monitoring Well locations) was performed in 2004. PCB and water level data has been collected in 6 monitoring wells (MW-9, MW-10, MW-12, MW-13, MW-16, and MW-17) for 8 semi-annual monitoring events that have occurred between November 2004 and May 2008. Based upon the GMIT operation rules (statistical increase in PCB concentrations over two semi-annual sampling events), there have been no qualifying trigger events to operate the GMIT.

All monitoring wells have concentrations above the ES of 0.03ug/L. Wells MW-10, MW-12 and MW-13 have Upper Confidence Levels (UCLs) above the Maximum Contaminant Level (MCL) of 0.5 µg/L. These monitoring wells are located near the central part of the GMIT. The maximum PCB total concentration is 2.8 µg/L in MW-13 (UCL= 2.17 µg/L) which is located just south of the former Tecumseh facility building. There is no significant concentration trend observed and one of the monitoring wells (MW-12) indicates an improvement compared to baseline. See Attachment 10 for a summary of the groundwater data review.

Upper River Sediment Removal

PCB-contaminated soft sediment deposits were removed to obtain a minimum of 88% mass removal in the Upper River. PCB-contaminated floodplain soil may act as a future source to the river during high flow events; therefore, PCB-contaminated soils may need to be removed in seven areas.

During the 2006 and 2007 seasons, sediment was removed from nine armored area Remedial Management Units (RMUs) and 122 soft sediment deposit RMUs. The soft sediment RMUs and armored areas removed in 2006 and 2007 contained the majority of the PCB mass within the Upper River. A total of 94.1%

of the PCB mass was removed from the river in 2006 and 2007. All activities were performed in compliance with the approved Remedial Action Work Plan and addendum.

During 2006, a total of 2,227.96 cubic yards of sediment and 332.20 lbs (56.6%) of PCBs were removed from the armored areas. In addition, 6,424.40 cubic yards of sediment and 151.42 lbs (25.8%) of PCBs were removed from soft sediment RMU deposits. During 2007, a total of 12,075.41 cubic yards of sediment and 68.83 lbs (11.7%) of PCBs were removed from soft sediment RMU deposits. Combining 2006 and 2007, the remedial action removed 20,727.77 cubic yards of sediment and 552.45 lbs of PCBs for a total removal percentage of 94.1%. This left 13,474.42 cubic yards and 34.56 lbs (5.9%) of PCBs remaining in the upper portion of the Sheboygan River. Please see Attachment 3 for a figure showing sediment deposits and percentage mass removals per RMU. The ROD requires sediment concentrations to be monitored at least once every five years and to remove at least 88% of the soft sediment in the Upper River in order to achieve a 0.5 ppm SWAC over time. At the completion of the sediment dredging activities in the Upper River, PRS performed confirmatory sampling with EPA oversight. See Attachment 4 for tables that contain a summary of PCB concentrations per sediment deposit and a table that estimates the SWAC for the Upper River at the completion of the dredging activities. The estimated SWAC in the Upper River at the completion of dredging was 1.96 ppm. The ROD requires the Upper River to achieve a SWAC of 0.5 ppm over time.

Baseline Fish Monitoring

Smallmouth bass, carp, walleye, and catfish were selected for monitoring as they have assigned target goals in the ROD. According to the ROD, smallmouth bass and carp are the more contaminated resident fish species at the site and EPA selected these fish to determine cleanup goals believing that if these fish met the goals, the lesser contaminated species such as walleye, trout, salmon, and steelhead would also be protected. Therefore, the monitoring included smallmouth bass and carp as well as walleye and catfish. Walleye and smallmouth bass will also help evaluate risk reduction for sport fishermen while carp and catfish will help evaluate risk reduction for sustenance fishermen. Rock bass and longnose dace were added because catfish and walleye are rarely caught, according to WDNR. Juvenile carp and white suckers also were added at the suggestion of the WDNR.

Collection of fish for the baseline monitoring event began in the Upper River reach before generally proceeding to the Lower River, Inner Harbor, and finally, the Middle River reaches. Due to an inability to initially collect Longnose Dace and juvenile species, the Upper and Middle River reaches were revisited. The fish collection occurred between August 19, 2008, and September 17, 2008.

Generally, the results showed decreasing concentrations moving from the Upper River to the Inner Harbor. In almost every case, the PCB concentrations were higher in the Lower River reach than the Middle River 2 site. This would correspond to the increase in PCBs in the sediment in the Lower River and Inner Harbor due to the identified sources in these reaches. Adult carp tended to have the highest mean PCB concentrations of the fish species sampled, although for the few caught, catfish had the highest mean concentration. These are bottom feeders and the results are not unexpected compared to the sport fish. While the carp had the highest mean concentration (Upper River), this was the only fish caught that had many of the individual results less than the ROD goal. EPA and WDNR are currently reviewing the results of the baseline fish monitoring event. Please see Attachment 5 for a table summarizing baseline fish collection quantities and figures showing fish collection areas in the river reaches. Attachment 6 contains tables showing fish tissue sample results.

Site Inspection

EPA has assumed the primary oversight role at the Site with cooperation from the WDNR. The most recent Site inspection was conducted on May 14, 2009, specifically for the purpose of the five-year review. The Site inspection began with an interview of the Site Manager, Ken Aukerman of PRS. Information from the interview has been incorporated into this report and also in Attachment 7, the Site inspection checklist. The inspection covered the entire Site, including the GMIT located at the former Tecumseh Sheboygan Falls plant, with a walk along the entire former plant perimeter and fence. Additionally, a walk-through was conducted along the 14 miles of river that comprise the Site. Photographs were taken of all significant site features and are included as Attachment 8.

No significant issues have been identified regarding the GMIT. Based on the groundwater monitoring reports there is an indication that there might be a need to operate the GMIT into the future.

There have been no incidences of trespassing, vandalism or other external problems. No complaints from nearby residents have been received by the Site Manager, the WDNR Site Coordinator or the EPA Remedial Project Manager.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The remedy is not yet completed. The remedial action activities that have occurred to date (Upper River) have been constructed in accordance with the requirements of the ROD and the design specifications. The remedy is expected to be protective after it is completed, although it may take some time after completion of remedial construction activities for the Site to achieve the Site-wide

SWAC specified in the ROD and for fish tissue concentrations to decrease. Upon completion of the remedial action, long-term monitoring of fish and soft sediment will be conducted to determine if the remedy is functioning as intended and described in the decision documents. Fish and waterfowl consumption advisories and restrictions on dredging in federal navigational channels and dredging as required by the Clean Water Act permits (401/404) are governmental restrictions that are already in place. However, an ICWP will be developed to further evaluate necessary ICs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes. Site conditions are relatively unchanged and there are no new promulgated standards applicable to the Site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. At this time, nothing has come to light that would call into question the protectiveness of the remedy.

Technical Assessment Summary

Implementation of the remedy is not yet complete. The remedial action activities that have been conducted to date (Upper River) have been constructed in accordance with the requirements of the ROD and design specifications. The remedy is expected to be protective after it is completed, although it may take some time after completion of remedial construction activities for the Site to achieve the Site-wide SWAC specified in the ROD and for fish tissue concentrations to decrease. EPA will determine whether the remedy is functioning as intended once the remedial action is completed. A determination about long-term protectiveness will be made after evaluating the results of long-term monitoring of fish and soft sediment.

VIII. Issues

Construction of the remedy, long-term monitoring, and final determination of ICs have not been completed. Completion of the remedy includes confirmation monitoring to demonstrate that the remedy was constructed in accordance with design specifications. Long-term monitoring of fish and soft sediment needs to be conducted to evaluate remedy protectiveness and environmental recovery. Additionally, the existing ICs have not been formally evaluated, and some of the required ICs have not been implemented. A review of the institutional controls is needed to assure that the remedy is functioning as intended with regard to ICs

and to ensure that effective procedures are in place for long-term stewardship at the Site. Table 6 summarizes these issues.

Table 6 – Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Remedy is not yet complete	Y	Y
Long-term monitoring of fish and soft sediment needs to be conducted to evaluate remedy protectiveness and environmental recovery	N	Y
Existing ICs have not been formally evaluated and some required ICs have not been implemented	N	Y

IX. Recommendations and Follow-up Actions

The following actions are recommended to address the issues identified in Section VIII above.

Table 7 - Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Remedy is not yet complete	Complete remedial actions and conduct follow-up construction confirmation monitoring	PRPs	EPA and WDNR	2014[1]	Y	Y
Long-term monitoring of fish and soft sediment needs to be conducted	Conduct long-term monitoring of fish and soft sediment	PRPs	EPA and WDNR	2009[2]	N	Y
Existing ICs have not been formally evaluated and some required ICs have not been implemented	Develop an ICWP, or ICP if necessary, to ensure long-term stewardship	PRPs	EPA and WDNR	Within 12 months of completion of this five-year review (2010)	N	Y

[1] All remaining areas of the Site (Middle River, Lower River and Inner Harbor) are anticipated to have remedial actions completed by 2014.

[2] Long-term monitoring will begin in 2009 for the Upper River, in 2011 for the Middle River, and 2015 for the Lower River and Inner Harbor.

X. Protectiveness Statement

The remedial action being implemented at the Sheboygan River and Harbor Site is expected to be protective, although it may take some time after completion of remedial action construction activities for the Site to achieve the Site-wide SWAC specified in the ROD and for fish tissue concentrations to decrease. It is expected that site-wide remediation activities will be completed in 2014. Following the completion of the remedial action and after evaluation of additional information, including the results of long-term monitoring, EPA will make a site-wide protectiveness determination.

Long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

XI. Next Review

The next five-year review for the Sheboygan River and Harbor Site is required within five years of the signature date of this review.

ATTACHMENT 1
Former Tecumseh Sheboygan Falls Plant Features

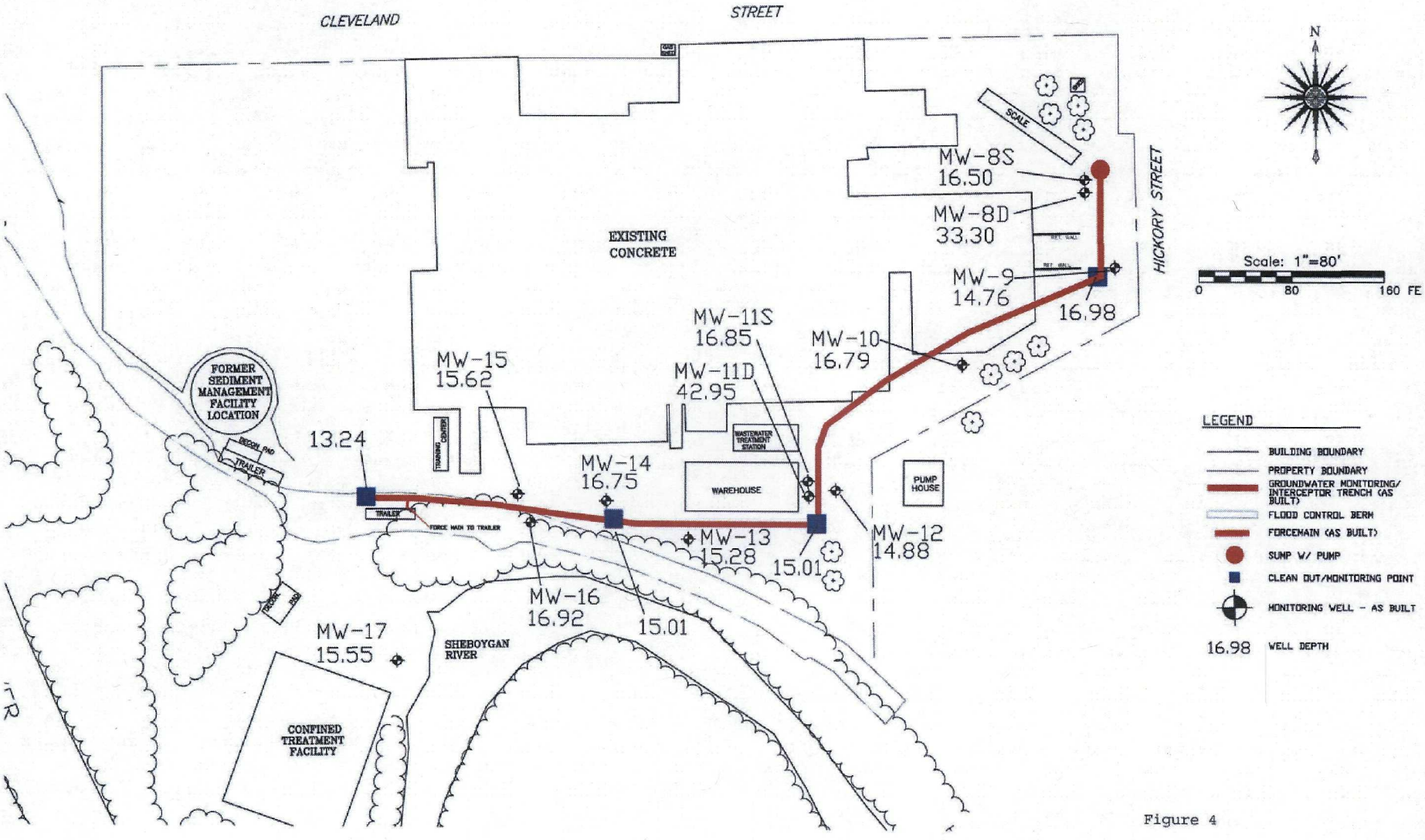

CLEVELAND
STREET
HICKORY STREET
N
Scale: 1"=80'
0
80
160 FE
MW-8S
16.50
MW-8D
33.30
MW-9
14.76
16.98
MW-11S
16.85
MW-10
16.79
MW-15
15.62
MW-11D
42.95
13.24
MW-14
16.75
MW-13
15.28
15.01
MW-12
14.88
MW-16
16.92
15.01
MW-17
15.55
EXISTING
CONCRETE
FORMER
SEDIMENT
MANAGEMENT
FACILITY
LOCATION
TRAILER
TRAILER
FORCE MAIN TO TRAILER
TRAINING CENTER
WASTEWATER TREATMENT STATION
WAREHOUSE
PUMP HOUSE
SCALE
SHEBOYGAN
RIVER
CONFINED
TREATMENT
FACILITY
LEGEND
BUILDING BOUNDARY
PROPERTY BOUNDARY
GROUNDWATER MONITORING/
INTERCEPTOR TRENCH (AS
BUILT)
FLOOD CONTROL BERM
FORCEMAIN (AS BUILT)
SUMP W/ PUMP
CLEAN OUT/MONITORING POINT
MONITORING WELL - AS BUILT
16.98
WELL DEPTH

Figure 4

ATTACHMENT 2
LIST OF DOCUMENTS REVIEWED

EPA, 2000, Record of Decision, Sheboygan River and Harbor, Sheboygan, Wisconsin, May (SDMS 259984)

EPA, 1998, Letter to Dawn Foster of Blasland, Bouck and Lee Re: Sheboygan River and Harbor Superfund Site Feasibility Study Report review and comments. Sheboygan, Wisconsin. - Docket No V-W-86-C-005. - January 28 (SDMS 224643)

Blasland and Bouck Engineers, P.C., 1993 - DRAFT Groundwater Investigation Report, Alternative Specific Remedial Investigation Sheboygan River and Harbor; Tecumseh Products Company, Sheboygan Falls, Wisconsin - *[Final report published in 1995, not available at EPA]* (SDMS 324809)

Blasland and Bouck Engineers, P.C., 1998 - Feasibility Study, Sheboygan River and Harbor, Tecumseh Products Company, Sheboygan Falls, Wisconsin – April (SDMS 170175)

Blasland and Bouck Engineers, P.C., 1999 - Sheboygan River and Harbor Remedial Investigation/Feasibility Study, May 1999 Monthly Status Report - June 14 (SDMS 224798)

Pollution Risk Services, LLC and URS Corporation, 2004 - Remedial Design Work Plan Narrative, Upper River - Phases I and II, Sheboygan River and Harbor Superfund Site Sheboygan County, Wisconsin - Issued for Construction. Volume 1 (SDMS 324810) June, Volume 4 (SDMS 324813)

Pollution Risk Services, LLC and URS Corporation, 2004 - Sheboygan River & Harbor Superfund Site Field Sampling Plan (FSP) & Quality Assurance Project Plan (QAPP) Volume I of IV - February (SDMS 320139)

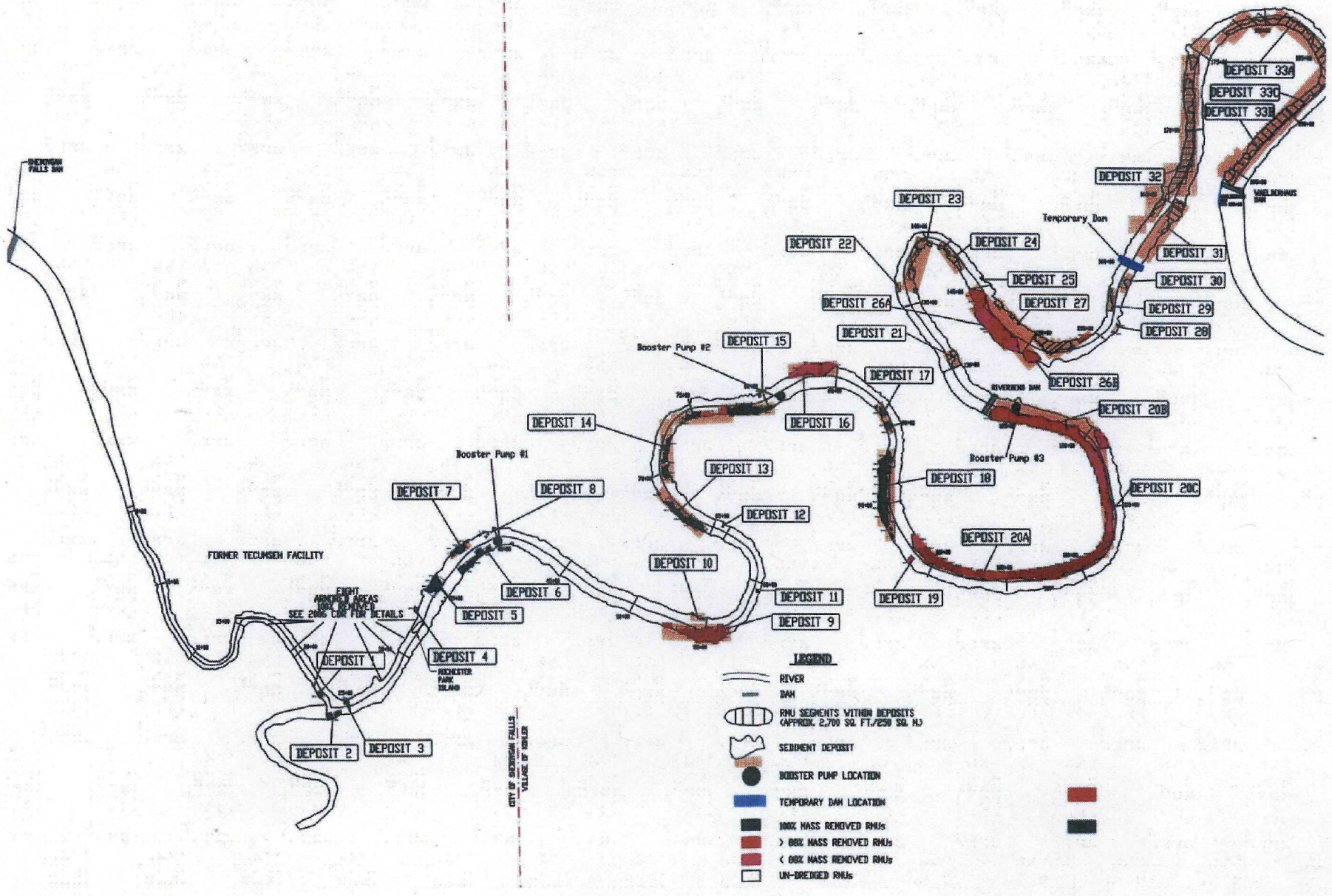
Pollution Risk Services, LLC (2005) Upper River Phase 1 Completion Report. Sheboygan River and Harbor Superfund Site Sheboygan County, Wisconsin (SDMS 320146)

Wisconsin Department of Natural Resources, 1997 - Letter from Thomas A. Wentland to Steven Padovani of EPA; Re: Feasibility Study Report, Sheboygan River and Harbor Site, Sept. 1997. November 25 (SDMS 224643)

Wisconsin Administrative Code, Natural Resources Chapter 140, Groundwater Quality http://www.legis.state.wi.us/rsb/code/nr/nr140.pdf

Wisconsin Administrative Code, Natural Resources Chapter 809, Safe Drinking Water, http://www.legis.state.wi.us/rsb/code/nr/nr809.pdf

ATTACHMENT 3
Figure Showing Sediment Deposits and Percentage Mass Removals per RMUs


DEPOSIT 33A
DEPOSIT 33C
DEPOSIT 33B
DEPOSIT 32
DEPOSIT 23
Temporary Dam
DEPOSIT 22
DEPOSIT 24
DEPOSIT 31
DEPOSIT 25
DEPOSIT 30
DEPOSIT 26A
DEPOSIT 27
DEPOSIT 29
DEPOSIT 21
DEPOSIT 28
Booster Pump #2
DEPOSIT 15
DEPOSIT 17
DEPOSIT 26B
DEPOSIT 14
DEPOSIT 16
DEPOSIT 20B
Booster Pump #1
DEPOSIT 13
Booster Pump #3
DEPOSIT 7
DEPOSIT 8
DEPOSIT 18
DEPOSIT 20C
DEPOSIT 12
DEPOSIT 20A
FORMER TECUMSEH FACILITY
DEPOSIT 10
DEPOSIT 6
DEPOSIT 11
EIGHT ADJACENT AREAS NOT DREDGED SEE 2005 CDR FOR DETAILS
DEPOSIT 5
DEPOSIT 19
DEPOSIT 9
DEPOSIT 1
DEPOSIT 4
ROCHESTER PARK ISLAND
DEPOSIT 2
DEPOSIT 3
CITY OF SHERBURNE FALLS
VILLAGE OF ADLER
LEGEND
RIVER
DAM
RMU SEGMENTS WITHIN DEPOSITS (APPROX. 2,700 SQ. FT./250 SQ. M.)
SEDIMENT DEPOSIT
BOOSTER PUMP LOCATION
TEMPORARY DAM LOCATION
100% MASS REMOVED RMUs
> 80% MASS REMOVED RMUs
< 80% MASS REMOVED RMUs
UN-DREDGED RMUs

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep01-1	54.10	54.10	0.00	0.00	1.10	1.10	0.00	0.00	0.2%	0.2%
Dep02-1	108.30	108.30	0.00	0.00	0.50	0.50	0.00	0.00	0.1%	0.3%
Dep03-1	13.00	13.00	0.00	0.00	0.20	0.20	0.00	0.00	0.0%	0.3%
Dep04-1	8.70	8.70	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	0.3%
Dep05-1	152.20	152.20	0.00	0.00	3.40	3.40	0.00	0.00	0.6%	0.9%
Dep05-2	158.20	158.20	0.00	0.00	2.90	2.90	0.00	0.00	0.5%	1.4%
Dep05-3	50.80	50.80	0.00	0.00	0.20	0.20	0.00	0.00	0.0%	1.4%
Dep06-1	139.50	139.50	0.00	0.00	0.60	0.60	0.00	0.00	0.1%	1.5%
Dep06-2	153.20	153.20	0.00	0.00	1.30	1.30	0.00	0.00	0.2%	1.7%
Dep06-3	131.60	131.60	0.00	0.00	1.30	1.30	0.00	0.00	0.2%	2.0%
Dep07-1	157.00	157.00	0.00	0.00	2.00	2.00	0.00	0.00	0.3%	2.3%
Dep07-2	39.90	39.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	2.3%
Dep08-1	7.20	7.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	2.3%
Dep09-1	139.80	103.90	24.23	11.67	1.10	0.82	0.19	0.09	0.2%	2.5%
Dep09-2	227.90	186.30	30.02	11.58	0.90	0.74	0.11	0.05	0.1%	2.6%
Dep09-3	218.50	158.50	49.88	10.12	0.60	0.44	0.13	0.03	0.1%	2.7%
Dep09-4	249.70	190.60	55.40	3.70	0.50	0.38	0.11	0.01	0.1%	2.8%
Dep09-5	254.80	182.30	59.80	12.70	1.00	0.72	0.23	0.05	0.2%	3.0%
Dep09-6	239.20	194.60	26.99	17.61	0.50	0.41	0.05	0.04	0.1%	3.0%
Dep09-7	172.20	140.30	19.09	12.81	0.20	0.16	0.03	0.01	0.0%	3.1%
Dep09-8	76.80	0.00	69.52	7.28	0.10	0.00	0.09	0.01	0.0%	3.1%
Dep10-1	12.20	12.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	3.1%
Dep11-1	5.70	5.70	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	3.1%
Dep12-1	1.10	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	3.1%
Dep13-1	55.20	55.20	0.00	0.00	0.45	0.45	0.00	0.00	0.1%	3.2%
Dep13-2	81.60	81.60	0.00	0.00	15.46	15.46	0.00	0.00	2.6%	5.8%
Dep13-3	137.80	137.80	0.00	0.00	10.61	10.61	0.00	0.00	1.8%	7.6%
Dep13-4	111.90	111.90	0.00	0.00	11.84	11.84	0.00	0.00	2.0%	9.6%
Dep13-5	1.20	1.20	0.00	0.00	0.20	0.20	0.00	0.00	0.0%	9.7%
Dep14-1	147.00	147.00	0.00	0.00	0.80	0.80	0.00	0.00	0.1%	9.8%
Dep14-2	139.70	139.70	0.00	0.00	41.20	41.20	0.00	0.00	7.0%	16.8%
Dep14-3	148.10	148.10	0.00	0.00	2.20	2.20	0.00	0.00	0.4%	17.2%
Dep14-4	143.30	143.30	0.00	0.00	0.20	0.20	0.00	0.00	0.0%	17.2%
Dep14-5	155.30	0.00	154.00	1.30	1.70	0.00	1.69	0.01	0.3%	17.5%
Dep14-6	201.30	0.00	201.30	0.00	0.70	0.00	0.70	0.00	0.1%	17.6%
Dep14-7	187.40	0.00	187.40	0.00	1.20	0.00	1.20	0.00	0.2%	17.8%
Dep14-8	167.10	167.10	0.00	0.00	0.40	0.40	0.00	0.00	0.1%	17.9%
Dep14-9	135.30	135.30	0.00	0.00	0.30	0.30	0.00	0.00	0.1%	17.9%
Dep14-10	98.50	98.50	0.00	0.00	0.30	0.30	0.00	0.00	0.1%	9.8%

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep15-1	25.10	25.10	0.00	0.00	0.10	0.10	0.00	0.00	0.0%	18.0%
Dep16-1	156.00	0.00	130.82	25.18	0.20	0.00	0.17	0.03	0.0%	18.0%
Dep16-2	207.10	0.00	171.94	35.16	0.40	0.00	0.33	0.07	0.1%	18.0%
Dep16-3	198.40	0.00	164.00	34.40	0.60	0.00	0.50	0.10	0.1%	18.1%
Dep16-4	182.10	0.00	167.50	14.60	0.50	0.00	0.46	0.04	0.1%	18.2%
Dep16-5	140.50	0.00	117.30	23.20	0.30	0.00	0.25	0.05	0.0%	18.3%
Dep16-6	6.40	0.00	4.50	1.90	0.01	0.00	0.01	0.00	0.0%	18.3%
Dep17-1	124.90	124.90	0.00	0.00	0.50	0.50	0.00	0.00	0.1%	18.3%
Dep17-2	26.10	26.10	0.00	0.00	0.10	0.10	0.00	0.00	0.0%	18.4%
Dep18-1	236.10	236.10	0.00	0.00	10.20	10.20	0.00	0.00	1.7%	20.1%
Dep18-2	291.50	291.50	0.00	0.00	10.50	10.50	0.00	0.00	1.8%	21.9%
Dep18-3	215.80	215.80	0.00	0.00	2.60	2.60	0.00	0.00	0.4%	22.3%
Dep18-4	280.40	280.40	0.00	0.00	8.10	8.10	0.00	0.00	1.4%	23.7%
Dep18-5	252.10	252.10	0.00	0.00	4.50	4.50	0.00	0.00	0.8%	24.5%
Dep18-6	251.60	251.60	0.00	0.00	3.20	3.20	0.00	0.00	0.5%	25.0%
Dep18-7	312.90	312.90	0.00	0.00	2.20	2.20	0.00	0.00	0.4%	25.4%
Dep18-8	354.80	354.80	0.00	0.00	4.40	4.40	0.00	0.00	0.7%	26.1%
Dep18-9	245.10	245.10	0.00	0.00	3.10	3.10	0.00	0.00	0.5%	26.7%
Dep18-10	92.10	92.10	0.00	0.00	0.80	0.80	0.00	0.00	0.1%	26.8%
Dep19-1	34.60	0.00	30.10	4.50	0.10	0.00	0.09	0.01	0.0%	26.8%
Dep20A-1	140.30	0.00	117.29	23.01	0.20	0.00	0.17	0.03	0.0%	26.8%
Dep20A-2	189.80	0.00	171.76	18.04	0.60	0.00	0.54	0.06	0.1%	26.9%
Dep20A-3	187.00	0.00	170.69	16.31	0.70	0.00	0.64	0.06	0.1%	27.1%
Dep20A-4	147.50	0.00	145.49	2.01	0.50	0.00	0.49	0.01	0.1%	27.1%
Dep20A-5	55.20	0.00	51.67	3.53	0.10	0.00	0.09	0.01	0.0%	27.2%
Dep20A-6	165.50	0.00	154.70	10.80	0.50	0.00	0.47	0.03	0.1%	27.2%
Dep20A-7	189.80	0.00	180.10	9.70	1.10	0.00	1.04	0.06	0.2%	27.4%
Dep20A-8	153.30	0.00	142.88	10.42	0.70	0.00	0.65	0.05	0.1%	27.5%
Dep20A-9	162.10	0.00	152.09	10.01	1.80	0.00	1.69	0.11	0.3%	27.8%
Dep20A-10	165.30	0.00	153.57	11.73	1.10	0.00	1.02	0.08	0.2%	28.0%
Dep20A-11	141.20	0.00	124.07	17.13	0.60	0.00	0.53	0.07	0.1%	28.1%
Dep20A-12	178.10	0.00	166.25	11.85	0.80	0.00	0.75	0.05	0.1%	28.2%
Dep20A-13	155.20	0.00	138.20	17.00	0.60	0.00	0.53	0.07	0.1%	28.3%
Dep20A-14	152.70	0.00	142.42	10.28	0.40	0.00	0.37	0.03	0.1%	28.4%
Dep20C-15	146.90	0.00	138.18	8.72	0.80	0.00	0.75	0.05	0.1%	28.5%
Dep20C-16	179.40	0.00	171.68	7.72	0.90	0.00	0.86	0.04	0.1%	28.6%
Dep20C-17	192.60	0.00	183.08	9.52	0.80	0.00	0.76	0.04	0.1%	28.8%
Dep20C-18	201.60	0.00	192.63	8.97	0.30	0.00	0.29	0.01	0.0%	28.8%
Dep20C-19	202.50	0.00	189.44	13.06	0.50	0.00	0.47	0.03	0.1%	28.9%

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep20C-20	171.00	0.00	162.19	8.81	0.50	0.00	0.47	0.03	0.1%	29.0%
Dep20C-21	141.00	0.00	136.00	5.00	0.10	0.00	0.10	0.00	0.0%	29.0%
Dep20C-22	138.60	0.00	135.97	2.63	0.20	0.00	0.20	0.00	0.0%	29.0%
Dep20C-23	135.80	0.00	125.92	9.88	0.10	0.00	0.09	0.01	0.0%	29.0%
Dep20C-24	193.00	0.00	181.53	11.47	0.20	0.00	0.19	0.01	0.0%	29.1%
Dep20C-25	166.00	0.00	143.52	22.48	0.40	0.00	0.35	0.05	0.1%	29.1%
Dep20C-26	165.80	0.00	152.72	13.08	0.40	0.00	0.37	0.03	0.1%	29.2%
Dep20C-27	156.30	0.00	141.10	15.20	0.20	0.00	0.18	0.02	0.0%	29.2%
Dep20C-28	173.90	0.00	155.46	18.44	0.30	0.00	0.27	0.03	0.0%	29.3%
Dep20C-29	142.90	0.00	123.63	19.27	0.50	0.00	0.43	0.07	0.1%	29.3%
Dep20B-30	184.20	0.00	158.38	25.82	1.00	0.00	0.86	0.14	0.1%	29.5%
Dep20B-31	209.10	0.00	188.96	20.14	1.00	0.00	0.90	0.10	0.2%	29.6%
Dep20B-32	158.40	0.00	136.09	22.31	0.60	0.00	0.52	0.08	0.1%	29.7%
Dep20B-33	188.60	0.00	179.91	8.69	1.50	0.00	1.43	0.07	0.2%	30.0%
Dep20B-34	139.50	0.00	128.82	10.68	1.30	0.00	1.20	0.10	0.2%	30.2%
Dep20B-35	149.10	0.00	145.23	3.87	0.60	0.00	0.58	0.02	0.1%	30.3%
Dep20B-36	246.90	0.00	240.30	6.60	1.00	0.00	0.97	0.03	0.2%	30.4%
Dep20B-37	327.80	0.00	318.42	9.38	0.40	0.00	0.39	0.01	0.1%	30.5%
Dep20B-38	241.70	0.00	220.95	20.75	0.40	0.00	0.37	0.03	0.1%	30.6%
Dep20B-39	333.80	0.00	318.86	14.94	4.70	0.00	4.49	0.21	0.8%	31.3%
Dep20B-40	341.60	0.00	323.96	17.64	0.90	0.00	0.85	0.05	0.1%	31.5%
Dep20B-41	208.50	0.00	189.00	19.50	0.50	0.00	0.45	0.05	0.1%	31.6%
Dep20B-42	174.20	0.00	156.63	17.57	0.70	0.00	0.63	0.07	0.1%	31.7%
Dep20B-43	321.00	0.00	300.87	20.13	1.00	0.00	0.94	0.06	0.2%	31.8%
Dep20B-44	378.90	0.00	356.40	22.50	1.40	0.00	1.32	0.08	0.2%	32.0%
Dep20B-45	280.10	0.00	258.91	21.19	5.00	0.00	4.62	0.38	0.8%	32.8%
Dep20B-46	32.10	0.00	0.00	32.10	0.10	0.00	0.00	0.10	0.0%	32.8%
Dep20B-47	32.10	0.00	30.32	1.78	0.01	0.00	0.01	0.00	0.0%	32.8%
Dep20B-48	104.80	0.00	87.90	16.90	0.20	0.00	0.17	0.03	0.0%	32.9%
Dep20B-49	25.80	0.00	21.15	4.65	0.10	0.00	0.08	0.02	0.0%	32.9%
Dep21-1	140.50	0.00	0.00	140.50	0.30	0.00	0.00	0.30	0.0%	32.9%
Dep21-2	61.80	0.00	0.00	61.80	0.10	0.00	0.00	0.10	0.0%	32.9%
Dep22-1	28.20	0.00	0.00	28.20	0.00	0.00	0.00	0.00	0.0%	32.9%
Dep23-1	148.70	0.00	0.00	148.70	0.60	0.00	0.00	0.60	0.0%	32.9%
Dep23-2	161.10	0.00	0.00	161.10	0.50	0.00	0.00	0.50	0.0%	32.9%
Dep23-3	267.70	0.00	0.00	267.70	0.50	0.00	0.00	0.50	0.0%	32.9%
Dep23-4	100.80	0.00	0.00	100.80	0.40	0.00	0.00	0.40	0.0%	32.9%
Dep24-1	186.10	0.00	0.00	186.10	0.70	0.00	0.00	0.70	0.0%	32.9%
Dep24-2	74.20	0.00	0.00	74.20	0.20	0.00	0.00	0.20	0.0%	32.9%

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep25-1	3.10	0.00	0.00	3.10	0.00	0.00	0.00	0.00	0.0%	32.9%
Dep26A-1	72.24	0.00	71.18	1.06	0.34	0.00	0.34	0.00	0.1%	32.9%
Dep26A-2	153.67	0.00	145.40	8.27	0.60	0.00	0.57	0.03	0.1%	33.0%
Dep26A-3	115.28	0.00	102.45	12.83	0.33	0.00	0.29	0.04	0.0%	33.1%
Dep26A-4	203.24	0.00	156.94	46.30	0.55	0.00	0.42	0.13	0.1%	33.2%
Dep26A-5	224.00	0.00	165.49	58.51	0.10	0.00	0.07	0.03	0.0%	33.2%
Dep26A-6	229.20	0.00	183.15	46.05	1.10	0.00	0.88	0.22	0.1%	33.3%
Dep26A-7	312.10	0.00	276.54	35.56	1.80	0.00	1.59	0.21	0.3%	33.6%
Dep26A-8	239.70	0.00	213.19	26.51	1.53	0.00	1.36	0.17	0.2%	33.8%
Dep26A-9	179.00	0.00	171.57	7.43	0.99	0.00	0.95	0.04	0.2%	34.0%
Dep26A-10	186.50	0.00	185.12	1.38	4.20	0.00	4.17	0.03	0.7%	34.7%
Dep26A-11	166.50	0.00	158.71	7.79	1.40	0.00	1.33	0.07	0.2%	34.9%
Dep26A-12	158.90	0.00	151.31	7.59	0.70	0.00	0.67	0.03	0.1%	35.0%
Dep26B-13	164.90	0.00	139.67	25.23	0.60	0.00	0.51	0.09	0.1%	35.1%
Dep26B-14	146.80	0.00	129.16	17.64	15.50	0.00	13.64	1.86	2.3%	37.4%
Dep26B-15	69.60	0.00	56.45	13.15	0.20	0.00	0.16	0.04	0.0%	37.5%
Dep27-1	101.60	0.00	0.00	101.60	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep27-2	137.50	0.00	0.00	137.50	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep27-3	172.70	0.00	0.00	172.70	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep27-4	169.40	0.00	0.00	169.40	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep27-5	139.50	0.00	0.00	139.50	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep27-6	137.40	0.00	0.00	137.40	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep27-7	86.00	0.00	0.00	86.00	2.20	0.00	0.00	2.20	0.0%	37.5%
Dep28-1	5.20	0.00	0.00	5.20	0.00	0.00	0.00	0.00	0.0%	37.5%
Dep29-1	135.40	0.00	0.00	135.40	0.60	0.00	0.00	0.60	0.0%	37.5%
Dep29-2	32.90	0.00	0.00	32.90	0.00	0.00	0.00	0.00	0.0%	37.5%
Dep30-1	98.60	0.00	0.00	98.60	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep31-1	143.90	0.00	0.00	143.90	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep31-2	199.10	0.00	0.00	199.10	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep31-3	206.40	0.00	0.00	206.40	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep31-4	171.40	0.00	0.00	171.40	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep31-5	4.80	0.00	0.00	4.80	0.00	0.00	0.00	0.00	0.0%	37.5%
Dep32-1	142.20	0.00	0.00	142.20	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-2	137.70	0.00	0.00	137.70	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-3	170.20	0.00	0.00	170.20	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-4	182.80	0.00	0.00	182.80	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-5	204.10	0.00	0.00	204.10	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-6	229.60	0.00	0.00	229.60	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-7	234.10	0.00	0.00	234.10	0.20	0.00	0.00	0.20	0.0%	37.5%

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep32-8	211.60	0.00	0.00	211.60	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep32-9	210.90	0.00	0.00	210.90	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep32-10	176.10	0.00	0.00	176.10	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-11	141.00	0.00	0.00	141.00	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-12	170.70	0.00	0.00	170.70	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-13	155.80	0.00	0.00	155.80	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-14	150.10	0.00	0.00	150.10	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-15	159.00	0.00	0.00	159.00	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-16	149.10	0.00	0.00	149.10	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep32-17	138.60	0.00	0.00	138.60	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-18	142.60	0.00	0.00	142.60	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep32-19	39.30	0.00	0.00	39.30	0.00	0.00	0.00	0.00	0.0%	37.5%
Dep33A-1	137.90	0.00	0.00	137.90	0.00	0.00	0.00	0.00	0.0%	37.5%
Dep33A-2	144.50	0.00	0.00	144.50	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep33A-3	140.00	0.00	0.00	140.00	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep33A-4	137.20	0.00	0.00	137.20	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep33A-5	163.90	0.00	0.00	163.90	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep33A-6	189.60	0.00	0.00	189.60	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep33A-7	213.30	0.00	0.00	213.30	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep33A-8	207.90	0.00	0.00	207.90	0.10	0.00	0.00	0.10	0.0%	37.5%
Dep33A-9	173.40	0.00	0.00	173.40	0.40	0.00	0.00	0.40	0.0%	37.5%
Dep33A-10	260.40	0.00	0.00	260.40	0.60	0.00	0.00	0.60	0.0%	37.5%
Dep33A-11	306.60	0.00	0.00	306.60	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep33A-12	317.00	0.00	0.00	317.00	0.40	0.00	0.00	0.40	0.0%	37.5%
Dep33A-13	313.30	0.00	0.00	313.30	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep33A-14	277.50	0.00	0.00	277.50	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep33C-15	192.50	0.00	0.00	192.50	1.00	0.00	0.00	1.00	0.0%	37.5%
Dep33C-16	214.30	0.00	0.00	214.30	3.00	0.00	0.00	3.00	0.0%	37.5%
Dep33C-17	277.40	0.00	0.00	277.40	2.00	0.00	0.00	2.00	0.0%	37.5%
Dep33C-18	283.90	0.00	0.00	283.90	2.30	0.00	0.00	2.30	0.0%	37.5%
Dep33C-19	230.10	0.00	0.00	230.10	1.00	0.00	0.00	1.00	0.0%	37.5%
Dep33C-20	216.00	0.00	0.00	216.00	0.70	0.00	0.00	0.70	0.0%	37.5%
Dep33B-21	227.30	0.00	0.00	227.30	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep33B-22	262.30	0.00	0.00	262.30	0.50	0.00	0.00	0.50	0.0%	37.5%
Dep33B-23	254.00	0.00	0.00	254.00	0.40	0.00	0.00	0.40	0.0%	37.5%
Dep33B-24	259.60	0.00	0.00	259.60	0.30	0.00	0.00	0.30	0.0%	37.5%
Dep33B-25	219.40	0.00	0.00	219.40	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep33B-26	167.60	0.00	0.00	167.60	0.20	0.00	0.00	0.20	0.0%	37.5%
Dep33B-27	121.10	0.00	0.00	121.10	0.10	0.00	0.00	0.10	0.0%	37.5%

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)
Dep33B-28	100.70	0.00	0.00	100.70	0.20	0.00	0.00	0.20	0.0%	37.5%
AA1-1	191.60	191.60	0.00	0.00	116.40	116.40	0.00	0.00	19.8%	57.3%
AA2-1	125.20	125.20	0.00	0.00	3.20	3.20	0.00	0.00	0.5%	57.8%
AA3-1	66.30	66.30	0.00	0.00	3.70	3.70	0.00	0.00	0.6%	58.5%
AA4-1	154.10	154.10	0.00	0.00	4.60	4.60	0.00	0.00	0.8%	59.3%
AA5A-1	364.50	364.50	0.00	0.00	26.90	26.90	0.00	0.00	4.6%	63.8%
AA7-1	339.20	339.20	0.00	0.00	134.70	134.70	0.00	0.00	22.9%	86.8%
AA8-1	232.10	232.10	0.00	0.00	15.90	15.90	0.00	0.00	2.7%	89.5%
AA10-1	361.50	361.50	0.00	0.00	7.60	7.60	0.00	0.00	1.3%	90.8%
AA11-1	393.46	393.46	0.00	0.00	19.20	19.20	0.00	0.00	3.3%	94.1%
Sub-total by Year		**8,652.36**	**12,075.41**			**483.62**	**68.83**			
Grand total	**34,202.19**	**20,727.77**		**13,474.42**	**587.02**	**552.45**		**34.56**		**94.1%**

PERCENTAGE OF MASS REMOVED
UPPER RIVER - 2006/2007

	A	B	B	C = A - B	D	E = B/A * D	E = B/A * D	F = D - E	G = E/SUM(E) * 100	K = SUM(J)
Identifier	Design or Re-calculated Volume	Volume Removed 2006	Volume Removed 2007	Volume Remaining	Design or Re-calculated PCB Mass	PCB Mass Removed 2006	PCB Mass Removed 2007	Mass Remaining	% of UR Mass Removed	Cumulative Mass Removed
	(cu. yd.)	(cu. yd.)	(cu. yd.)	(cu. yd.)	(lbs.)	(lbs.)	(lbs.)	(lbs.)	(%)	(%)

Definitions

1. Design or re-calculated volume/mass (Column A & D) means either the design volume/mass from the 2006 Sediment Removal Design or a re-calculated volume based on new known field conditions.
2. Volume/Mass Removed (Column B & E) means the volume of sediment removed for each dredged RMU using the Mass Calculation Worksheet in Appendix B.

3. These RMUs had volumes/mass changes from the design based on new field conditions. They are discussed in the 2006 Construction Documentation Report.
4. These RMUs had volumes/mass changes from the design based on new field conditions. They are discussed in Section 3.4 of this report.

Notes:

1. The total starting volume/mass from the 2006 design was determined to be 35,485.00 cy/448.8 lbs, respectively.
2. The total re-calculated volume/mass for the 2006 CDR was 35,338.40/606.4 with the field condtions noted in Deposit 13 and Armored Areas (highlighted in yellow).
3. There was an error found in the 2006 CDR prior to starting 2007 activities on the mass quantity for RMU 16-6. The mass in 2006 was 9.0 lbs when it should have been 0.0 lbs. This was adjusted to make the total re-calculated starting mass of 597.4 lbs in 2007.
4. The total re-calculated volume/mass for the Final CDR was 34,202.19/587.02 with the field conditions noted in Deposit 26 (highlighted in blue).
5. The total volume removed in 2007 differed from that recently reported on the metrics as the volume in Deposit 9 was divided by each year (2006/2007) dredging occurred. RMU DEP9-8 used the value removed from 2007 as it was the lesser volume. No volume was accounted for in 2006 to avoid double counting.

ATTACHMENT 4
TABLES DOCUMENTING POST DREDGING SEDIMENT DEPOSIT PCB CONCENTRATIONS and SWAC

ESTIMATED SWAC ACHIEVED
UPPER RIVER - 2006/2007

	A	B	C	D = B*C
Identifier	Design or Measured Average PCB Concentration	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(mg/kg)	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep01-1	12.0	909.0	0.017	15.5
Dep02-1	2.8	2,331.0	0.017	39.6
Dep03-1	7.1	337.0	0.017	5.7
Dep04-1	1.7	224.0	0.017	3.8
Dep05-1	12.1	2,694.0	0.017	45.8
Dep05-2	8.1	2,731.0	0.017	46.4
Dep05-3	1.5	1,001.0	0.017	17.0
Dep06-1	2.3	2,745.0	0.017	46.7
Dep06-2	4.4	2,679.0	0.017	45.5
Dep06-3	6.6	2,464.0	0.017	41.9
Dep07-1	7.9	2,715.0	0.017	46.2
Dep07-2	0.2	816.0	0.017	13.9
Dep08-1	1.0	185.0	0.017	3.1
Dep09-1	4.7	2,724.0	1.155	3,146.8
Dep09-2	2.6	2,704.0	0.874	2,362.2
Dep09-3	2.3	2,692.0	0.680	1,830.6
Dep09-4	1.5	2,667.0	0.391	1,043.2
Dep09-5	2.1	2,690.0	0.206	555.4
Dep09-6	1.3	2,695.0	0.672	1,811.4
Dep09-7	0.9	2,577.0	0.705	1,816.3
Dep09-8	1.3	1,455.0	0.318	462.9
Dep10-1	1.2	314.0	0.017	5.3
Dep11-1	2.6	147.0	0.017	2.5
Dep12-1	1.2	29.0	0.017	0.5
Dep13-1	5.3	2,581.8	0.017	43.9
Dep13-2	132.7	2,582.8	0.017	43.9
Dep13-3	56.3	3,181.0	0.017	54.1
Dep13-4	75.8	2,931.7	0.017	49.8
Dep13-5	74.0	25.0	0.017	0.4
Dep14-1	3.9	2,687.0	0.017	45.7
Dep14-2	190.6	2,680.0	0.017	45.6
Dep14-3	10.1	2,709.0	0.017	46.1
Dep14-4	1.5	2,716.0	0.017	46.2
Dep14-5	8.5	2,656.0	0.416	1,106.0
Dep14-6	2.8	2,673.0	0.017	45.4
Dep14-7	4.0	2,688.0	0.017	45.7
Dep14-8	1.5	2,678.0	0.017	45.5
Dep14-9	1.6	2,668.0	0.017	45.4
Dep14-10	2.3	1,804.0	0.017	30.7
Dep15-1	2.1	647.0	0.017	11.0
Dep16-1	1.2	2,738.0	1.744	4,774.3
Dep16-2	1.5	2,668.0	1.833	4,891.6
Dep16-3	2.1	2,700.0	0.727	1,962.8
Dep16-4	2.1	2,724.0	0.255	694.9
Dep16-5	1.6	2,683.0	0.269	721.7
Dep16-6	1.6	127.0	0.370	47.0
Dep17-1	2.2	2,725.0	0.017	46.3
Dep17-2	1.4	673.0	0.017	11.4

ESTIMATED SWAC ACHIEVED
UPPER RIVER - 2006/2007

	A	B	C	D = B*C
Identifier	Design or Measured Average PCB Concentration	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(mg/kg)	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep18-1	25.0	2,669.0	0.017	45.4
Dep18-2	21.8	2,703.0	0.017	46.0
Dep18-3	7.2	2,744.0	0.017	46.6
Dep18-4	18.7	2,691.0	0.017	45.7
Dep18-5	9.3	2,678.0	0.017	45.5
Dep18-6	6.5	2,723.0	0.017	46.3
Dep18-7	3.8	2,692.0	0.017	45.8
Dep18-8	7.4	2,686.0	0.017	45.7
Dep18-9	8.8	2,722.0	0.017	46.3
Dep18-10	5.3	2,069.0	0.017	35.2
Dep19-1	2.3	892.0	0.254	226.6
Dep20A-1	0.8	2,639.0	0.326	859.4
Dep20A-2	2.2	2,712.0	0.101	273.0
Dep20A-3	2.1	2,711.0	0.573	1,552.3
Dep20A-4	1.8	2,728.0	0.048	130.3
Dep20A-5	0.6	1,090.0	0.098	106.5
Dep20A-6	1.3	2,660.0	0.055	147.5
Dep20A-7	3.1	2,748.0	0.412	1,131.5
Dep20A-8	2.3	2,736.0	0.584	1,598.7
Dep20A-9	5.6	2,684.0	0.545	1,461.9
Dep20A-10	4.4	2,641.0	0.206	543.1
Dep20A-11	2.3	2,680.0	0.323	868.7
Dep20A-12	2.7	2,704.0	0.108	292.8
Dep20A-13	2.1	2,703.0	0.184	496.1
Dep20A-14	1.4	2,708.0	0.545	1,475.0
Dep20C-15	3.3	2,684.0	0.478	1,283.0
Dep20C-16	2.5	2,695.0	0.522	1,406.5
Dep20C-17	2.1	2,731.0	0.293	799.3
Dep20C-18	0.7	2,681.0	0.288	772.3
Dep20C-19	1.2	2,692.0	0.352	946.5
Dep20C-20	1.8	2,720.0	0.178	484.2
Dep20C-21	0.4	2,720.0	0.051	139.6
Dep20C-22	0.9	2,604.0	0.398	1,035.1
Dep20C-23	0.2	2,677.0	0.438	1,173.4
Dep20C-24	0.6	2,693.0	2.673	7,198.7
Dep20C-25	1.6	2,636.0	7.207	18,998.4
Dep20C-26	1.3	2,695.0	1.312	3,537.1
Dep20C-27	0.7	2,702.0	1.343	3,627.6
Dep20C-28	1.1	2,708.0	2.621	7,098.4
Dep20C-29	2.6	2,692.0	1.067	2,873.6
Dep20B-30	3.2	2,656.0	4.768	12,664.5
Dep20B-31	2.8	2,743.0	2.978	8,168.4
Dep20B-32	1.8	2,682.0	3.413	9,153.3
Dep20B-33	5.5	2,640.0	13.890	36,669.8
Dep20B-34	6.2	2,635.0	4.205	11,079.8
Dep20B-35	2.2	2,821.0	2.109	5,949.5
Dep20B-36	2.0	2,681.0	1.684	4,513.6
Dep20B-37	0.5	2,736.0	2.563	7,017.2

ESTIMATED SWAC ACHIEVED
UPPER RIVER - 2006/2007

	A	B	C	D = B*C
Identifier	Design or Measured Average PCB Concentration	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(mg/kg)	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep20B-38	1.0	2,628.0	9.746	25,611.9
Dep20B-39	8.0	2,682.0	1.009	2,706.9
Dep20B-40	1.9	2,708.0	7.009	18,979.0
Dep20B-41	1.6	2,644.0	1.097	2,900.7
Dep20B-42	2.5	2,764.0	2.082	5,755.4
Dep20B-43	2.1	2,726.0	1.338	3,648.2
Dep20B-44	2.4	2,726.0	8.153	22,223.9
Dep20B-45	9.2	2,636.0	11.009	29,040.4
Dep20B-46	1.8	534.0	1.800	961.2
Dep20B-47	0.2	827.0	0.530	438.5
Dep20B-48	2.4	664.0	1.916	1,273.5
Dep20B-49	2.4	2,697.0	1.443	3,892.8
Dep21-1	1.3	2,619.0	1.300	3,404.7
Dep21-2	2.2	1,130.0	2.200	2,486.0
Dep22-1	0.6	728.0	0.600	436.8
Dep23-1	2.1	2,636.0	2.100	5,535.6
Dep23-2	1.2	2,705.0	1.200	3,246.0
Dep23-3	1.0	2,735.0	1.000	2,735.0
Dep23-4	3.2	1,347.0	3.200	4,310.4
Dep24-1	3.1	2,680.0	3.100	8,308.0
Dep24-2	2.1	1,417.0	2.100	2,975.7
Dep25-1	2.7	80.0	2.700	216.0
Dep26A-1	2.1	2,687.0	2.167	5,821.8
Dep26A-2	2.1	2,720.0	3.667	9,973.3
Dep26A-3	2.2	2,706.0	4.500	12,177.0
Dep26A-4	1.9	2,714.0	3.500	9,499.0
Dep26A-5	2.4	2,708.0	12.350	33,443.8
Dep26A-6	3.2	2,673.0	10.737	28,699.6
Dep26A-7	4.5	2,786.0	19.125	53,282.3
Dep26A-8	6.3	2,691.0	11.471	30,867.4
Dep26A-9	4.0	2,670.0	3.273	8,738.2
Dep26A-10	11.2	2,729.0	0.273	744.3
Dep26A-11	4.3	2,740.0	12.444	34,097.8
Dep26A-12	3.0	2,609.0	6.500	16,958.5
Dep26B-13	2.3	2,693.0	15.333	41,292.7
Dep26B-14	72.0	2,746.0	18.750	51,487.5
Dep26B-15	2.2	1,373.0	9.333	12,814.7
Dep27-1	2.0	2,619.0	2.000	5,238.0
Dep27-2	0.9	2,685.0	0.900	2,416.5
Dep27-3	0.9	2,712.0	0.900	2,440.8
Dep27-4	1.1	2,657.0	1.100	2,922.7
Dep27-5	0.9	2,743.0	0.900	2,468.7
Dep27-6	0.6	2,709.0	0.600	1,625.4
Dep27-7	17.1	1,678.0	17.100	28,693.8
Dep28-1	0.3	135.0	0.300	40.5
Dep29-1	2.1	2,672.0	2.100	5,611.2
Dep29-2	1.1	652.0	1.100	717.2
Dep30-1	0.4	1,790.0	0.400	716.0

ESTIMATED SWAC ACHIEVED
UPPER RIVER - 2006/2007

	A	B	C	D = B*C
Identifier	Design or Measured Average PCB Concentration	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(mg/kg)	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep31-1	2.0	2,747.0	2.000	5,494.0
Dep31-2	1.1	2,640.0	1.100	2,904.0
Dep31-3	0.3	2,722.0	0.300	816.6
Dep31-4	1.5	2,681.0	1.500	4,021.5
Dep31-5	1.2	95.0	1.200	114.0
Dep32-1	0.7	2,879.0	0.700	2,015.3
Dep32-2	0.5	2,701.0	0.500	1,350.5
Dep32-3	0.8	2,667.0	0.800	2,133.6
Dep32-4	0.7	2,659.0	0.700	1,861.3
Dep32-5	0.8	2,720.0	0.800	2,176.0
Dep32-6	0.4	2,773.0	0.400	1,109.2
Dep32-7	0.8	2,675.0	0.800	2,140.0
Dep32-8	1.7	2,702.0	1.700	4,593.4
Dep32-9	0.9	2,694.0	0.900	2,424.6
Dep32-10	0.8	2,731.0	0.800	2,184.8
Dep32-11	0.6	2,722.0	0.600	1,633.2
Dep32-12	0.7	2,717.0	0.700	1,901.9
Dep32-13	0.8	2,701.0	0.800	2,160.8
Dep32-14	0.6	2,658.0	0.600	1,594.8
Dep32-15	0.6	2,696.0	0.600	1,617.6
Dep32-16	0.8	2,693.0	0.800	2,154.4
Dep32-17	0.5	2,668.0	0.500	1,334.0
Dep32-18	0.4	2,699.0	0.400	1,079.6
Dep32-19	0.2	789.0	0.200	157.8
Dep33A-1	0.1	2,703.0	0.100	270.3
Dep33A-2	1.2	2,644.0	1.200	3,172.8
Dep33A-3	0.4	2,690.0	0.400	1,076.0
Dep33A-4	0.2	2,665.0	0.200	533.0
Dep33A-5	0.5	2,786.0	0.500	1,393.0
Dep33A-6	0.5	2,702.0	0.500	1,351.0
Dep33A-7	0.6	2,657.0	0.600	1,594.2
Dep33A-8	0.3	2,708.0	0.300	812.4
Dep33A-9	1.4	2,806.0	1.400	3,928.4
Dep33A-10	1.5	2,723.0	1.500	4,084.5
Dep33A-11	0.7	2,711.0	0.700	1,897.7
Dep33A-12	1.0	2,728.0	1.000	2,728.0
Dep33A-13	1.6	2,694.0	1.600	4,310.4
Dep33A-14	1.4	2,717.0	1.400	3,803.8
Dep33C-15	3.7	2,627.0	3.700	9,719.9
Dep33C-16	11.7	2,694.0	11.700	31,519.8
Dep33C-17	6.4	2,652.0	6.400	16,972.8
Dep33C-18	7.0	2,744.0	7.000	19,208.0
Dep33C-19	3.4	2,708.0	3.400	9,207.2
Dep33C-20	2.4	2,654.0	2.400	6,369.6
Dep33B-21	1.8	2,751.0	1.800	4,951.8
Dep33B-22	1.6	2,740.0	1.600	4,384.0
Dep33B-23	1.3	2,676.0	1.300	3,478.8
Dep33B-24	1.0	2,676.0	1.000	2,676.0

ESTIMATED SWAC ACHIEVED
UPPER RIVER - 2006/2007

	A	B	C	D = B*C
Identifier	Design or Measured Average PCB Concentration	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(mg/kg)	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep33B-25	0.7	2,740.0	0.700	1,918.0
Dep33B-26	0.9	2,676.0	0.900	2,408.4
Dep33B-27	0.7	2,714.0	0.700	1,899.8
Dep33B-28	0.7	2,590.0	0.700	1,813.0
AA1-1	353.2	2,800.0	0.017	47.6
AA2-1	14.9	1,500.0	0.017	25.5
AA3-1	32.0	360.0	0.017	6.1
AA4-1	17.2	1,200.0	0.017	20.4
AA5A-1	42.9	2,625.0	0.017	44.6
AA7-1	230.9	400.0	0.017	6.8
AA8-1	39.9	1,000.0	0.017	17.0
AA10-1	12.3	2,000.0	0.017	34.0
AA11-1	28.2	1,050.0	0.017	17.9
TOTAL		**478,362.2**		**937,013.4**
ESTIMATED SWAC = SUM(D)/SUM(B)				**1.96**

Defininitions:

1. Design or measured PCB concentration (Column A) means either the design concentration from the 2006 Sediment Removal Design or a measured concentration from known field conditions.
2. Desing or re-calculated Surface Area (Column B) measn either the design surface area from the 2006 Sediment Removal Design or a re-calculated surface area from known field conditions.
3. Post-Dredge Average PCB concentration (Column C) is calculated for each RMU using the SWAC worksheet in Appendix B. RMUs that have no measured sediment in poling locations (i.e hardpan) are assigned an average PCB concentration of 0.017 mg/Kg.

These RMUs had surface area changes from the design based on new field conditions. They are discussed in the 2006 Construction Documentation Report.

These RMUs had concentration changes from the design based on new field conditions. They are discussed in the 2006 Construction Documentation Report.

ATTACHMENT 5
BASELINE FISH MONITORING FIGURES
Figure 5-a – Baseline Fish Collection Summary Table
Figure 5-b – Upper River Fish Collection Areas
Figure 5-c – Middle River Fish Collection Areas
Figure 5-d - Lower River Fish Collection Areas
Figure 5-e – Inner Harbor Fish Collection Areas

Figure 5-a - Baseline Fish Collection Summary Table

Species	UR1 Target	UR1 Collected	UR2 Target	UR2 Collected	MR1 Target	MR1 Collected	MR2 Target	MR2 Collected	LR Target	LR Collected	IH Target	IH Collected
Adult Carp	16	16	16	16	8	8	8	1	8	8	8	8
Juvenile Carp	16	0	16	0	8	0	8	0	8	0	8	0
Adult White Sucker	8	8	8	8	8	7	8	8	8	2	8	0
Juvenile White Sucker	8	8	8	8	8	0	8	7	8	5	8	0
Smallmouth Bass	8	8	8	8	8	8	8	8	8	8	8	8
Rock Bass	8	8	8	8	8	1	8	8	9	9	9	0
Longnose Dace	8	6	8	0	8	6	8	8	8	0	8	0
Walleye	8	0	8	0	8	8	8	0	9	0	9	3
Channel Catfish	8	0	8	0	8	4	8	4	8	4	8	1
Total	88	54	88	48	72	42	72	44	74	36	74	20

UR1 – Upper River from former Tecumseh Site to Riverbend Dam
UR2 – Upper River from Riverbend Dam to Waelderhaus Dam
MR1 – Middle River from Waelderhaus Dam to Kohler Landfill (County Road A Bridge)
MR2 – Middle River from Kohler Landfill (County Road A Bridge) to C&NW Railroad Bridge
LR – Lower River from C&NW Railroad Bridge to Pennsylvania Avenue Bridge
IH – Inner Harbor from Pennsylvania Avenue Bridge to Coast Guard Station

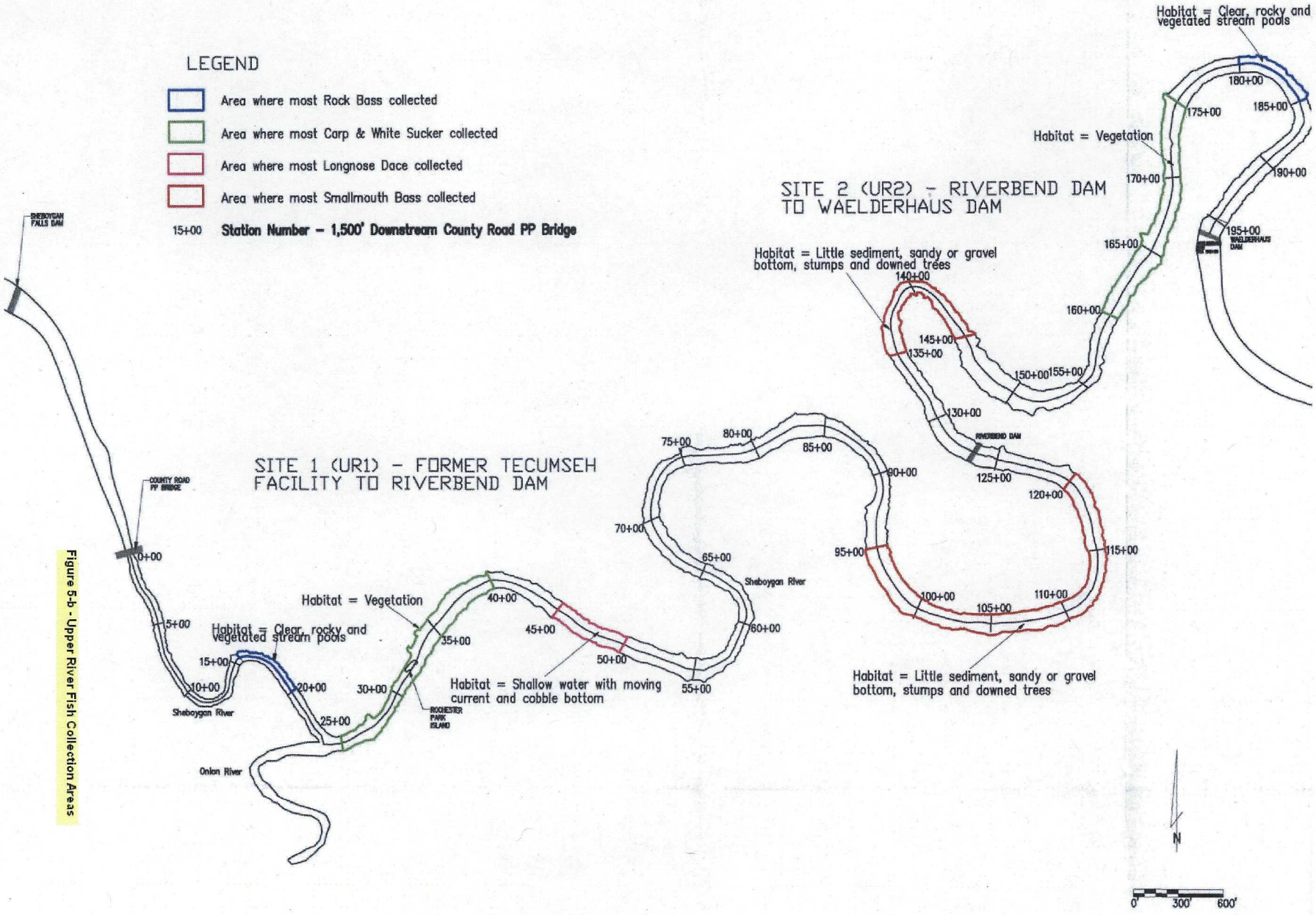
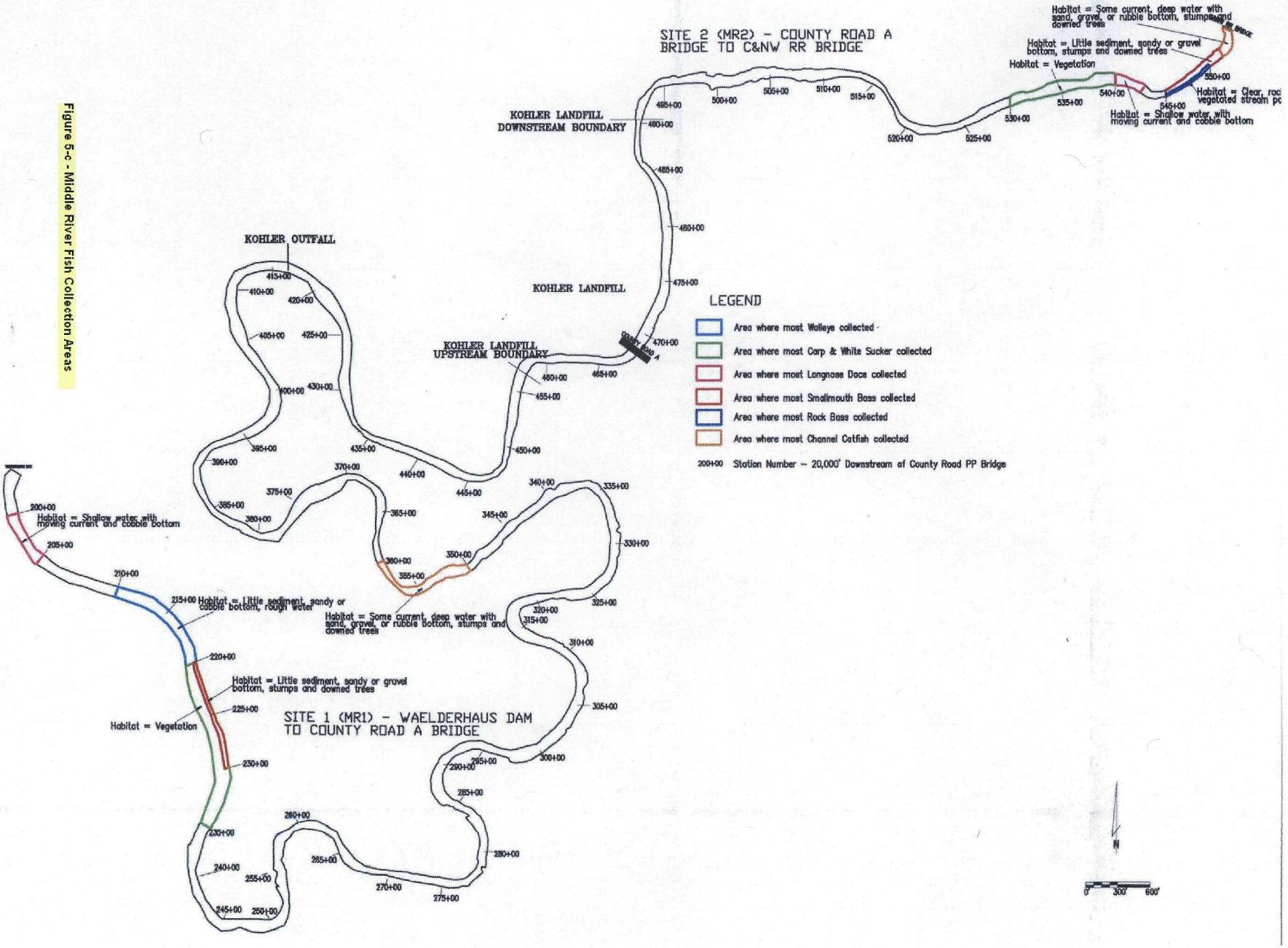


Figure 5-b - Upper River Fish Collection Areas

Figure 5-c - Middle River Fish Collection Areas



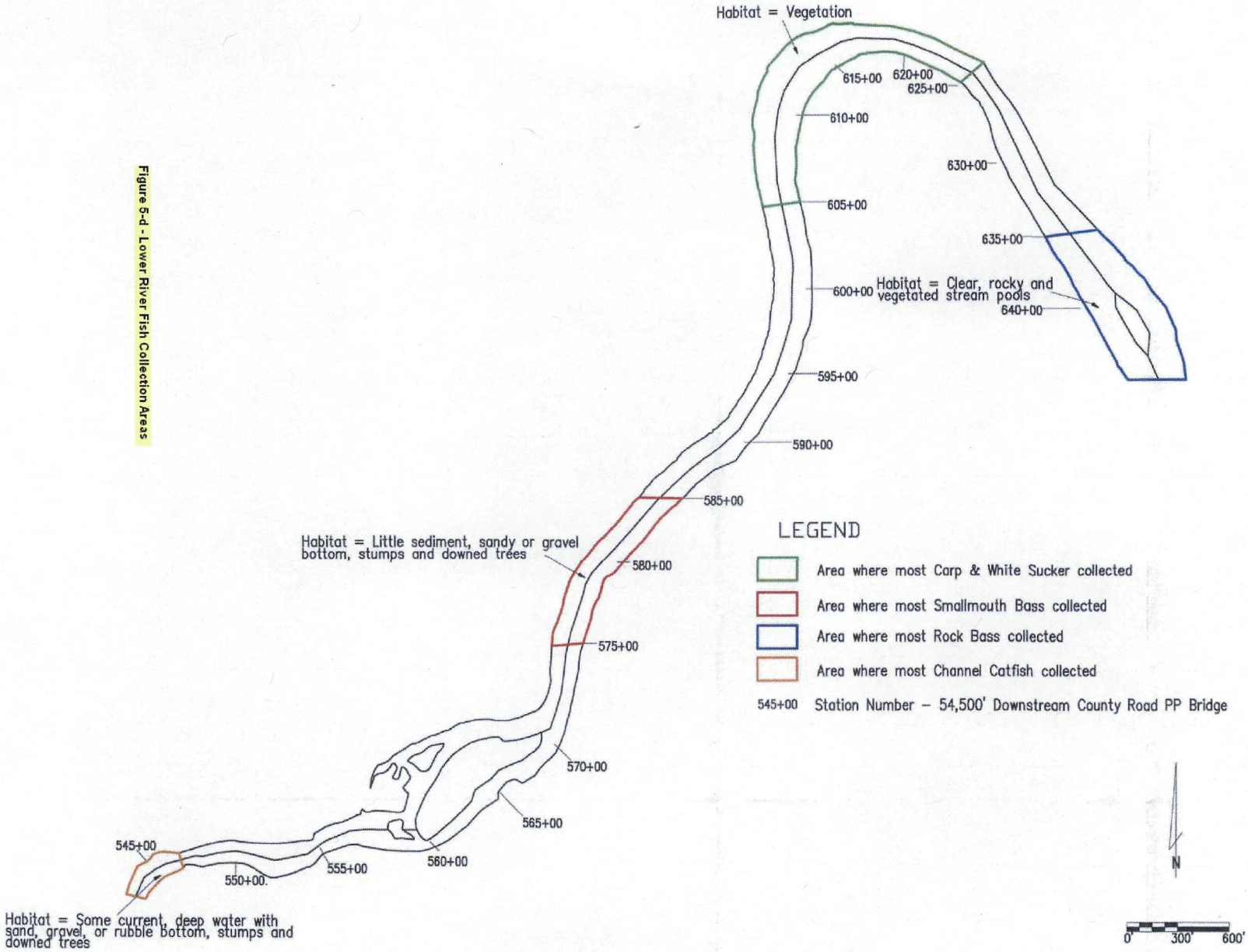


Figure 5-d - Lower River Fish Collection Areas

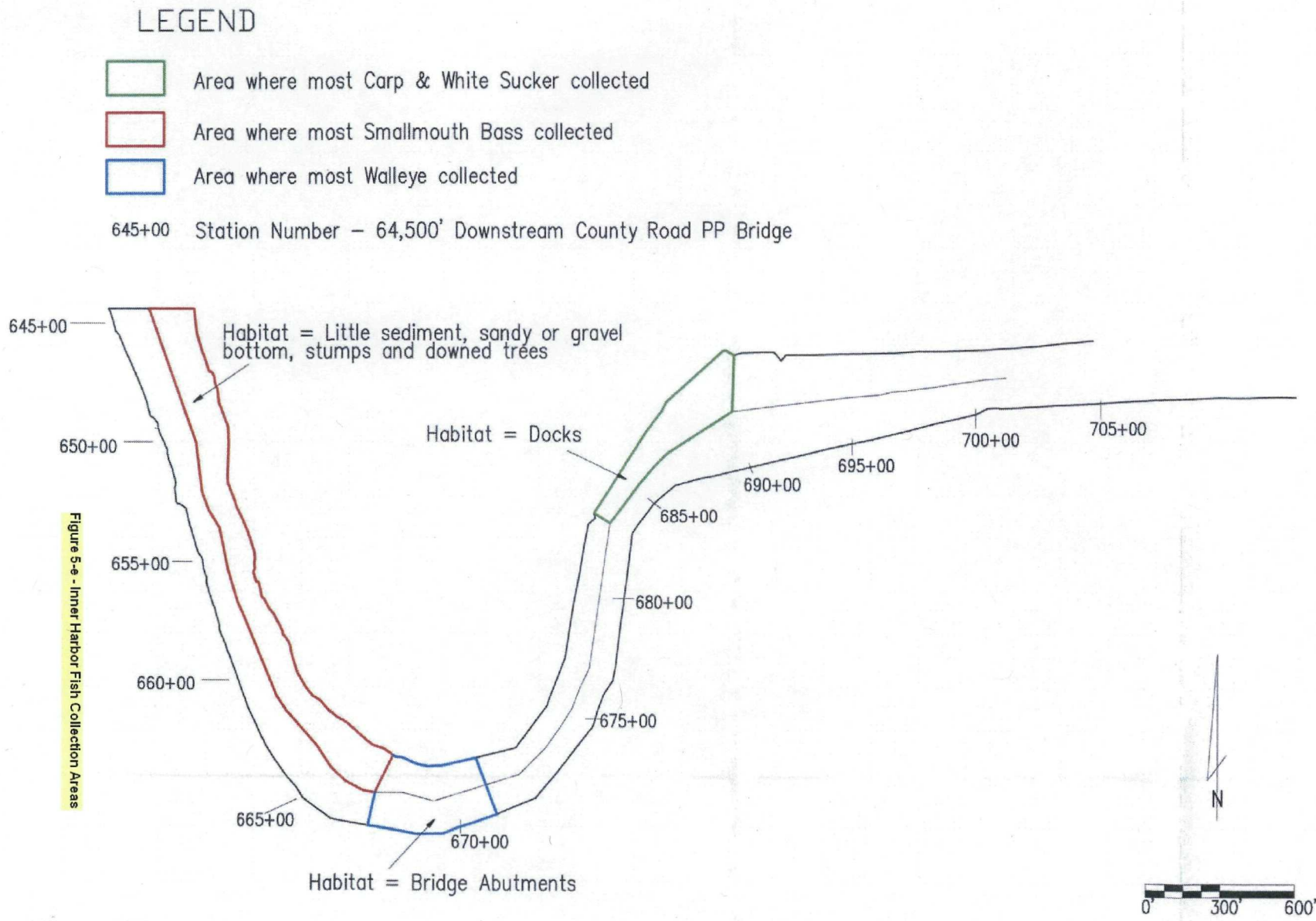


Figure 5-e - Inner Harbor Fish Collection Areas

ATTACHMENT 6
TABLES of FISH TISSUE SAMPLE RESULTS

FISH SAMPLE RESULTS - UPPER RIVER SITE 1 (UR1)

Sample ID, Collection Date	*Sample Type*	*Sample Form*	*Length (in)*	*Length (cm)*	*Weight (ounces)*	*Weight (grams)*	*Gender (M/F)*	*Age (Yr)*[1]	*Fat (%)*	*PCB (mg/kg)*
BL-UR1-AC1-G, 8/19/08	Adult Carp	SO	24.0	61.0	82.0	2325	F	7/8	4.60%	37.0
BL-UR1-AC2-G, 8/18/08			21.0	53.3	61.0	1729	M	6	1.33%	73.1
BL-UR1-AC3-G, 8/18/08			18.0	45.7	32.0	907	M	4	4.84%	1.63
BL-UR1-AC4-G, 8/18/08			19.0	48.3	50.0	1417	F	4	4.45%	7.44
BL-UR1-AC5-G, 9/6/08			15.0	38.1	30.0	850	F	4	2.19%	4.77
BL-UR1-AC6-G, 9/6/08			16.0	40.6	30.0	850	M	3/4	0.625%	14.0
BL-UR1-AC7-G, 9/6/08			20.0	50.8	64.0	1814	M	5	2.50%	17.6
BL-UR1-AC8-G, 9/6/08			19.5	49.5	48.0	1361	M	4/5	0.340%	2.08
BL-UR1-AC9-G, 9/6/08			25.0	63.5	113	3203	M	8	7.49%	53.9
BL-UR1-AC10-G, 9/6/08			24.0	61.0	124	3515	M	7/8	7.55%	28.4
BL-UR1-AC11-G, 9/6/08			21.0	53.3	69.0	1956	F	5/6	3.44%	9.48
BL-UR1-AC12-G, 9/6/08			23.0	58.4	96.0	2722	M	7	3.02%	29.4
BL-UR1-AC13-G, 9/6/08			25.0	63.5	152	4309	F	8	13.69%	33.3
BL-UR1-AC14-G, 9/6/08			25.0	63.5	123	3487	F	8	1.01%	9.55
BL-UR1-AC15-G, 9/6/08			22.5	57.2	96.0	2722	F	6/7	8.70%	55.5
BL-UR1-AC16-G, 9/6/08			23.0	58.4	100	2835	M	7	7.03%	36.9
Mean Result for Adult Carp			21.3	54.1	79.4	2250	NA	6.01	4.55%	25.9
Minimum Results for Adult Carp			15.0	38.1	30.0	850	NA	3.50	0.340%	1.63
Maximum Results for Adult Carp			25.0	63.5	152.0	4309	NA	8.00	13.69%	73.1
Standard Deviation for Adult Carp			3.18	8.08	37.4	1059	NA	1.65	3.60%	21.4
Coefficient of Variation for Adult Carp			0.149	0.149	0.471	0.471	NA	0.274	0.791	0.83
Distribution for Adult Carp			Normal							
Upper 95% UCL for Adult Carp			22.9	58.1	97.7	2769	NA	6.82	6.31%	35.3

Distribution of PCB results determined using ProUCL, Version 4.00.02.

FISH SAMPLE RESULTS - UPPER RIVER SITE 1 (UR1)

Sample ID, Collection Date	*Sample Type*	*Sample Form*	*Length (in)*	*Length (cm)*	*Weight (ounces)*	*Weight (grams)*	*Gender (M/F)*	*Age (Yr)*[1]	*Fat (%)*	*PCB (mg/kg)*
BL-UR1-AWS1-G, 8/18/08	Adult White Sucker	SO	16.0	40.6	24.0	680.4	M	4	1.40%	15.9
BL-UR1-AWS2-G, 8/18/08			14.0	35.6	16.0	454	M	4	1.33%	16.6
BL-UR1-AWS3-G, 8/19/08			13.0	33.0	16.0	454	M	3	0.555%	10.3
BL-UR1-AWS4-G, 8/19/08			12.0	30.5	19.0	539	M	3	1.52%	20.6
BL-UR1-AWS5-G, 9/6/08			14.0	35.6	18.0	510	M	4	0.855%	10.6
BL-UR1-AWS6-G, 9/6/08			12.0	30.5	14.0	397	M	3	0.495%	5.74
BL-UR1-AWS7-G, 9/6/08			14.0	35.6	19.0	539	M	3	0.330%	7.34
BL-UR1-AWS8-G, 9/6/08			11.5	29.2	11.0	312	M	3	0.760%	12.3
Mean Result for Adult White Sucker			13.3	33.8	17.1	485	NA	3.38	0.905%	12.4
Minimum Results for Adult White Sucker			11.5	29.2	11.0	312	NA	3.00	0.330%	5.74
Maximum Results for Adult White Sucker			16.0	40.6	24.0	680	NA	4.00	1.52%	20.6
Standard Deviation for Adult White Sucker			1.49	3.77	3.87	110	NA	0.518	0.454%	5.00
Coefficient of Variation for Adult White Sucker			0.112	0.111	0.226	0.226	NA	0.153	0.502	0.402
Distribution for Adult White Sucker			Normal							
Upper 95% UCL for Adult White Sucker			14.3	36.4	19.8	562	NA	3.73	1.22%	15.8

BL-UR1-JWS1-G, 8/19/08	Juvenile White Sucker	SO	6.00	15.2	2.00	56.7	M	1	0.151%	9.71
BL-UR1-JWS2-G, 8/19/08			6.00	15.2	1.00	28.3	M	1	0.367%	8.93
BL-UR1-JWS3-G, 8/19/08			5.00	12.7	1.00	28.3	M	1	0.462%	6.08
BL-UR1-JWS4-G, 8/19/08			6.00	15.2	2.00	56.7	M	1	0.248%	4.85
BL-UR1-JWS5-G, 8/20/08			7.00	17.8	2.00	56.7	M	1	0.330%	7.76
BL-UR1-JWS6-G, 8/20/08			6.00	15.2	1.00	28.3	M	1	0.638%	6.51
BL-UR1-JWS7-G, 8/20/08			6.50	16.5	2.00	56.7	M	1	0.281%	2.28
BL-UR1-JWS8-G, 8/20/08			6.00	15.2	2.00	56.7	M	1	0.275%	1.99
Mean Result for Juvenile White Sucker			6.06	15.4	1.63	46.1	NA	1.00	0.344%	6.01
Minimum Results for Juvenile White Sucker			5.00	12.7	1.00	28.3	NA	1.00	0.151%	1.99
Maximum Results for Juvenile White Sucker			7.00	17.8	2.00	56.7	NA	1.00	0.638%	9.71
Standard Deviation for Juvenile White Sucker			0.563	1.43	0.518	14.7	NA	0.00	0.149%	2.85
Coefficient of Variation for Juvenile White Sucker			0.093	0.093	0.318	0.318	NA	0.00	0.434	0.474
Distribution for Juvenile White Sucker			Normal							
Upper 95% UCL for Juvenile White Sucker			6.45	16.4	1.98	56.2	NA	NA	0.448%	7.92

Distribution of PCB results determined using ProUCL, Version 4.00.02.

FISH SAMPLE RESULTS - UPPER RIVER SITE 1 (UR1)

Sample ID, Collection Date	*Sample Type*	*Sample Form*	*Length (in)*	*Length (cm)*	*Weight (ounces)*	*Weight (grams)*	*Gender (M/F)*	*Age (Yr)*[1]	*Fat (%)*	*PCB (mg/kg)*
BL-UR1-SB1-G, 8/18/08	Smallmouth Bass	SO	13.0	33.0	22.0	624	F	5	0.625%	18.6
BL-UR1-SB2-G, 8/18/08			10.0	25.4	8.0	227	M	3	0.400%	21.5
BL-UR1-SB3-G, 8/19/08			15.0	38.1	34.0	964	F	6	1.43%	15.2
BL-UR1-SB4-G, 8/19/08			10.0	25.4	11.0	312	M	3/4	0.490%	22.2
BL-UR1-SB5-G, 8/19/08			10.0	25.4	8.0	227	M	3	0.695%	7.33
BL-UR1-SB6-G, 8/19/08			11.0	27.9	12.0	340	M	3/4	0.765%	6.14
BL-UR1-SB7-G, 8/19/08			14.0	35.6	23.0	652	F	6	1.17%	8.59
BL-UR1-SB8-G, 8/19/08			10.0	25.4	8.00	227	M	4	0.430%	4.09
Mean Result for Smallmouth Bass			11.6	29.5	15.8	447	NA	4.25	0.750%	13.0
Minimum Results for Smallmouth Bass			10.0	25.4	8.00	227	NA	3.00	0.400%	4.09
Maximum Results for Smallmouth Bass			15.0	38.1	34.0	964	NA	6.00	1.43%	22.2
Standard Deviation for Smallmouth Bass			2.07	5.25	9.57	271	NA	1.25	0.368%	7.28
Coefficient of Variation for Smallmouth Bass			0.178	0.178	0.608	0.608	NA	0.295	0.490	0.562
Distribution for Smallmouth Bass			Normal							
Upper 95% UCL for Smallmouth Bass			13.1	33.2	22.4	635	NA	5.12	1.00%	17.8
BL-UR1-RB1-G, 8/19/08	Rock Bass	SO	8.50	21.6	8.00	227	M	5	0.415%	6.53
BL-UR1-RB2-G, 8/20/08			8.00	20.3	7.00	198	M	4/5	0.590%	5.82
BL-UR1-RB3-G, 8/20/08			5.50	14.0	2.00	57	M	4	0.775%	16.8
BL-UR1-RB4-G, 8/20/08			6.00	15.2	4.00	113	M	3/4	1.02%	10.4
BL-UR1-RB5-G, 8/20/08			6.00	15.2	4.00	113	M	4	0.581%	7.91
BL-UR1-RB6-G, 8/20/08			7.00	17.8	4.00	113	M	4	0.325%	1.22
BL-UR1-RB7-G, 8/20/08			8.00	20.3	6.00	170	M	4	0.485%	1.57
BL-UR1-RB8-G, 8/20/08			5.50	14.0	3.00	85.0	M	3	0.619%	5.30
Mean Result for Rock Bass			6.81	17.3	4.75	135	NA	4.00	0.601%	6.94
Minimum Results for Rock Bass			5.50	14.0	2.00	56.7	NA	3.00	0.325%	1.22
Maximum Results for Rock Bass			8.50	21.6	8.00	227	NA	5.00	1.02%	16.8
Standard Deviation for Rock Bass			1.22	3.11	2.05	58.2	NA	0.598	0.217%	5.01
Coefficient of Variation for Rock Bass			0.180	0.180	0.432	0.432	NA	0.149	0.362	0.722
Distribution for Rock Bass			Normal							
Upper 95% UCL for Rock Bass			7.66	19.5	6.17	175	NA	4.41	0.752%	10.3

Distribution of PCB results determined using ProUCL, Version 4.00.02.

FISH SAMPLE RESULTS - UPPER RIVER SITE 1 (UR1)

Sample ID, Collection Date	*Sample Type*	*Sample Form*	*Length (in)*	*Length (cm)*	*Weight (ounces)*	*Weight (grams)*	*Gender (M/F)*	*Age (Yr)*[1]	*Fat (%)*	*PCB (mg/kg)*
BL-UR1-LD1-G, 9/12/08	Longnose Dace	W	3.00	7.62	0.260	7.37	TS	NA	2.77%	17.6
BL-UR1-LD2-G, 9/12/08			2.50	6.35	0.120	3.40	TS	NA	1.24%	3.20
BL-UR1-LD3-G, 9/12/08			2.00	5.08	0.070	1.98	TS	NA	1.14%	1.72
BL-UR1-LD4-G, 9/12/08			2.50	6.35	0.100	2.83	TS	NA	2.30%	3.29
BL-UR1-LD5-G, 9/17/08			3.50	8.89	0.260	7.37	TS	NA	4.00%	15.1
BL-UR1-LD6-G, 9/17/08			2.50	6.35	0.090	2.55	TS	NA	4.40%	5.11
Mean Result for Longnose Dace			2.67	6.77	0.150	4.25	NA	NA	2.64%	7.67
Minimum Results for Longnose Dace			2.00	5.08	0.070	1.98	NA	NA	1.140%	1.72
Maximum Results for Longnose Dace			3.50	8.89	0.260	7.37	NA	NA	4.40%	17.6
Standard Deviation for Longnose Dace			0.516	1.31	0.087	2.46	NA	NA	1.363%	6.85
Coefficient of Variation for Longnose Dace			0.194	0.194	0.578	0.578	NA	NA	0.516	0.894
Distribution for Longnose Dace			Normal							
Upper 95% UCL for Longnose Dace			3.08	7.82	0.22	6.22	NA	NA	3.73%	13.3

NA - Not applicable
TS - Too small to gender/age
SO - Scale off, skin on fillet
SOF - Skin off fillet
W - Whole fish

[1] Where fish ages were in between ages, a half age was applied for the calculations. For example: 4/5 would be 4.5 years.

Distribution of PCB results determined using ProUCL, Version 4.00.02.

ATTACHMENT 7
SITE INSPECTION CHECKLIST

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the five-year review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: Sheboygan River and Harbor	**Date of inspection:** May 14, 2009
Location and Region: Sheboygan, WI Region 5	**EPA ID:** WID 980996367
Agency, office, or company leading the five-year review: USEPA	**Weather/temperature:** Sunny / 56°F

Remedy Includes: (Check all that apply)

- G Landfill cover/containment
- G Access controls
- ☒ Institutional controls
- G Groundwater pump and treatment
- G Surface water collection and treatment
- ☒ Other Ground water interceptor trench, Sediment removal

Attachments: G Inspection team roster attached G Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Ken Aukerman (Name) Project Manager (Title) 5/14/09 (Date)
   Interviewed ☒ at site G at office G by phone Phone no. 920-467-9795
   Problems, suggestions; G Report attached
   N/A

2. **O&M staff** Same as above (Name) _____ (Title) _____ (Date)
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency WDNR
Contact Thomas Wentland Project Manager 05/14/09 _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

4. **Other interviews** (optional) G Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☒ O&M manual — ☒ Readily available — G Up to date — G N/A
   - ☒ As-built drawings — ☒ Readily available — G Up to date — G N/A
   - G Maintenance logs — G Readily available — G Up to date — G N/A
   - Remarks

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — G N/A
   - G Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — G N/A
   - Remarks

3. **O&M and OSHA Training Records** — ☒ Readily available — G Up to date — G N/A
   - Remarks

4. **Permits and Service Agreements**
   - G Air discharge permit — G Readily available — G Up to date — ☒ N/A
   - G Effluent discharge — ☒ Readily available — ☒ Up to date — G N/A
   - G Waste disposal, POTW — ☒ Readily available — ☒ Up to date — G N/A
   - G Other permits — G Readily available — G Up to date — G N/A
   - Remarks Available at Corporate offices as well

5. **Gas Generation Records** — G Readily available — G Up to date — ☒ N/A
   - Remarks

6. **Settlement Monument Records** — ☒ Readily available — ☒ Up to date — ☒ N/A
   - Remarks Available at Corporate M.V. 05/14/09

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — G N/A
   - Remarks available at Corporate offices as well

8. **Leachate Extraction Records** — G Readily available — G Up to date — ☒ N/A
   - Remarks

9. **Discharge Compliance Records**
   - G Air — G Readily available — G Up to date — ☒ N/A
   - G Water (effluent) — ☒ Readily available — ☒ Up to date — G N/A
   - Remarks Water treatment

10. **Daily Access/Security Logs** — ☒ Readily available — ☒ Up to date — G N/A
    - Remarks

IV. O&M COSTS

1. **O&M Organization**
G State in-house G Contractor for State
G PRP in-house G Contractor for PRP
G Other _____

2. **O&M Cost Records**
G Readily available G Up to date
G Funding mechanism/agreement in place
Original O&M cost estimate _____ G Breakdown attached

Total annual cost by year for review period if available

From 2004 (Date)	To 2008 (Date)	$35,000 (Total cost)	G Breakdown attached * GW monitoring
From 2008 (Date)	To 2008 (Date)	$130,000 (Total cost)	G Breakdown attached ** Fish monitoring
From _____ (Date)	To _____ (Date)	_____ (Total cost)	G Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	G Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	G Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing damaged** G Location shown on site map G Gates secured G N/A
Remarks Fencing is in Place at former Tecumseh facility

** Approximately $9,000/year

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map G N/A
   Remarks Signs placed on-site fence

C. Institutional Controls

1. **Implementation and enforcement**
   Site conditions imply ICs not properly implemented G Yes G No G N/A
   Site conditions imply ICs not being fully enforced G Yes G No G N/A

   Type of monitoring (e.g., self-reporting, drive by) _____
   Frequency _____
   Responsible party/agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone no.

   Reporting is up-to-date G Yes G No G N/A
   Reports are verified by the lead agency G Yes G No G N/A

   Specific requirements in deed or decision documents have been met G Yes G No G N/A
   Violations have been reported G Yes G No G N/A
   Other problems or suggestions: G Report attached

   Institutional Controls not in place due to on-going Remediation of the Site

2. **Adequacy** G ICs are adequate G ICs are inadequate G N/A
   Remarks _____

D. General

1. **Vandalism/trespassing** G Location shown on site map ✓ No vandalism evident
   Remarks _____

2. **Land use changes onsite** ✓ N/A
   Remarks _____

3. **Land use changes offsite** ✓ N/A
   Remarks _____

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable G N/A

1. **Roads damaged** G Location shown on site map G Roads adequate G N/A
   Remarks

B. Other Site Conditions

Remarks Water treatment facility

VII. LANDFILL COVERS G Applicable G N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map G Settlement not evident
   Areal extent Depth
   Remarks

2. **Cracks** G Location shown on site map G Cracking not evident
   Lengths Widths Depths
   Remarks

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent Depth
   Remarks

4. **Holes** G Location shown on site map G Holes not evident
   Areal extent Depth
   Remarks

5. **Vegetative Cover** G Grass G Cover properly established G No signs of stress
   G Trees/Shrubs (indicate size and locations on a diagram)
   Remarks

6. **Alternative Cover (armored rock, concrete, etc.)** G N/A
   Remarks

7. **Bulges** G Location shown on site map G Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** G Wet areas/water damage not evident
G Wet areas G Location shown on site map Areal extent_____
G Ponding G Location shown on site map Areal extent_____
G Seeps G Location shown on site map Areal extent_____
G Soft subgrade G Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** G Slides G Location shown on site map G No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches G Applicable G N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** G Location shown on site map G N/A or okay
Remarks_____

2. **Bench Breached** G Location shown on site map G N/A or okay
Remarks_____

3. **Bench Overtopped** G Location shown on site map G N/A or okay
Remarks_____

C. Letdown Channels G Applicable G N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** G Location shown on site map G No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** G Location shown on site map G No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** G Location shown on site map G No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** G Location shown on site map G No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ G No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
G No evidence of excessive growth
G Vegetation in channels does not obstruct flow
G Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations G Applicable G N/A

1. **Gas Vents** G Active G Passive
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs O&M G N/A
Remarks_____

2. **Gas Monitoring Probes**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs O&M G N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs O&M G N/A
Remarks_____

4. **Leachate Extraction Wells**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs O&M G N/A
Remarks_____

5. **Settlement Monuments** G Located G Routinely surveyed G N/A
Remarks_____

E. Gas Collection and Treatment G Applicable G N/A

1. **Gas Treatment Facilities**
G Flaring G Thermal destruction G Collection for reuse
G Good condition G Needs O&M
Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
G Good condition G Needs O&M
Remarks_____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)
G Good condition G Needs O&M G N/A
Remarks_____

F. Cover Drainage Layer G Applicable G N/A

1. **Outlet Pipes Inspected** G Functioning G N/A
Remarks_____

2. **Outlet Rock Inspected** G Functioning G N/A
Remarks_____

G. Detention/Sedimentation Ponds G Applicable G N/A

1. **Siltation** Areal extent_____ Depth_____ G N/A
G Siltation not evident
Remarks_____

2. **Erosion** Areal extent_____ Depth_____
G Erosion not evident
Remarks_____

3. **Outlet Works** G Functioning G N/A
Remarks_____

4. **Dam** G Functioning G N/A
Remarks_____

H. Retaining Walls G Applicable G N/A

1. **Deformations** G Location shown on site map G Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** G Location shown on site map G Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge G Applicable G N/A

1. **Siltation** G Location shown on site map G Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** G Location shown on site map G N/A
   G Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** G Functioning G N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS G Applicable G N/A

1. **Settlement** G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   G Performance not monitored
   Frequency_____ G Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☒ All required wells located ☐ Needs O&M ☐ N/A
   Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs O&M
   Remarks _____

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs O&M
   Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs O&M
   Remarks _____

3. **Spare Parts and Equipment**
G Readily available G Good condition G Requires upgrade G Needs to be provided
Remarks_____

C. Treatment System ☒ Applicable G N/A Currently not operating since no sediment dredging is taking!

1. **Treatment Train** (Check components that apply)
G Metals removal G Oil/water separation G Bioremediation
G Air stripping G Carbon adsorbers
G Filters_____
G Additive (e.g., chelation agent, flocculent)_____
G Others_____
G Good condition G Needs O&M
G Sampling ports properly marked and functional
G Sampling/maintenance log displayed and up to date
G Equipment properly identified
G Quantity of groundwater treated annually_____
G Quantity of surface water treated annually_____
Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
G N/A G Good condition G Needs O&M
Remarks_____

3. **Tanks, Vaults, Storage Vessels**
G N/A G Good condition G Proper secondary containment G Needs O&M
Remarks_____

4. **Discharge Structure and Appurtenances**
G N/A G Good condition G Needs O&M
Remarks_____

5. **Treatment Building(s)**
G N/A G Good condition (esp. roof and doorways) G Needs repair
G Chemicals and equipment properly stored
Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G All required wells located G Needs O&M G N/A
Remarks_____

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   G Properly secured/locked G Functioning G Routinely sampled G Good condition
   G All required wells located G Needs O&M G N/A
   Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Site is well maintained, all equipment in good condition and properly staged. Areas where restoration took place seem to be recovering well.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C.	**Early Indicators of Potential Remedy Failure**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. N/A
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. N/A

ATTACHMENT 8
PHOTOGRAPHS DOCUMENTING SITE CONDITIONS

Upper River - restored river bank at Former Tecumseh Property (preferential pathway excavation)

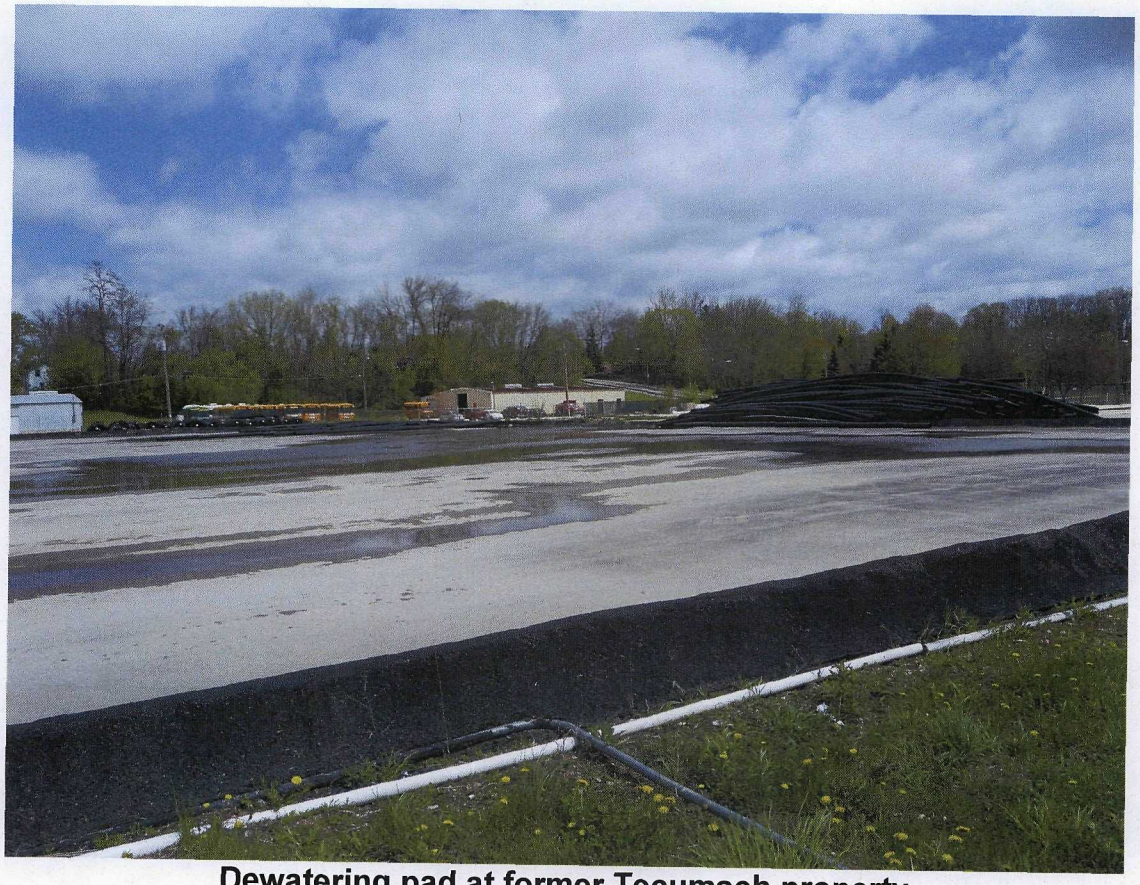
Monitoring well MW-16 being sampled at Groundwater Monitoring/ Interceptor Trench

Upper River - restored river bank at former location of armored areas

Discharge wastewater treatment plant

Waste water treatment plant at former Tecumseh property

Stored dredging equipment at former Tecumseh property



Dewatering pad at former Tecumseh property

Groundwater Monitoring/ Interceptor Trench Sump

Groundwater Monitoring/ Interceptor trench control panel

Upper River – river bank restoration at former access point

Upper River – river bank restoration at former access point

ATTACHMENT 9
NEWSPAPER AD

EPA Begins Review of Sheboygan River and Harbor Superfund Site

Sheboygan, Wisconsin

U.S. Environmental Protection Agency is conducting a five-year review of the 14-mile-long Sheboygan River and Harbor Superfund site that runs from Sheboygan Falls to the mouth of the river at Lake Michigan. The Superfund law requires regular checkups of sites that have been cleaned up or where cleanup has been ongoing for at least five years – with waste managed on-site – to make sure the cleanup continues to protect people and the environment.

In 2004 EPA began cleaning up PCB contamination in the sediment. The upper portion of the river is done. It involved dredging contaminated sediment from the former Tecumseh Products plant in Sheboygan Falls to the Waelderhaus Dam, storing sediment in large geotextile "tubes," squeezing water out of the tubes, and taking the remaining cleaned sediment to a licensed landfill for proper disposal.

This is the first five-year review. It should be completed by April 2009.

More information is available at the Mead Public Library, 710 N. Eighth St., Sheboygan, and at www.epa.gov/region5/sites/sheboygan/index.htm.

The five-year review is an opportunity for you to tell EPA about your concerns. Contact:

Susan Pastor
Community Involvement Coordinator
312-353-1325
pastor.susan@epa.gov

Pablo Valentin
Remedial Project Manager
312-353-2886
valentin.pablo@epa.gov

You may call toll-free at 800-621-8431, 8:30 a.m. – 4:30 p.m., weekdays.

ATTACHMENT 10
SUMMARY of GROUNDWATER DATA REVIEW

S.S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

DRAFT Memorandum

Date: 16 April 2009

From: Dominique Sorel

To: David Wilson, U.S. EPA Region 5

Project: SSP-1164 task 019 Sheboygan

Subject: **Summary of Groundwater Data Review**

1) Introduction

This memorandum has been prepared by S.S. Papadopulos & Associates, Inc. (SSP&A) on behalf of the U.S. Environmental Protection Agency (U.S. EPA), Region V, Groundwater Evaluation and Optimization System (GEOS) program to assist in the preparation of the next Five-Year review report for the Sheboygan River and Harbor Superfund Site, located in Wisconsin (Figure 1).

As indicated in the Record of Decision (ROD; U.S. EPA, 2000), the main environmental impacts at the Sheboygan site are the contamination of river sediments and floodplain soils by polychlorinated biphenyls (PCBs). However, the Tecumseh Products Company (Tecumseh) Plant, has been identified as a potential source of PCBs contamination to groundwater. This memorandum is focused upon the review of groundwater quality data for the Tecumseh Product Company (Tecumseh) Plant located in Sheboygan Falls and highlights the main discussion points to be addressed in our final report.

2) Regulatory Background relevant to Groundwater

- Record of Decision was issued by U.S EPA in 2000. Find below excerpts from the ROD, pertaining to groundwater:

> -p. 6: **D. SCOPE AND ROLE OF RESPONSE ACTION**: "Contaminated ground-water and Tecumseh's discontinued discharge sewer lines underneath the Tecumseh's Sheboygan Falls plant may pose a threat of PCB release to the River. In addition, soft sediment and river bank samples taken near the Tecumseh plant in 1999 indicated that additional PCB sources on or near the Tecumseh Products Company property likely exist."
>
> -p.7 **E. SITE CHARACTERISTICS** Tecumseh investigations, between 1987 and 1990, defined the nature and extent of contamination at the site and describe the extent of the threat that contaminants pose to human health and the environment. Tecumseh obtained additional data as recently as June 1999. The primary compounds of concern were determined to be PCBs, and several heavy metals"(arsenic, cadmium,

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chromium, copper, lead, mercury, nickel and zinc). PCBs drive risk and, therefore, the cleanup alternatives described are primarily focused on removing PCB-contaminated sediments and soils. However, metals, volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) were also detected at varying concentrations.

-p. 10 **E. SITE CHARACTERISTICS:Ground-water**: "PCB contamination is also present in ground-water at the Tecumseh plant. Ground-water sampling conducted in September 1992 and May 1993 by Tecumseh indicated that PCBs were locally present in the Tecumseh's Sheboygan Falls plant ground-water in concentrations ranging from 0.10 ug/L to 7.4 ug/L (unfiltered) and below the detection limit [0.05 ug/L] to 0.98 ug/L (filtered).These concentrations are above the 0.05 ug/L WDNR enforcement standard for ground-water *[DS:see comment below]*. Tecumseh estimated that the resulting flux of PCBs to the Sheboygan River was 0.4 grams/year. In a February 1998, letter to Tecumseh, the WDNR indicated that the flux could range from 0.4 to 280 gram/year, depending on the selection of input variables. Whether 0.4 or 280 grams/year, all flux calculations are conservative in that PCB retardation was not included. Given the high adsorption of PCBs to solids, the transport velocity of PCBs in ground-water is likely to be low. However, preferential pathways for flows, such as those that have been identified since the Feasibility Study was done, can greatly reduce the amount of travel time for PCB-contaminated groundwater to travel to the river. River bank samples that Tecumseh collected in 1999, near their Sheboygan Falls plant show PCB concentrations as high as 2,700 ppm where previous removal actions should have addressed concentrations of this magnitude. This PCB concentration was near a non-contact cooling water pipe outfall. Therefore, additional investigations near Tecumseh's Sheboygan Falls plant are needed to characterize any possible continuing sources, including preferential pathways, of PCBs to the Sheboygan River. With respect to potential exposure to PCB-contaminated ground-water at Tecumseh's Sheboygan Falls plant, there are no water supply wells at the plant. Also, an existing City of Sheboygan Falls ordinance prohibits the use of private water supply wells except by permit. To prevent potential future plant personnel from using and directly contacting the PCB-contaminated ground-water, deed restrictions must be placed on Tecumseh's Sheboygan Falls plant property to prevent the installation and development of water supply wells."

-p.32: **H. Remedial Objectives**: "2. Mitigate potential PCB sources to the Sheboygan River/Harbor system and reduce PCB transport within the river system. As mentioned previously, additional investigations will occur to determine the effects of PCB-contaminated ground-water or possible additional PCB sources from Tecumseh's Sheboygan Falls plant.

-p.85 **L.Selected Remedy:** Ground-water & Additional Source Investigation Based on information in the Feasibility Study and information presented in this ROD, the U.S. EPA selects Alternative 2: Investigation/Source Identification and Control. Current PCB concentrations in the existing facility monitoring wells will be assessed. If the ground-water sampling determines that PCB are present in ground-water at Tecumseh's Sheboygan Falls plant, additional borings/monitoring wells will be installed to further define the lateral extend of groundwater that contains PCBs and to more closely assess the hydrogeologic parameters at Tecumseh's Sheboygan Falls plant. The hydrogeologic parameters that will be targeted for evaluation include horizontal hydraulic gradient, vertical hydraulic gradient, nature of the ground-water/surface water interaction, including the possible effects of the flood control berm, and temporal variations in ground-water flow direction. The additional borings also will be used to further

assess the stratigraphy of the subsurface at Tecumseh's Sheboygan Falls plant. Information necessary to conduct a natural recovery evaluation will be collected.

In conjunction with evaluating ground-water to surface water migration, an investigation will be performed to identify potential PCS sources to ground-water under Tecumseh's Sheboygan Falls plant, or to the Sheboygan River directly. This will include an investigation of existing sewer lines that may be preferential pathways for PCBs into the river. Investigations in 1999 indicated high levels of PCBs in the river bank near Tecumseh's Sheboygan Falls plant. Source removal / control will be required depending on the results of these investigations. Long-term monitoring of Tecumseh's Sheboygan Falls plant ground-water and river bank sampling near Tecumseh's Sheboygan Falls plant will be conducted to ensure that no additional PCS sources to the river exist. If it is determined that ground-water under the Tecumseh plant is venting into surface water, and natural recovery is not appropriate as a final groundwater remedy, or preferential pathways from the Tecumseh plant to the river cannot be removed, Ground-water Alternative 3: Collection Trench and Treatment will be implemented.

Placement of an institutional control to limit access to Tecumseh's Sheboygan Falls plant ground-water as a drinking water source will be implemented.

- p.87 **Expected Outcomes of Selected Remedy.** "Source identification and control or a collection trench and treatment will reduce PCB loading to the Sheboygan River."

-p.88 **M. STATUTORY DETERMINATIONS**. Compliance with ARARs: Ground-water Quality Standards: State ground-water quality standards for various chemical are set forth in Wisconsin Administrative Code Section NR 140. In general, NR 140.24 and NR 140.26 require preventive action limits (PALs) to be achieved to the extent it is technically and economically feasible to do so. In the remediation context, the environmental standard is to be achieved within a reasonable timeframe. Natural attenuation is allowed as a remedial method where source control activities have been undertaken. The ground-water quality standards constitute an ARAR.

- According to Wisconsin Administrative Code, Chapter NR 140, the Public Health Goal for Groundwater enforcement standard (ES) for total PCB is 0.03 ug/L

-The drinking water standard is the same as the federal standard and that is 0.5 ug/L (NR 809)

-Bill Phelps of the Drinking Water and Groundwater office of the Wisconsin DNR (pers. communication) indicated that since its introduction in Chapter NR 140, the enforcement standard for PCBs has not been changed.

-A transmittal from the State of Wisconsin "Adoption of Order WR-48-92- revision of Chapter NR 140, Wis. Adm. Code, pertaining to groundwater quality standards" (August 1993), confirms that there were no changes since 1993.

-It appears that this sentence from p. 10 of the ROD (U.S. EPA, 2000) might be erroneous: "These concentrations are above the 0.05 ug/L WDNR enforcement standard for ground-water".

3) Summary of Historical Groundwater Data and Monitoring well Installation

-Historical information related to groundwater data is available from Blasland and Bouck Engineers, P.C., (1993)[*note that this is a draft report, the final report published in 1995 has not been located, P. Valentine, pers. comm.]):*

- 1978-1979: Donohue & Associates installed seven monitoring wells and piezometers:

  "seven monitoring wells and piezometers at five locations south, southeast and east of the Tecumseh facility. These investigations indicated that south of the facility, ground-water flow was generally toward the River. Groundwater levels in the vicinity of the property were approximately 5y2 feet below grade. Over a five month period, fluctuation in water levels at the seven monitoring points ranged from 1 to 5 feet. Donohue sampled the monitoring wells and piezometers, and analyzed the water for PCBs. Four of the seven samples had PCB concentrations reported as less than 2.5 parts per billion (ppb). In the remaining three samples PCB concentrations ranged from 2.9 ppb to 40.6 ppb. Since PCBs are relatively insoluble in water, we conclude that these results represent analysis of unfiltered samples.

- September 1992: Blasland and Bouck installed MW-1, MW-2, MW-3 and MW-4: only sampled for PCBs (See Figure 2 attached)

  "Ground-water sampling completed in September 1992 and May 1993 indicated that PCBs were locally present in the facility ground water [unfiltered concentrations ranged from 0.10 parts per billion (ppb) or micrograms per liter (ug/L) to 7.4 ppb; filtered concentrations ranged from below the detection limit (0.05 ppb) to 0.98 ppb. While low, these concentrations are above the 0.03 ppb WDNR Enforcement Standard (ES) for PCBs in ground water. It should be noted that ES is less than the method detection limit achievable with current technology." From SDMS170175, BB&L 1998 FS study

-BBL (1999) mentions sampling replacement wells MW-2R, MW-3R, and MW-4R in a monthly update report. The report documenting the well installation was not located

According to Pollution Risk Services, LLC and URS Corporation. (2004). Remedial Design Work Plan Narrative, Upper River - Phases I and II, Sheboygan River and Harbor Superfund Site Sheboygan County, Wisconsin. Issued for Construction. Volume 4. June. SDMS 324810

- (unknown date) Installation of wells MW-5, 6 (not located on figure) and 7 (See Figure 3)

Note that in the Feasibility Study (BBL,1998), there is mention of a work plan submitted on April 21, 1998 to the agencies to conduct additional ground-water investigation. This Workplan and resulting report has not been located.

According to Pollution Risk Services, LLC (2005) Upper River Phase 1 Completion Report. SDMS 320146:

-November 2004: Installation of wells MW-8,9,10,11,12,13,14,15,16,17 (See Figure 4)

4) Agency comments regarding groundwater in the Feasibility Study

-Below are comments about the Feasibility Study (BBL, 1998) from the U.S. EPA (1998) that are relevant to Groundwater:

Groundwater Investigation During implementation of the removal action (1991), Tecumseh upgraded their wastewater treatment plant (i.e., replaced it) at their facility. During construction soils were excavated and old sewer/drainage lines ("lines") were taken out of service. These soils anci material (i.e.,sediment or sludge as defined by TSCA) from one "line" were sampled and analyzed for PCBs. The analytical results indicated PCBs were present in exceedence of the TSCA limit of 50 ppm in both soils and the material. USEPA with WDNR concurrence determined that the soils should be placed with the sediment currently being dredged from the Sheboygan River into the Sediment Management Facility, and therefore be addressed for final disposal in the final action addressing these sediments (this was pursuant to the removal action authority). In addition, the sewer "line" was sealed. Discussions were initiated regarding the presence of potentially contaminated material in the "lines" which run under the Tecumseh plant. The agencies were concerned that the probable presence of PCBs in the "lines" would constitute a potential or actual source of PCBs to ground water and the river. The agencies recommended that the "lines" be evaluated for both physical condition of the "lines" and analysis of any material encountered for PCBs. [It is helpful to note that a similar situation had been determined to exist at the Ford Outfalls Superfund site on the River Raisin in Monroe, Michigan. The removal action implemented at that site addressed both the old sewer lines and contaminated soils, in addition to contaminated sediment in the river.]

Tecumseh and BBL were resistant to conducting an evaluation of the old "lines" and proposed a ground water investigation as an initial step based on the premise that if PCBs are in material in the "lines" and are a source of PCBs to the river, the pathway would be via ground water. The Agencies agreed to the ground water investigation of which the results would determine the course of future phases of study. The results of the ground water investigation show that ground water beneath the Tecumseh facility is contaminated with PCBs ranging from 0.01 to 7.4 ug/L in unfiltered samples, and ranging from non-detect (detection limit of 0.05 ug/L) to 0.98 ug/L in filtered samples. They also indicate that ground water is discharging to the Sheboygan River (refer to ground water investigation report and also see Agency comments). This is indicative of one or more of the following conclusions:

1. PCBs are migrating from the "lines" into the ground water and/or soils; and/or
2. PCBs in soils at/under the plant are migrating into the ground water; and/or
3. the clean up Tecumseh undertook in pursuant to a State Order was incomplete in that PCBs are remaining on the site in soils and ground water.

PCBs are present in soils, ground water, and likely in the material in the old "lines" under the Tecumseh plant. These pose a potential or actual source of PCBs to the environment including the river and may pose

a threat to human health and/or the environment (i.e., unacceptable risk). In addition, the original objectives of the ground water study were not met. The presence of PCBs in the ground water, soils at the Tecumseh facility, and old "lines" may constitute a continuing or potential future source of PCBs to the river. These PCBs may present a threat to human health and/or the environment. Additional study is warranted to more fully characterize the concentrations and extent of PCBs in soils at the plant and of the material in the old "lines" under the plant. This is necessary to ensure that these media do not pose an unacceptable risk to human health and the environment and that they do not pose a potential or actual source of PCBs to the river. Based on the information currently available, a range of alternatives to address these media is warranted and shall included in the FS. Further studies to refine the characterization of these media may be proposed during the RD and/or RA phases of the project as appropriate

Here are comments from the Wisconsin DNR (1997) regarding the Feasibility Study (BBL, 1998):

Ground-water sampling completed in September 1992 and May 1993 indicated that PCBs were locally present in the facility ground water [unfiltered concentrations ranged from 0.10 ug/L (ppb) to 7.4 ppb; filtered concentrations ranged from below the detection limit (<0.05 ppb) to 0.98 ppb]. These concentrations are above the 0.03 ppb WDNR Enforcement Standard (ES) for ground water, which is itself lower than the method detection limit.

(...)Based on groundwater data supplied by BB&L, the site is in violation of NR-140, NR-105 and possibly NR-700. A source of contaminants may still exist at the Tecumseh facility.

5) Information about Remediation and Groundwater Monitoring/Interception Trench (GMIT)

Remediation at the Tecumseh Plant has taken place as documented in the Upper River Phase 1 Completion Report. (PRS, 2005) and included the following activities:

- construction and installation of a groundwater monitoring /interceptor trench (GMIT);
- excavation of source materials;
- riverbank excavation;
- removal of preferential pathways;
- installation of monitoring wells; and
- site restoration.

As-built drawings for the GMIT are found in Figures 4 and 5 from the Upper River Phase 1 Completion Report. (PRS, 2005). Information related to the rationale for installing and operating the Groundwater Monitoring/Interception Trench (GMIT) is contained in the Remedial Design

Work Plan Narrative, Upper River - Phases I and II report (PRS, 2004), Figure 6 from that report contains the decision tree for operating the GMIT:

-p.14 The selected remedy for groundwater in the ROD is investigation/source identification and control. Following the investigation, natural attenuation will be evaluated to determine if it is a viable alternative. The ROD and URSOW indicate that if natural attenuation is not viable, then Alternative #3 (Collection Trench and Treatment) will be initiated.

PRS proposes to proceed directly with the construction of the groundwater monitoring/interceptor trench (GMIT) and forego the groundwater flux study for monitored natural attenuation. The proposed trenching activities to identify additional preferential pathways also provide the opportunity to concurrently install the GMIT. PRS understands that the installation and operation of the trench may not be required, based on groundwater monitoring data. The details of the GMIT construction are presented in Phase I Drawings 3 and 4, and are further detailed in the Phase I Remedial Design. The design of the GMIT is based on previously collected site data and known geologic conditions. As stated in the URSOW, additional monitoring wells (in addition to the existing wells) will be installed to further delineate the lateral and downgradient limits of the PCB-impacted groundwater plume.

(...)

The Design Basis for the Phase I Design is to remove additional source material from the plant site and construct a GMIT. The GMIT is designed to collect and intercept dissolved phase PCBs in groundwater from the Tecumseh facility to the Sheboygan River. The GMIT is not designed to remediate existing PCB impacted groundwater that may be present and/or located between the GMIT and the river.

Therefore, the proposed monitoring wells located downgradient of the GMIT will be sampled semi-annually for the first five years to measure the overall efficiency of the plant site source removal. If the sample results for the downgradient wells indicate that dissolved phase PCB concentrations in groundwater are decreasing, the GMIT will not be operated. If dissolved phase PCB concentrations in groundwater are increasing (two consecutive statistically significant monitoring events - see note below), then the GMIT will be operated until sample results for any given well continue to decrease.

Note: Two-sample comparisons will be made between one event (Event A) and the next (Event B). The goal will be to assess whether a statistically significant difference is present between the two events (A and B) with a 95% degree of confidence (i.e., a -0.05). If there is a statistically significant increase, the next event (Event C) will be compared with the prior event (Event B). If there is a statistically significant increase again, the GMIT will be operated. Rather than using the mean value of all downgradient monitoring wells to evaluate significance, each individual well will be evaluated. TheGMIT will be operated when one well yields statistically significant increases over two consecutive events. This ensures that the GMIT will operate if needed based on review of any data along its alignment.

If at the end of the five years, the dissolved phase PCB concentrations in any of the downgradient wells of the GMIT are above the acceptable limits (0.03 ppb), PRS will discuss and negotiate with the agencies on the path forward. The operation of the GMIT is detailed in the Phase I Design Narrative.

If pumping the GMIT is required, the groundwater pumped from the GMIT will be treated by the on-site wastewater treatment system (contingency water treatment system). The system is currently set up to treat the wastewater using a primary clarifier, multimedia filter, granular activated carbon, and final clarifier. Prior to on-site wastewater treatment, the system will be evaluated and repaired/upgraded as necessary. The treated water will be discharged to the Sheboygan River. Further discussion of the treatment system will be included in the Water Management Plan.

6) Summary of Available Groundwater data

-A database "20090210.WID980996367.EPARegion5EDD.zip" was submitted to U.S. EPA in 2009 by consultant to the PRP "Pollution Risk Services" (Ken Aukerman 513-518-2762)

- The database contains total PCB and water level data collected in 6 monitoring wells (MW-9, 10, 12, 13,16, 17) for 8 semi-annual monitoring events that occurred between November 2004 and May 2008.

-Ken Auckerman of Pollution Risk Services (pers. comm. April 9, 2009) indicated that PCB "baseline sampling" of all site monitoring wells was done in 2004, however this data was not incorporated in the database, since it was not specifically requested. Laboratory sheets have been transmitted to U.S. EPA in 2004 but have not been transmitted to SSP&A.

7) PAM Analysis

U.S. EPA performed statistical analyses on the PCB data available in the database provided by PRS. (See Table 1 for a summary of the statistical analysis results and Figure 7 posting the calculated Upper Confidence Limit (UCL) concentrations of total PCBs. Figures 8 through 13 show the graphs of the PAM results. The PAM analysis indicates that:

-all wells have concentrations above the Enforcement Standard of 0.03ug/L;
-MW-10, MW-12 and MW-13 have UCLs above MCL of 0.5 ug/L, they are located near the central part of the trench;
-maximum PCB TOT concentration is 2.8 ug/L in MW-13 (UCL= 2.17 ug/L) located just south of the white building.
-there is no significant concentration trend observed;
-One well (MW-12) indicates an improvement compared to baseline.

8) Summary of observations

1) The database transmitted by Pollution Risk services is incomplete as it only contains PCB data collected after installation of the GMIT, it is unclear weather the reported result is for filtered or unfiltered samples;

2) Groundwater level data provided in the database is limited to 6 monitoring wells located along the GMIT (MW-9, 10, 12, 13,16, 17); which is insufficient to properly evaluate flow direction and magnitude of the gradient at the site.

3) The ROD indicates that "PCBs drive risk and, therefore, the cleanup alternatives described are primarily focused on removing PCB-contaminated sediments and soils. However, metals, volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) were also detected at varying concentrations." All groundwater data that were available for our review are PCB data. It is currently unknown if other contaminants were detected above the enforcement standards on the Tecumseh facility;

4) The WDNR Enforcement Standard is for Total PCBs is 0.03 ug/L; detection limits are above the Enforcement Standard (0.05 ug/L); the Fields Sampling Plan (PRS, 2004) indicates that EPA method 8082 is used to analyze filtered and unfiltered groundwater samples for PCBs.

5) Documents related to groundwater monitoring well installation and monitoring are not complete in the SDMS database;

6) The results of the statistical analysis of total PCB concentrations using PAM indicate that PCBs are present in groundwater above the enforcement standard;

7) Based upon the GMIT operation rules, (statistical increase in PCB concentrations over two semi-annual sampling events), there have been no qualifying trigger events to operate the GMIT.

9) Recommendations

1) The database transmitted by Pollution Risk should be completed and include the baseline sampling that was done in all wells in 2004, and all historical data collected since wells were first installed at the Tecumseh plant, for PCBs or all other analytes. Additional information should be provided to indicate if samples are filtered or not filtered.

2) Water levels should be monitored in all site wells to provide an appropriate basis for evaluating groundwater flow direction and magnitude of the hydraulic gradient.

3) Historical data for other contaminants of concerns should be provided to evaluate the presence of contaminant source zones and the extent of groundwater contamination at the Tecumseh Plant.

4) Sampling methods should be further detailed to describe how PCB samples are collected to ascertain that they are appropriate for PCB sampling. Due to the high sorbing nature of PCBs, collecting representative dissolved PCB samples can be a challenge, and care should be taken to make sure that appropriate water collection methods are used to minimize sorptive losses onto pump tubing or other sampling material. Filtering is generally not recommended because of sorption losses to the filter. Chromatograms should also be provided to evaluate if the detected PCBs are in a dissolved phase or found as particulates. If it is determined that dissolved PCBs are present at low concentrations in site groundwater, an analytical method that can quantify total PCB concentrations at the enforcement level of 0.03 ug/L should be sought after.

5) The SDMS document database should be completed so that historical groundwater monitoring activities can be completely reviewed (PCB Baseline monitoring results 2004, reports documenting installation of replacement monitoring wells MW-2R, 3R, 4R, and monitoring wells MW-5, 6, -7, and -8);

6) As indicated in the ROD:
   a. " If the ground-water sampling determines that PCB are present in ground-water at Tecumseh's Sheboygan Falls plant, additional borings/monitoring wells will be installed to further define the lateral extend of groundwater that contains PCBs and to more closely assess the hydrogeologic parameters at Tecumseh's Sheboygan Falls plant"

   And as indicated in PRS (2004):
   b. "If at the end of the five years, the dissolved phase PCB concentrations in any of the downgradient wells of the GMIT are above the acceptable limits (0.03 ppb), PRS will discuss and negotiate with the agencies on the path forward."

   Based on the data provided, it appears that PCBs are present in groundwater at levels that are above the WDNR enforcement standard of 0.03 ug/L. On that basis, additional investigations should take place to define the extent of PCBs in groundwater.

However, because the PCB data provided does not appear to be adequate to evaluate the actual source of PCBs (i.e. as dissolved in groundwater or as particulates), it is recommended that a site-wide groundwater sampling event be conducted to evaluate the magnitude and extent of dissolved PCBs and other chemicals of potential concern (metals, VOCs, and PAHs) in groundwater at the Tecumseh plant. As is performed at other PCB site (i.e. Hudson River) samples could be collected and filtered in the field, and the aqueous (i.e., filtrate) and particulate (i.e., filter residue) phases could be extracted and analyzed for PCBs separately. Subsequent observation of the chromatograms could be performed to compare the fingerprints of the filtrate and filter residue and determine if they or of similar source or not.

7) The GMIT operation rules are currently based on PCB concentration trends in filtered groundwater samples. Relying on filtered sample concentrations is problematic as much of the PCB can be retained on the filter and thus may always return unrepresentative dissolved concentrations (and fairly constant levels at low concentrations). We recommend that the GMIT operation rules be revisited and be based on the magnitude of the observed concentrations of contaminant of concern (PCB, metals, VOCs, PAH) that are above the enforcement standards, rather than on observed increasing PCB concentration trends.

10) References

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U.S. EPA, 1998. Letter to Dawn Foster of Blasland, Bouck and Lee Re: Sheboygan River and Harbor Superfund Site Feasibility Study Report review and comments. Shehoygan, Wisconsin. Docket No V-W-' 86-C-005. January 28. SDMS 224643

Blasland and Bouck Engineers, P.C., 1993. DRAFT Groundwater Investigation Report, Alternative Specific Remedial Investigation, Sheboyegan River and Harbor, Tecumseh Products Company, Sheboygan Falls, Wisconsin. *[Final report published in 1995, not available at EPA]* SDMS 324809

Blasland and Bouck Engineers, P.C., 1998. Feasibility Study, Sheboyegan River and Harbor, Tecumseh Products Company, Sheboygan Falls, Wisconsin. April. SDMS 170175

Blasland and Bouck Engineers, P.C., 1999. Sheboygan River and Harbor Remedial Investigation/Feasibility Study, May 1999 Monthly Status Report. June 14. SDMS 224798

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Pollution Risk Services, LLC and URS Corporation. 2004. Sheboygan River & Harbor Superfund Site Field Sampling Plan (FSP) & Quality Assurance Project Plan (QAPP) Volume I of IV. February (SDMS 320139)

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Wisconsin Department of Natural Resources, 1997. Letter from Thomas A. Wentland to Steven Padovani of U.S. EPA. Re: Feasibility Study Report, Sheboygan River and Harbor Site, Sept. 1997. November 25. SDMS 224643

Wisconsin Administrative Code, Natural Resources Chapter 140, Groundwater Quality http://www.legis.state.wi.us/rsb/code/nr/nr140.pdf

Wisconsin Administrative Code, Natural Resources Chapter 809, Safe Drinking Water, http://www.legis.state.wi.us/rsb/code/nr/nr809.pdf

SHEBOYGAN RIVER AND HARBOR

Floodplain and Groundwater Issue Areas

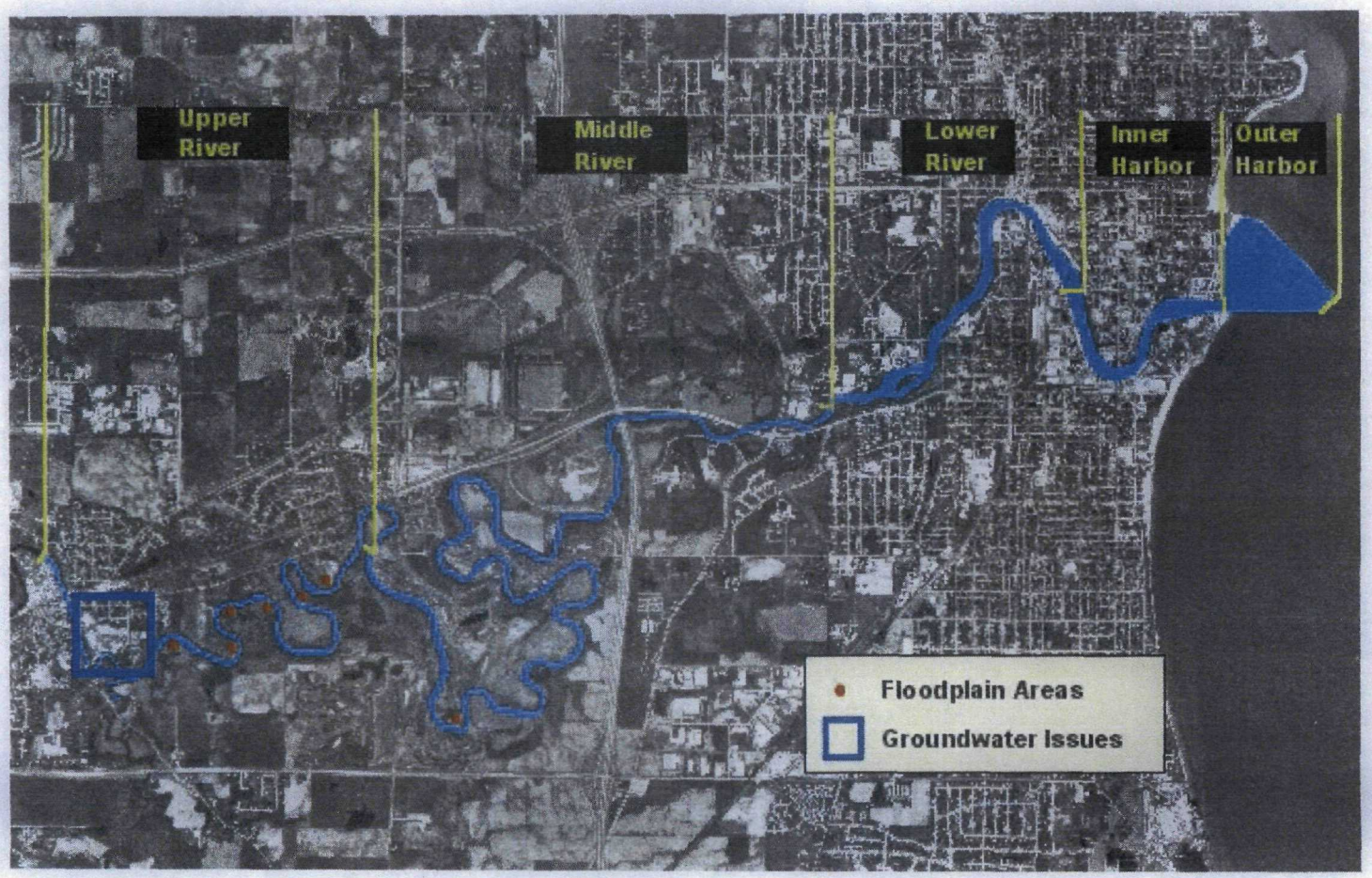


Figure 1

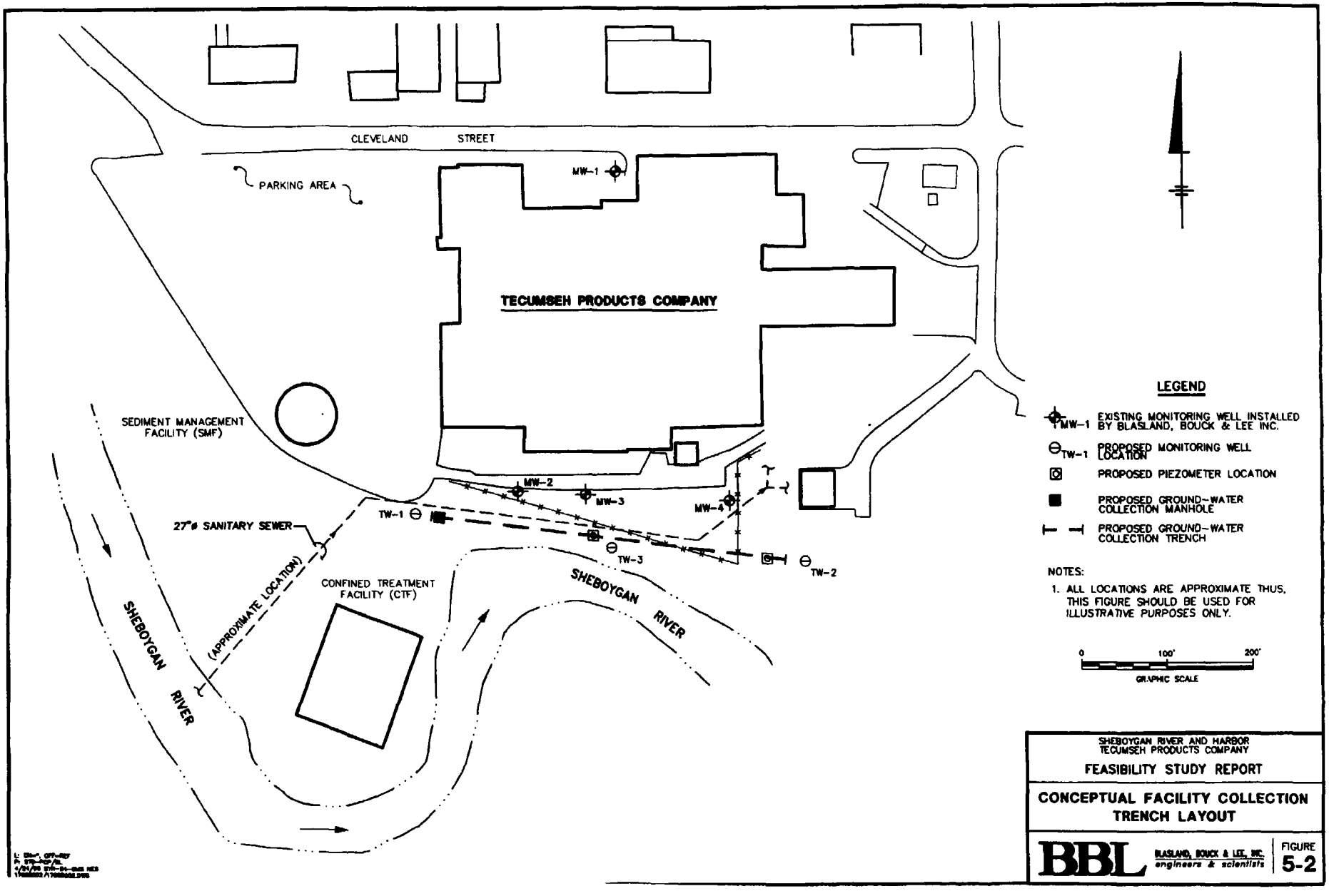

CLEVELAND STREET
PARKING AREA
MW-1
TECUMSEH PRODUCTS COMPANY
SEDIMENT MANAGEMENT FACILITY (SMF)
MW-2
MW-3
MW-4
TW-1
TW-3
TW-2
27"ø SANITARY SEWER
(APPROXIMATE LOCATION)
CONFINED TREATMENT FACILITY (CTF)
SHEBOYGAN RIVER
SHEBOYGAN RIVER
LEGEND
EXISTING MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE INC.
PROPOSED MONITORING WELL LOCATION
PROPOSED PIEZOMETER LOCATION
PROPOSED GROUND-WATER COLLECTION MANHOLE
PROPOSED GROUND-WATER COLLECTION TRENCH
NOTES:
1. ALL LOCATIONS ARE APPROXIMATE THUS, THIS FIGURE SHOULD BE USED FOR ILLUSTRATIVE PURPOSES ONLY.
0
100'
200'
GRAPHIC SCALE
SHEBOYGAN RIVER AND HARBOR
TECUMSEH PRODUCTS COMPANY
FEASIBILITY STUDY REPORT
CONCEPTUAL FACILITY COLLECTION TRENCH LAYOUT
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
5-2

Figure 2

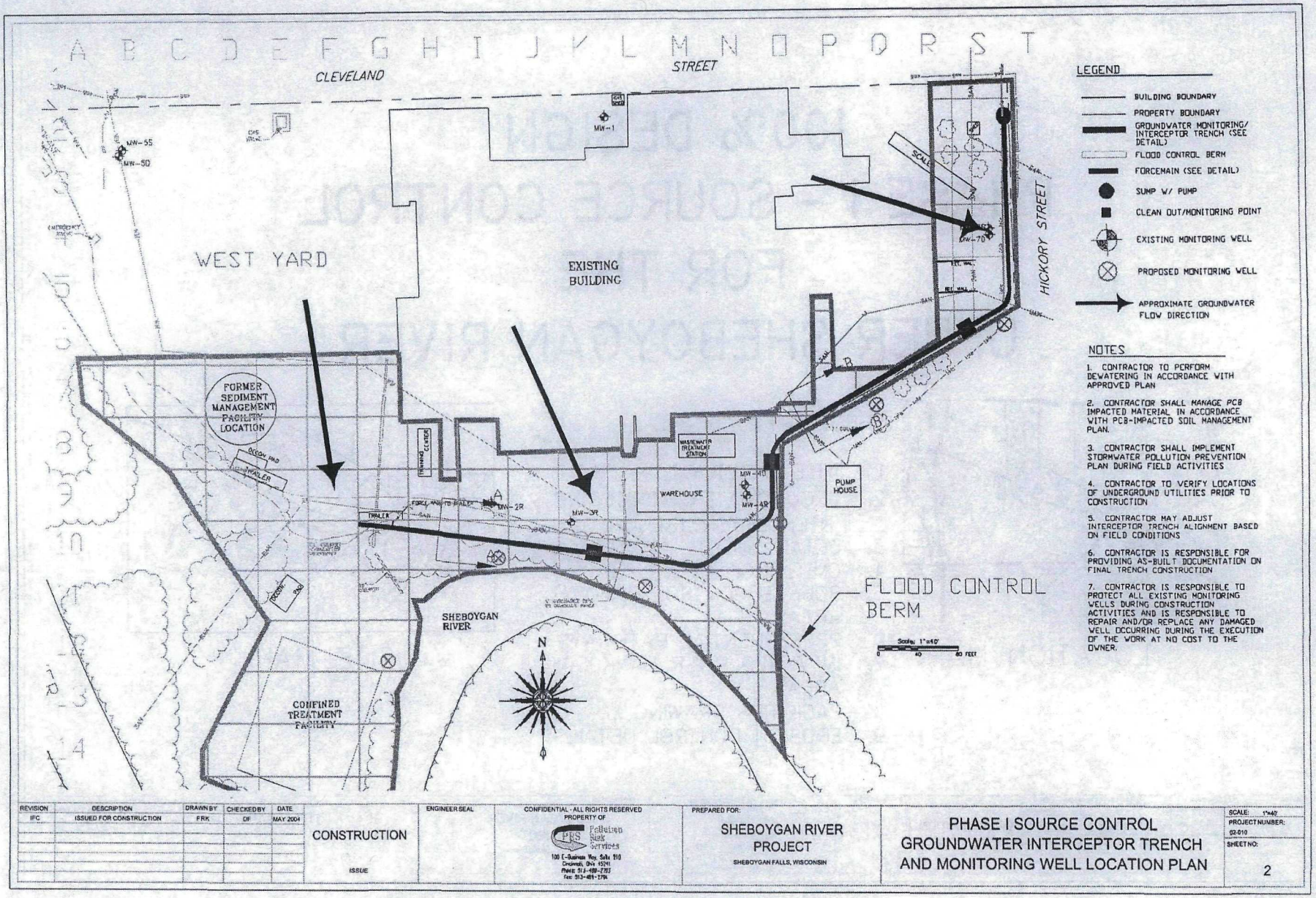


Figure 3

SDMS 324813

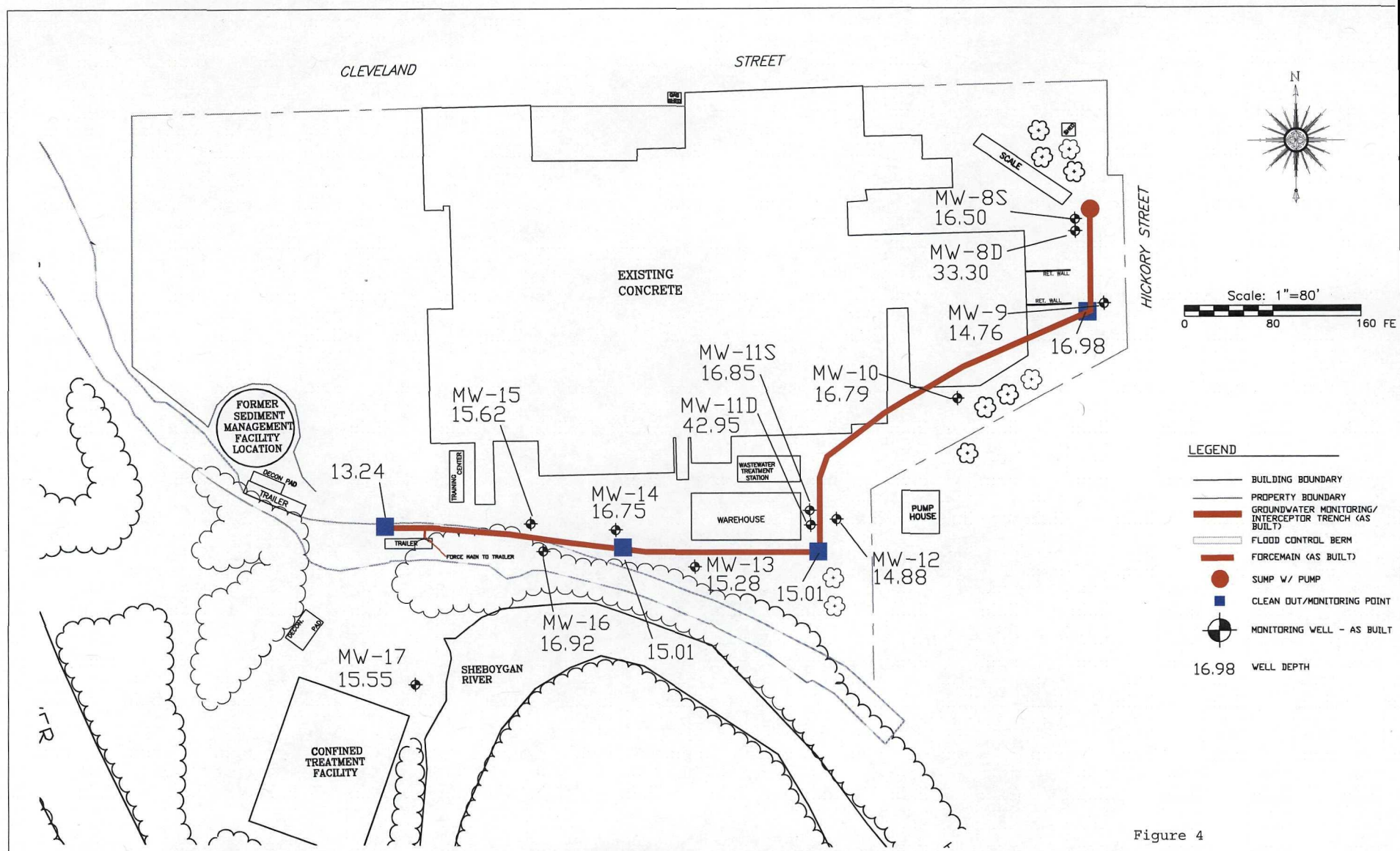


Figure 4

REVISION	DESCRIPTION	DRAWN BY	CHECKED BY	DATE
	AS-BUILT	KDA	PRK	NOV 2004

AS-BUILT

ENGINEER SEAL

PRS Pollution Risk Services
1176 100 E-Business Way, Suite 210
Cincinnati, Ohio 45241
Phone: 513-489-2793

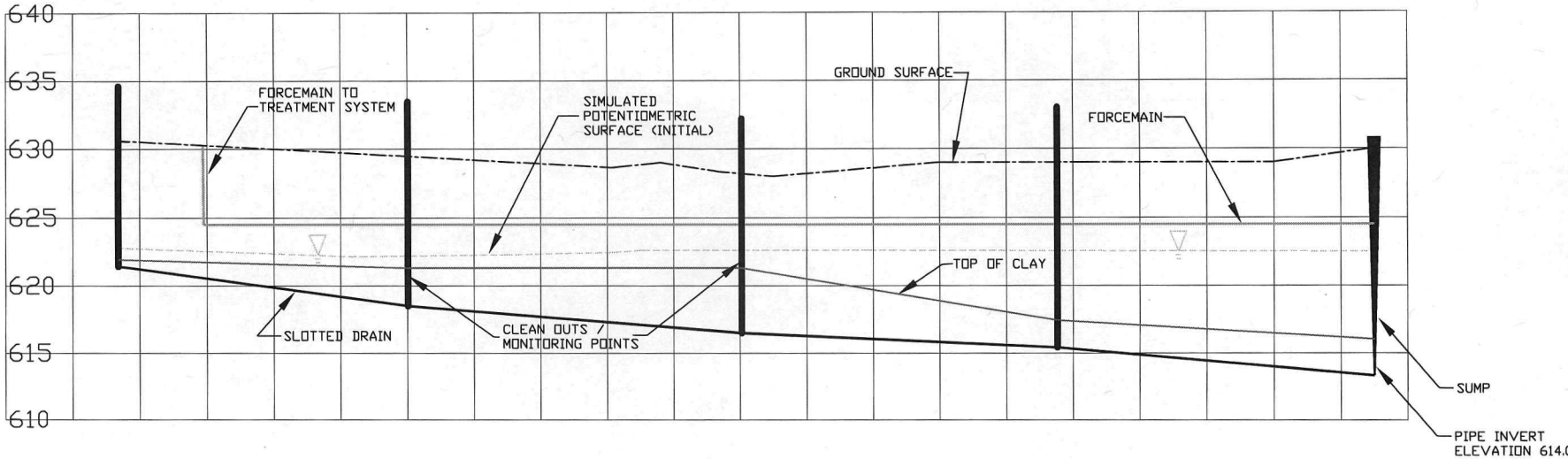
PREPARED FOR:

SHEBOYGAN RIVER
PROJECT
SHEBOYGAN FALLS, WISCONSIN

INTERCEPTOR TRENCH AND MONITORING WELLS AS-BUILT

SCALE: 1"=8
PROJECT NUMB
02-010
SHEET NO:
AB-

(25) DOC ID (320147)



NOTE:
ALL SOILS EXCAVATED WERE SAMPLED FOR PCB CONCENTRATIONS. SOIL LESS THAN 10 PPM WAS USED AS BACKFILL.

LEGEND

- EXISTING GROUND SURFACE
- GROUND WATER TABLE
- CLAY BOUNDARY
- SLOTTED DRAIN
- FORCE MAIN
- GROUNDWATER LEVEL
- 640 ELEVATION ABOVE MSL

Scale: 1"=80'

0 80 160 FEET

Figure 5

REVISION	DESCRIPTION	DRAWN BY	CHECKED BY	DATE
	AS-BUILT	KDA	PRK	NOV 2004

AS-BUILT

ENGINEER SEAL

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Cincinnati, Ohio 45241
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PREPARED FOR:

SHEBOYGAN RIVER PROJECT
SHEBOYGAN FALLS, WISCONSIN

INTERCEPTOR TRENCH AND MONTORING WELLS PROFILE AS-BUILT

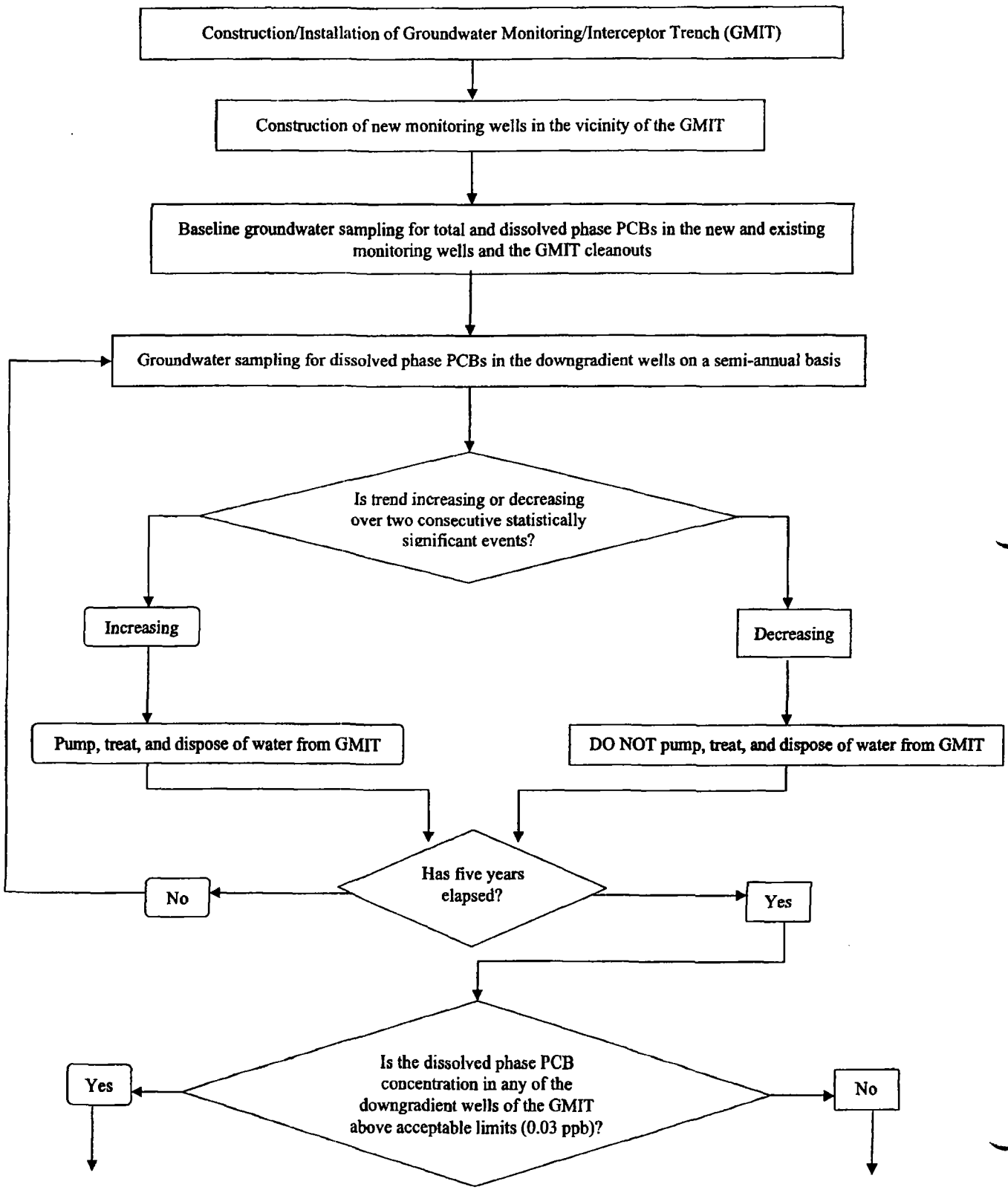
SCALE: AS S
PROJECT NUMB
02-010
SHEET NO:
AB-

(25) DOC ID (320148)

1177

Figure 6

FIGURE 1
Decision Tree for Operation of GMIT



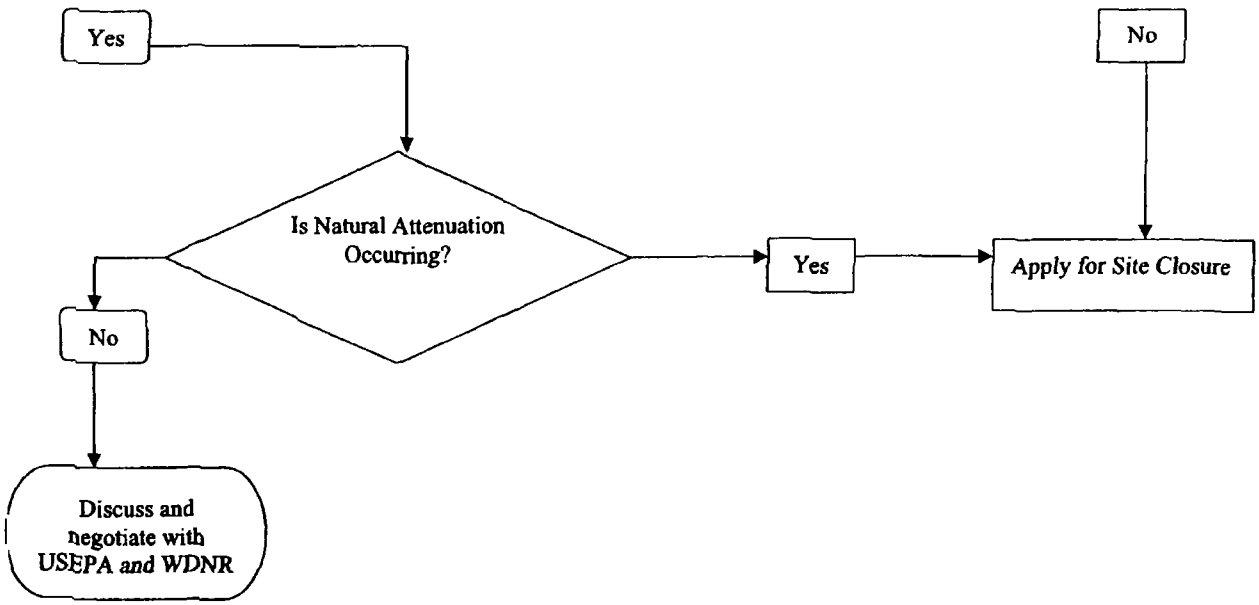
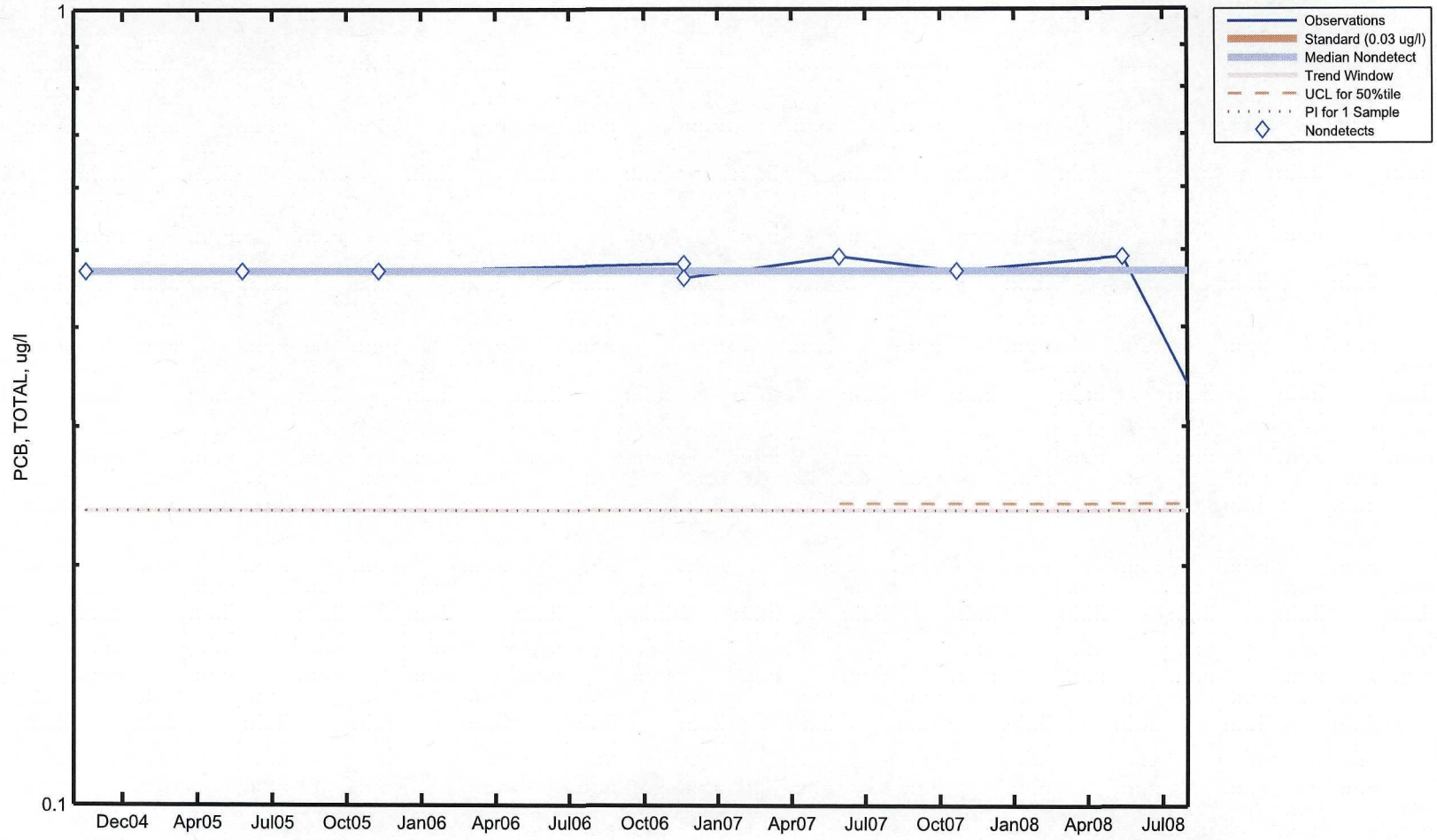

Yes
No
Is Natural Attenuation Occurring?
Yes
Apply for Site Closure
No
Discuss and negotiate with USEPA and WDNR

Figure 1 Sheboygan - Total PCBs in Groundwater (UCLs)

Figure 7

MW-9
PCB, TOTAL
Sheboygan Harbor & River

Standard
Baseline
Trend



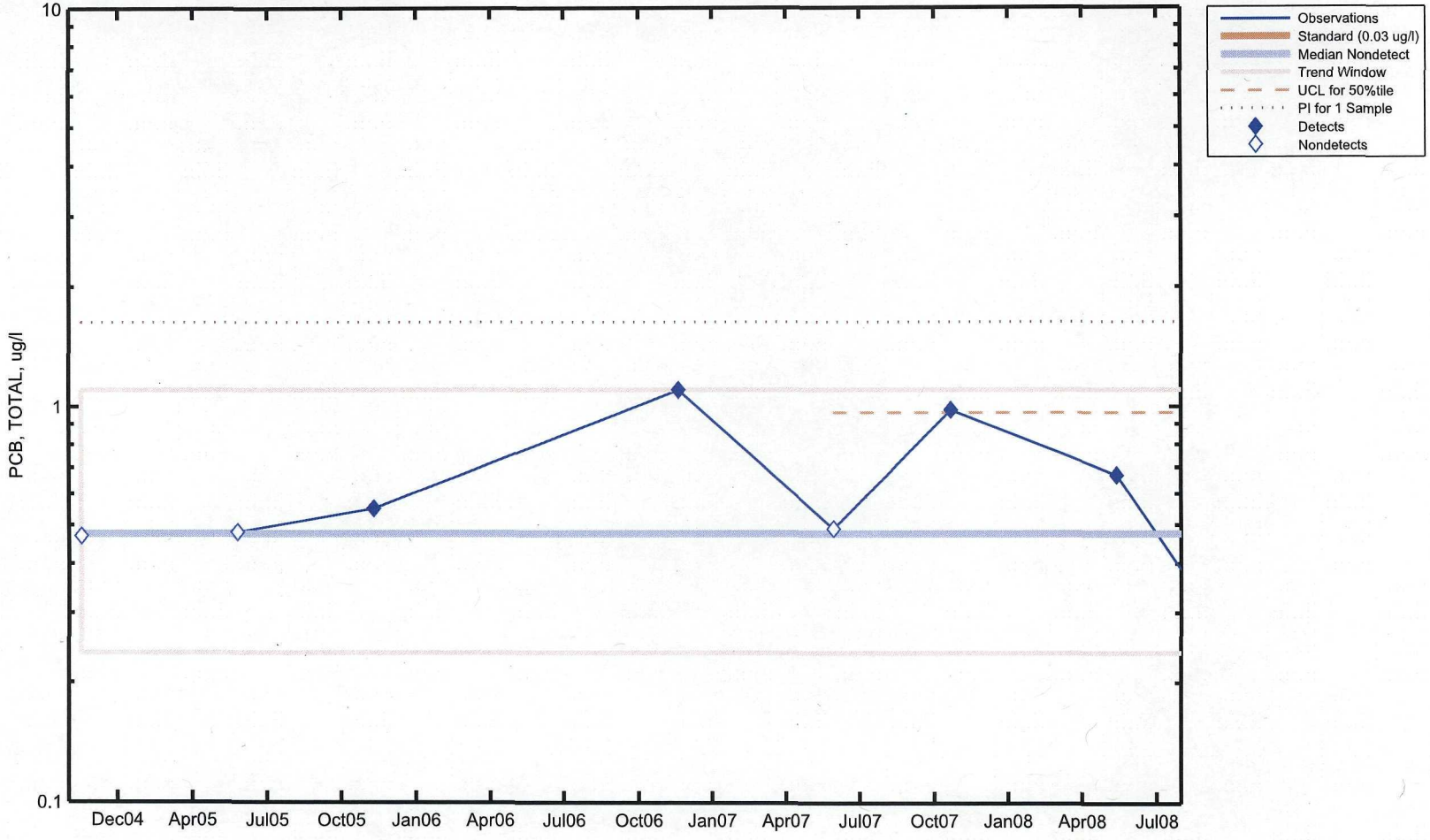
Standard Test (95%): None <UCL = 2.40e-001 ug/l>
Baseline Test (95%): No Change <UPL/LPL = 2.35e-001/2.35e-001 ug/l>
Trend Test (80%): No Trend <Slope = 0.00e+000 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 8

MW-10
PCB, TOTAL
Sheboygan Harbor & River

Standard
Baseline
Trend

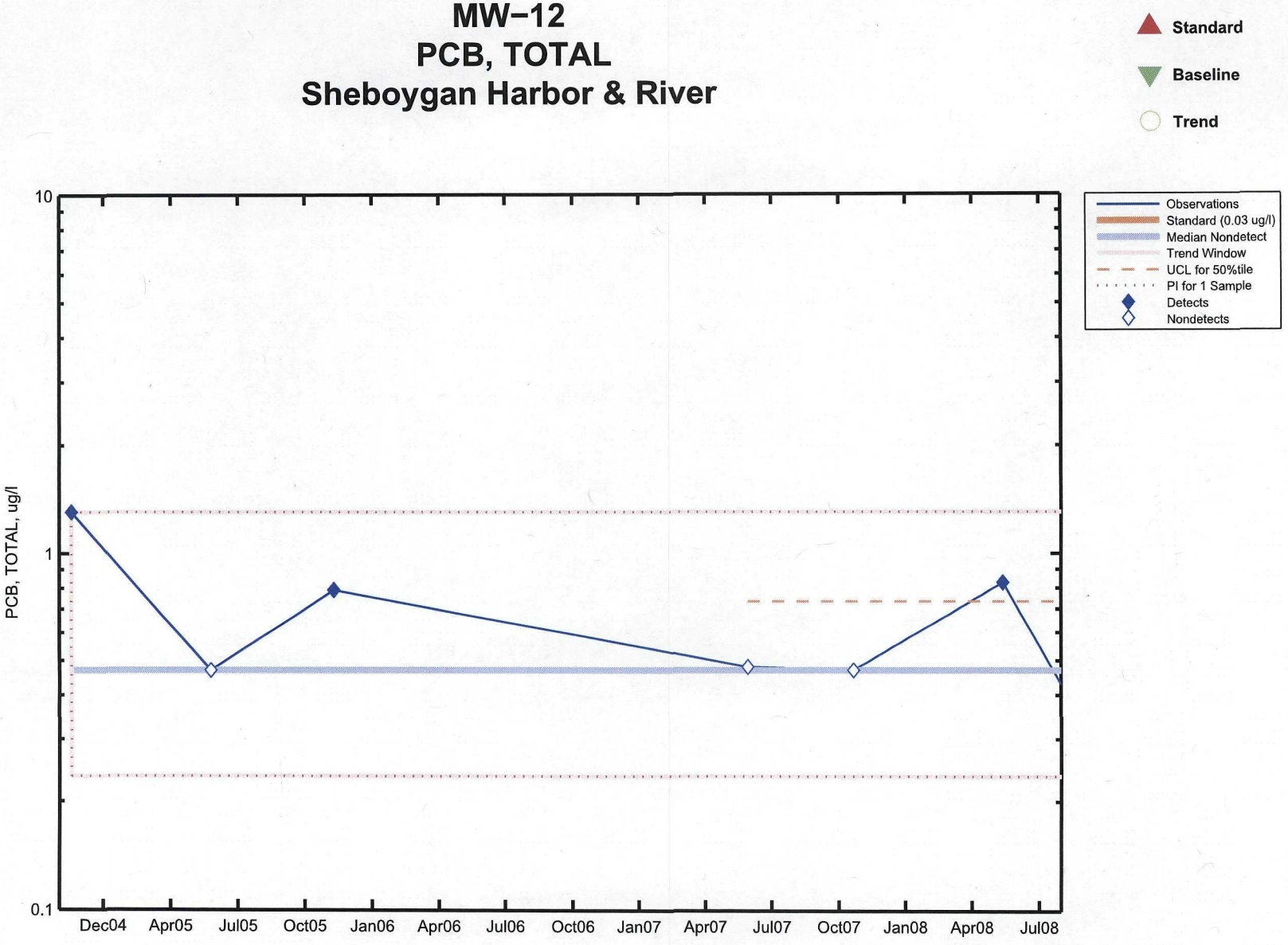


Standard Test (95%): Exceedance <UCL = 9.65e-001 ug/l>
Baseline Test (95%): No Change <UPL/LPL = 1.63e+000/0.00e+000 ug/l>
Trend Test (80%): No Trend <Slope = 0.00e+000 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 9

MW-12
PCB, TOTAL
Sheboygan Harbor & River



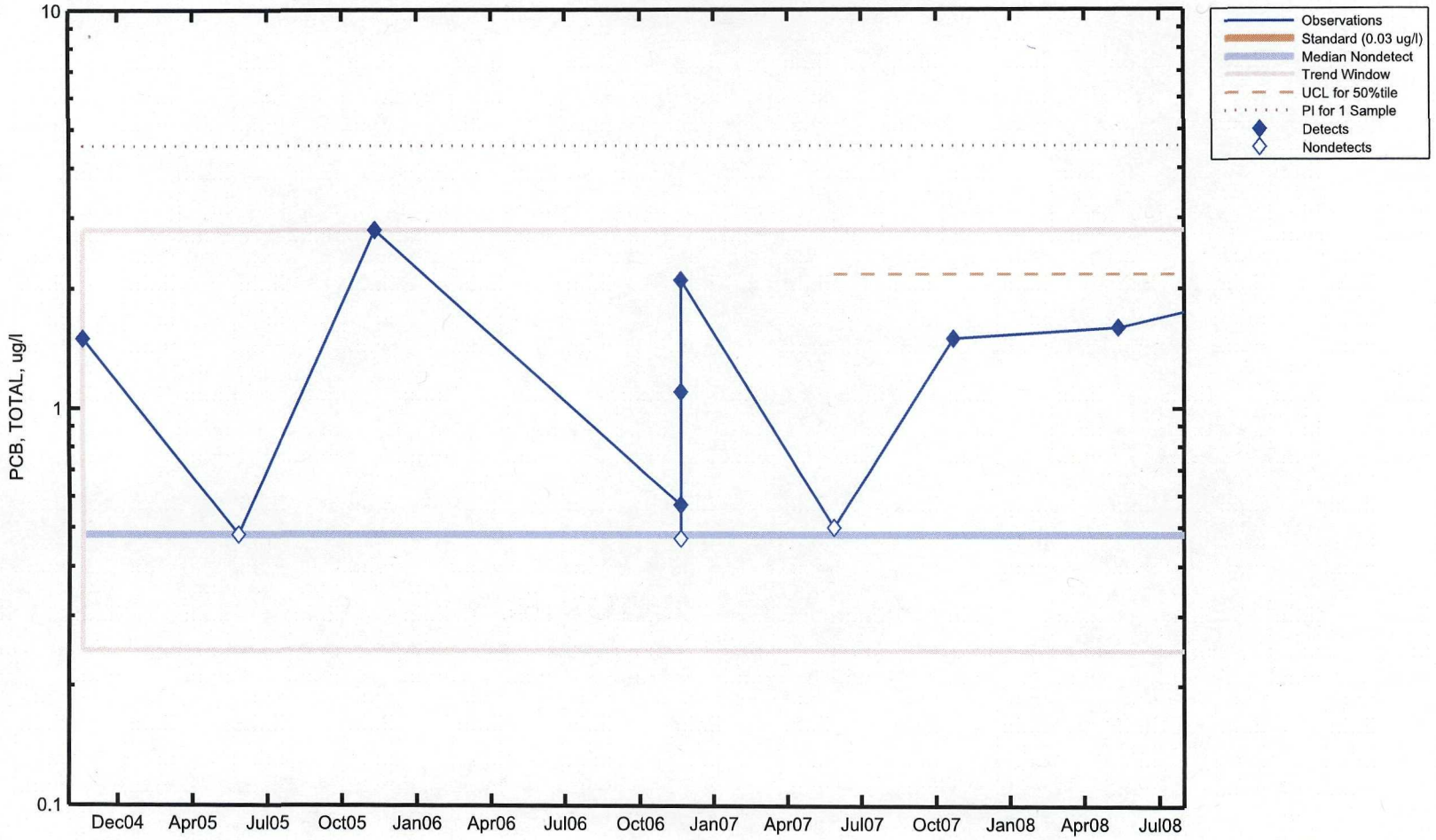
Standard Test (95%): Exceedance <UCL = 7.34e-001 ug/l>
Baseline Test (95%): Better <UPL/LPL = 1.30e+000/2.35e-001 ug/l>
Trend Test (80%): No Trend <Slope = 0.00e+000 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 10

MW-13
PCB, TOTAL
Sheboygan Harbor & River

Standard
Baseline
Trend



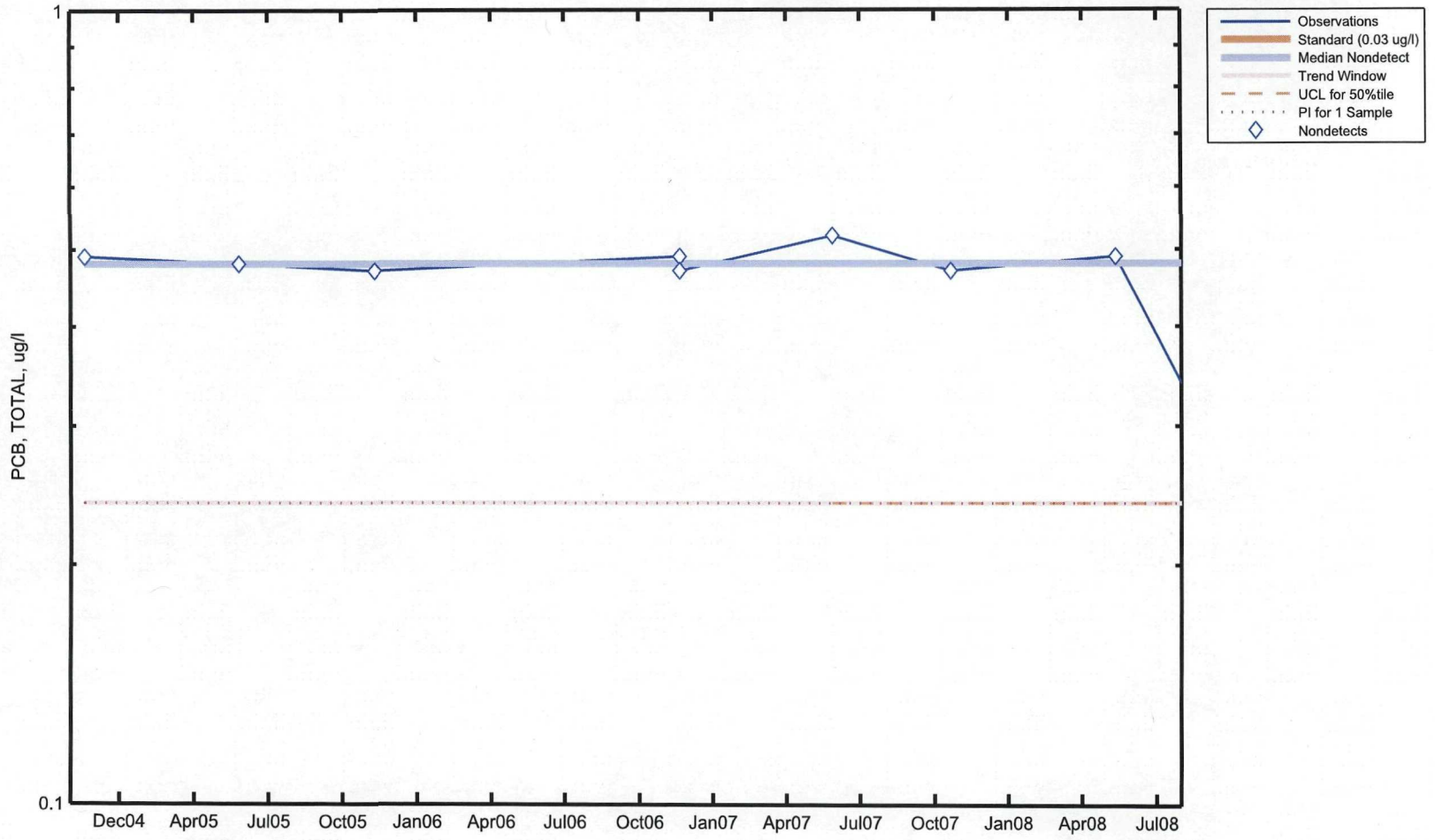
Standard Test (95%): Exceedance <UCL = 2.17e+000 ug/l>
Baseline Test (95%): No Change <UPL/LPL = 4.54e+000/0.00e+000 ug/l>
Trend Test (80%): No Trend <Slope = 1.17e-001 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 11

MW-16
PCB, TOTAL
Sheboygan Harbor & River

Standard
Baseline
Trend



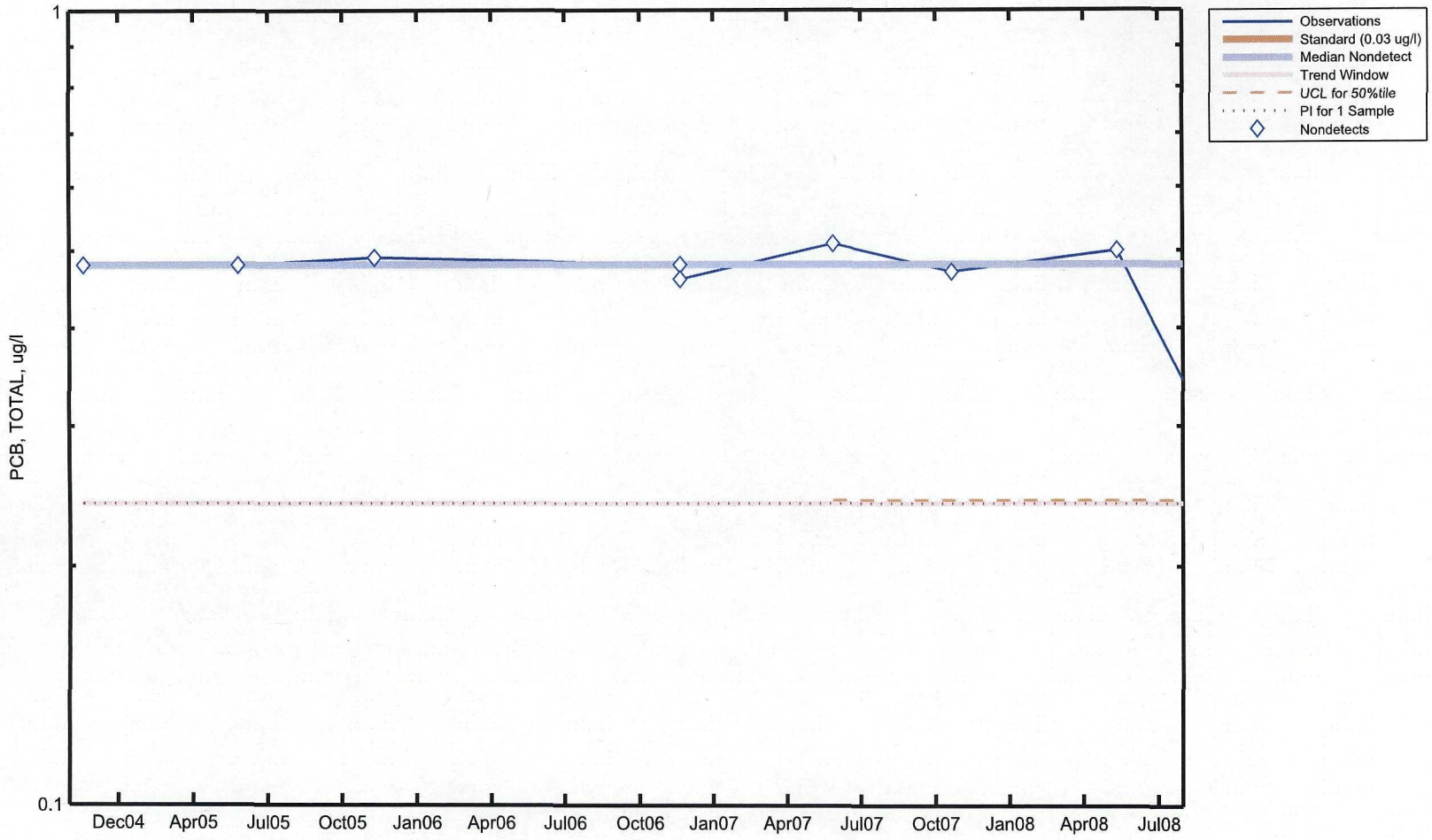
Standard Test (95%): None <UCL = 2.40e-001 ug/l>
Baseline Test (95%): No Change <UPL/LPL = 2.40e-001/2.40e-001 ug/l>
Trend Test (80%): No Trend <Slope = 0.00e+000 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 12

MW-17
PCB, TOTAL
Sheboygan Harbor & River

Standard
Baseline
Trend



Standard Test (95%): None <UCL = 2.42e-001 ug/l>
Baseline Test (95%): No Change <UPL/LPL = 2.40e-001/2.40e-001 ug/l>
Trend Test (80%): No Trend <Slope = 0.00e+000 log-ug/l/year>
Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 26-Mar-2009
Prepared by: US EPA, Region 5

Figure 13

Sheboygan Harbor & River									
Analyte Name	Well ID	Units*	Trend Test (80% Confidence)		Compare-to-Standard Test (95% Confidence)			Compare-to-Baseline Test (95% Confidence)	
			Result	Slope Estimate (Units*/Yr)	Result	UCL (Units*)	Standard (Units*)	Result	UPL (Units*)
PCB, TOTAL	MW-10	ug/l	No Trend	0#	Exceedance	0.9653	0.03	No Change	1.628
PCB, TOTAL	MW-12	ug/l	No Trend	0#	Exceedance	0.7338	0.03	Better	1.3
PCB, TOTAL	MW-13	ug/l	No Trend	0.1172#	Exceedance	2.17	0.03	No Change	4.543
PCB, TOTAL	MW-16	ug/l	No Trend	0#	None	0.24	0.03	No Change	0.24
PCB, TOTAL	MW-17	ug/l	No Trend	0#	None	0.2425	0.03	No Change	0.24
PCB, TOTAL	MW-9	ug/l	No Trend	0#	None	0.24	0.03	No Change	0.235

NOTES:

means trend coefficient of log-transformed data. Log(2) times its reciprocal is doubling(+)/halving(-) time.

Statistical Note: ND surrogate = 0.5 X Median of Nondetects' PQLs.

These results obtained on 03/26/2009.

Table 1