

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>SHIAWASSEE RIVER</u>	ProjectID: 05-15
Last Updated:	10/14/02	
City:	Howell, et al.	
County:	Livingston	
State:	MI	
Country:	USA	
Bodies of Water:	South Branch Shiawassee River	
US EPA Region:	V	
Status (Active, Complete, or Monitoring Only):	Active	
Date On NPL:	1983	
ROD/ESD Date:	2001	
Operable Unit:	N/A	
Areas of Concern (length or acres):	South Branch of the Shiawassee River from the Cast Forge Company plant property and downstream for 8 miles.	
Other Characteristics of Water Body:	The South Branch Shiawassee River is characterized by bars and mudflats, as well as moderate scour areas. Water depth is typically several feet. Considerable blockage occurs as a result of deadfalls and beaver activities. The river ranges from 20-45 feet in width, with the floodplain ranging from approximately 100 to 300 feet in width. Flow data for 1982 indicate nominal flow at 15 cubic feet per second (cfs) and spring flood at 75 cfs. Much of the river bank is private property and undeveloped. Vehicular access points are only at bridges on cross roads.	
Contaminants of Concern:	PCBs (1242/1248/1254)	
Source of Contamination:	PCBs in wastewaters, which originated in hydraulic fluids used in die-casting operations on the Cast Forge Company property. Also, PCBs were detected in an unlined evaporative lagoon on the property which received PCB-contaminated process waters. The lagoon occasionally overflowed into a drainage ditch that discharged to the river.	
Contaminated Area Physical Characteristics:	<p>Reference A-1 reports that historical sediment sample data show that low-level (not defined, but apparently <5 ppm) PCB contamination is present in most of the 8 mile study section. Higher concentrations (>5 ppm) are located within 6,000 feet of the former Cast Forge Company (CFC) facility and are also concentrated in three areas further downstream. Reference A-1 also reports that measurable PCB contamination is present throughout the floodplain in the study area downstream of the former CFC facility (measurable PCBs in 232 of 372 samples). Reference A-1 also concluded, based on 28 sediment samples collected in 1994 for comparison with historical data, that sediment PCB concentrations in 1994 were about an order of magnitude less than in 1987.</p> <p>White sucker fillets, collected and analyzed in 1994, exhibited PCBs ranging from 1.2 to 5.0 ppm PCBs.</p> <p>The Reference A-349 Proposed Plan reports that "PCB contamination was detected above 10 ppm in sediments within 0.21 miles of the plant, between 5 and 10 ppm from 0.21 to 0.91 miles of the plant, and between 1 ppm and 5 ppm from a distance of 0.91 to 3.5 miles downstream from the plant." Reference A-349 also reports "residual PCB concentrations of concern in wetlands east of the plant and in the floodplain at the point where a discharge pipe from the lagoons once existed" and that "... the contamination in the wetland area, unless stabilized, could serve as a continuing source of contamination to the river."</p>	

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Additional sampling in 1999-2000 showed five locations in the floodplain with PCB levels at or above 10 ppm, i.e., 10, 11, 11, 13, and 99 ppm; and six locations in river sediment, i.e., 13, 14, 26, 46, 100, and 300 ppm. These occurred in the first 1.5 miles downstream of the CFC site.

Based on the comparison of sampling data from 1988 and 1999-2000, the PCBs appear to be dispersing downstream of the CFC facility, without accumulating in any particular location. Sampling in the Shiawassee town Reservoir and Shaw Lake downstream of the CFS facility, which would act as sediment traps for material moving downstream, showed primarily non-detectable levels of PCBs.

Type of Regulatory Action: Superfund. Final. Originally State-Lead; EPA-Lead as of 1999.

Overall Status Summary: The site comprises the former Cast Forge Company (CFC) aluminum die-cast facility and 8 miles of the South Branch Shiawassee River. A Consent Judgment in 1981 led to a removal action in the river with a cleanup goal of 10 ppm PCBs. The removal action was stopped at the end of 1982 due to exhaustion of funds and the presence of PCB contamination extending further downstream than anticipated. The removal action was accomplished by use of a dragline and by vacuuming by divers and resulted in removal of 1,805 cy of sediments over a 1.5 mile stretch. The removed sediments which exceeded 50 ppm PCBs (260 cy) were disposed at the CECOS landfill in Williamston, OH. The remainder of the removed sediments were disposed at the Granger Landfill near Lansing, MI. A University of Michigan follow-up study (Reference C-324) showed an increase in the bioavailability of PCBs following the removal action.

The site became an NPL site in 1983. The MDEQ acted as the lead agency in managing the RI/FS. The RI was completed in 1992 and the FS in 1997. A Proposed Plan for both the plant facility and the river was issued by the MDEQ for public comment in August 1998. The proposed remedy was to remove soils and sediments from wetlands, floodplains, and 8 miles of river which exceed 10 ppm PCBs and dispose of removed materials at offsite commercial facilities. The basis for selecting a 10 ppm PCBs cleanup level was not clearly explained in the Proposed Plan. However, it was proposed that at each location requiring removal, the ecological impacts of the removal would be evaluated and removal would be implemented only at locations where ecological harm is judged to be not excessive.

In response to a February 1999 inquiry regarding the status of the Proposed Plan, the MDEQ advised that a number of issues had developed which would require substantial time to resolve. As a result, the MDEQ advised, a response to public comments and a ROD would be indefinitely delayed. Subsequently, a July 1999 Information Bulletin (Reference B-4) clarified the status of the proposed remedy as follows:

"The MDEQ, acting as the lead agency, had proposed a remedy to the public in September 1998, and had hoped to make a decision on the best approach to clean up the river and issue a Record of Decision for the site early in 1999. The MDEQ felt the existing data about the site was adequate to demonstrate that a cleanup was needed, and that the existing RI/FS provided a foundation for the cleanup concept proposed in September. The MDEQ proposal was to address, in some manner, site soils and sediments at locations where they were concentrated at high levels. The EPA agreed with that at the time, and supported the cleanup proposal that the MDEQ presented to the public. The MDEQ was aware, and acknowledged at the public meeting, that additional and more current site information would be needed prior to actual implementation of a clean up action, but had planned to obtain the additional data during the predesign phase - after an appropriate remedy had been selected. However, due primarily to comments submitted by various parties during the public comment period on the proposed plan, the EPA now feels further study is necessary to update and confirm the extent of contamination before a cleanup plan can be selected. The comments generally questioned the

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site data and the risks posed by the site, and the need for, and cost of, the proposed remedy. While the MDEQ was prepared to respond to the comments, the EPA felt that new studies were needed. Therefore, a final decision on a remedy has been postponed until further investigation is done and the cleanup options are reevaluated."

"For the MDEQ to undertake the additional work, it would be necessary to amend our Cooperative Agreement with the EPA, wait for the funding to be approved, and then initiate the state procurement process to obtain a contractor. Due to the time frame for these things to occur, it is unlikely that the additional studies could have been done this year. Because the EPA is able to directly assign a contractor and start work immediately, the lead management role for the site has been returned to the EPA."

The US EPA performed additional sediment and floodplain sampling in November 1999 through April 2000. These data were reported in May 2000 (Data Evaluation Report). A Supplemental FS was completed in February 2001. A Proposed Plan was issued in July 2001. The ROD was issued in September 2001.

The selected remedy is excavation of an estimated 1,755 cy of floodplain soil to meet a 10 ppm PCB cleanup criterion and an estimated 1,590 cy of river sediment in the first mile below the CFC site to meet a 5 ppm PCB criterion. Excavated material would be disposed at offsite commercial landfills. The estimated cost is \$517,000. The EPA calculates that removal of this volume of river sediment from the one mile stretch of river would reduce the overall Surface Weighted Average Concentration (SWAC) for the first five miles of the river (downstream from the CFC site) from 3 ppm PCBs to 1.06 ppm PCBs. As stated in the ROD, "U.S. EPA is relying on monitored natural recovery to reduce the SWAC to within the (calculated, protective) range of 0.003 to 0.2 ppm after active remediation of the sediments to 5 ppm for the first river mile." Reduction to the protective range is calculated to take 18 and 7 years, respectively, following remediation, and is based on reaching the long term total PCB Preliminary Remedial Goal (PRG) range of 0.002 to 0.3 ppm for mink..

The Remedial Design/Remedial Action Work plan was approved by the USEPA on August 20, 2002. Sediments will be removed by dry excavation using PortaDam™ structures to divert water flow. Remedial construction is scheduled to start in Fall 2002.

Remedial Action Planned: ☒

Risk Assessment: ☒

Remedial Action Implemented: ☐

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

References: ☒

Modeling: ☐

Fishing Advisory: ☒

Key Conditions: commercial landfill, extended (> 1 mile) river, floodplains targeted, more-harm-than-good, natural recovery, property access issues, wetlands

REMEDIAL ACTION PLANNED

Project Name	<u>SHIAWASSEE RIVER</u>	ProjectID: 05-15
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Target Sediment Cleanup Standards (TSCS):	10 ppm PCBs (Original 1998 Proposed Plan); 5 ppm PCBs (2001 ROD)	
How TSCS Established:	Not determined	
Target Bank and Floodplain Cleanup Levels (if applicable):	10 ppm PCBs (Original 1998 Proposed Plan and subsequent 2001 ROD)	
Other Target:	None	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment: References A-1, A-122, A-123, A-124, A-391, and A-611• Water: References A-1, A-122, A-123, A-124, and A-391• Fish: References A-1, A-122, A-123, A-124, and A-391	
Estimated Target Volume:	1,755 cy floodplain soils; 1,590 cy sediments (2001 ROD)	
Planned Disposal Method:	Offsite commercial disposal facilities	
Estimated Calendar Time to Implement Remedy:	Undefined	
Estimated Time to Implement Remedy:	Undefined	
Estimated Cost to Implement Remedy:	\$10.9 million (Original 1998 Proposed Plan); \$517,000 (2001 ROD)	
Stated Remedial Action Objectives (and Source):	<p>Source: Reference A-349 (Original 1998 Proposed Plan): "The removal of PCB sediments in areas at or above 10 ppm, down to 1 ppm, would be effective in reducing the concentrated areas of PCBs, which in turn will reduce the toxicity and mobility of PCBs in the river and floodplains. These actions would reduce the potential for exposure to PCBs through consumption of contaminated fish, or skin contact with PCB contaminated sediment. It will result in a significant reduction of PCB contamination in the South Branch of the Shiawassee River."</p> <p>"Alternative SR-1A by itself may not be protective of human health to the extent required by the federal National Contingency Plan (NCP), which is the basis on which EPA determines acceptable risk ranges for remedial actions at Superfund sites. Therefore, in any areas where contamination remains an exposure concern, institution controls and fish advisories will be applied, for as long as necessary, to supplement the protectiveness provided by the PCB removal."</p> <p>Source: Reference A-745 (the 2001 ROD): "The remedial action objective is to 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 sediment will be remediated so that the five mile reach beginning at M-59 of the river will reach an average PCB sediment concentration of approximately 1 ppm immediately after active remediation and utilize monitored natural recovery over time to achieve the long-term PRGs. The long-term PCB PRG range for the Shiawassee River sediment, 0.003 to 0.2, is based on protecting mink through dietary consumption of fish."</p>	

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	<p>“A long-term monitoring plan will be developed during remedial design to ensure that natural recovery is adequate to meet the long-term cleanup range in a reasonable timeframe and that these levels remain protective of mink or other appropriate ecological receptors. In addition, attaining the levels which are protective of ecological receptors will eliminate the need for fish consumption advisories for recreational fishing. The historical trend of all the data based on previous sampling events shows the PCB contamination to be decreasing steadily, and therefore, natural recovery is an appropriate component of the remedy.”</p>	
Measures of Success to be Used:	Undefined	
Planned Monitoring and Restoration:	Undefined, except "where wetlands are excavated, they will be restored."	
Agency Position on Sediment Removal (and Source):	<p>Source: Reference A-349 (Original 1998 Proposed Plan): "The action level of 10 ppm will identify a location where removal of soils and sediments would be triggered, however, an attempt will be made to reduce PCB contaminant levels to the goal of 1 ppm, or to non-detection, if possible. At each location, the ecological impacts of excavation and dredging will be evaluated. Where ecological harm will not be excessive, then removal will be implemented at that location. A balance between the goal of contaminant removal and preservation of ecological stability will be struck to effect remedial actions appropriate to this river system. Additional investigative work will be done during design and remedial action to identify where areas above the 10 ppm action level are located."</p> <p>Source: References A-1 and A-123: A 1981 Consent Judgment directed that Cast Forge remove PCB-contaminated muck from the discharge area west of the plant and from the river. In January 1982, A-1 Disposal of Plainwell, Michigan, was awarded a contract by Cast Forge to perform remediation of the discharge area west of the plant and the river. The goal of this removal action was to reduce the concentration of PCBs in sediments for a distance of eight miles downstream of Cast Forge to less than 10 ppm. A-1 used a backhoe to remove PCB-contaminated material from around the discharge area and a dragline to remove contaminated sediments from an area in the river near Bowen Road approximately one mile downstream. In addition, small pockets of stream sediments exhibiting an oily appearance were vacuumed from the river bed in the section of the river between Cast Forge and Bowen Road. Solids from the vacuum operation were spread on a sand and gravel pad for dewatering. Water which drained from the solids was pumped through activated carbon and discharged to the ground north of the Cast Forge plant. The dewatered solids and spent carbon were then transported to a commercial landfill permitted to take PCB-contaminated wastes.</p> <p>The removal effort resulted in the removal of an estimated 2,531 pounds of PCBs in 1,805 cy of river sediment and 500 cy of sand and gravel from the dewatering pad. The contaminated sediments, sand, and gravel were segregated into two fractions. One fraction with PCB concentrations in excess of 50 ppm totaled 260 cy, and the other 2,045 cy of solids had PCBs <50 ppm. The former were shipped to the CECOS landfill in Williamston, OH. The latter were shipped to Granger Landfill near Lansing, MI. A total of 910,000 gallons of liquids were treated and discharged to the ground surface.</p> <p>Although intended to clean up a total of eight miles of the river, the remediation project stopped at the end of 1982 with only 1.5 miles of river remediated. Cost overruns and the presence of contamination extending farther than initially anticipated were identified as reasons for the incomplete removal action. Total cost was reportedly \$750,000.</p>	

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In order to assess the effectiveness of the cleanup performed by A-1, MDNR contracted with the University of Michigan (UM) to measure PCB concentration changes in fish and surface water and to evaluate the potential for bioaccumulation of PCBs in the river ecosystem. For this purpose, caged clam and fish studies were performed in the river before, during, and after the stream sediment remediation effort. Results are reported in Reference C-324. At all locations downstream from the site and in the area of dredging, the UM study indicated an increase in the bioavailability of PCBs following dredging. At the Bowen Road sampling location, for example, the concentration of PCBs in the fish (fat head minnows) went from 64.5 ppm dry weight to 87.95 ppm dry weight after dredging. PCB concentrations in caged clams taken from sampling locations approximately 1/4-mile downstream from Cast Forge ranged from 13.82 ppm dry weight to 18.30 ppm dry weight.

Data on PCBs in the water column were less conclusive and at variance with the organism studies. There was no noticeable increase in total PCB concentrations in water samples at Bowen Road after dredging (1.10 ppb pre-dredge vs. 1.11 ppb post-dredge), and at Chase Lake Road there was a slight decrease in the measured PCBs (0.65 ppb vs. 0.52 ppb). No sediment sampling data were collected during this study.

Source: Reference A-745 (2001 ROD):

“Capping sediment with PRGs of 5 and 1 ppm was determined not to be practical since this would entail raising the streambed substantially over long reaches and cause flooding or streambed stability problems.”

“U.S. EPA does not believe that removing sediments beyond those identified in this remedy will result in additional risk reduction immediately after completion of excavation and/or dredging. The reductions in SWAC immediately after completion of excavation and/or dredging using a 5 ppm PRG for the first five miles would lower the SWAC from 1.06 to 0.99 ppm, or if a 1 ppm PRG were used the SWAC immediately after completing excavation and or dredging to a range of 0.7 to 0.97 ppm. However, remediation costs would increase significantly if additional sediments were removed. In addition, cleanup in the additional river miles would require greater disturbance of the river and floodplain such as the need for access for construction equipment.”

RISK ASSESSMENT

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RA Type: Human Health and Ecological

RA Status: Complete

RA Objectives: Estimate the risk posed to human health and the environment associated with contamination of the Cast Forge property and the 8 mile reach of the South Branch Shiawassee River.

Company Pace, Inc. and Warzyn, Inc.

Performing RA:

RA Reference Report: References A-122 and A-745 (2001 ROD)

RA Summary and Source: Executive Summary in Reference A-122:

Conclusions:

"HUMAN HEALTH EVALUATION

Risks were assessed based on current land use conditions, for adolescents swimming in the River, and for adolescents trespassing in the wetlands adjacent to the Cast Forge property or trespassing on the Cast Forge property itself. Based on concentrations of PCBs in affected media (i.e., floodplain sediment, river sediment, fish, beef, milk, garden produce, and soil), and the assumptions used to quantify Site risks, risk levels greater than 10^{-6} (i.e., greater than one-in-a-million) were evident. The risk assessment indicates that nearby residents have the highest potential risk. The majority of the cancer risk for nearby residents is associated with consumption of fish caught in the contaminated reach of the River." (Note: An estimated risk of 3.5×10^{-2} ; HI of 4.6.) "Other pathways of concern for this subpopulation in order of highest to lowest risk are vegetable consumption, milk consumption, beef consumption, incidental ingestion of floodplain sediment, and dermal contact with flood plain sediment." (Note: An estimated risk of 4.9×10^{-3} ; HI of 0.5.)

"Noncancer health risks were also estimated for the same human subpopulations. Based on the findings of the risk assessment, consumption of fish by nearby residents was the only exposure pathway that was estimated to potentially cause health noncancer effect."

"ECOLOGICAL ASSESSMENT

PCBs were found in fish samples collected at Marr Road (about 3 miles downstream). The limited sampling of riverine fish does not indicate mortality to the fish population present. Results of the fish samples indicate continued transport of PCBs in the riverine system. A probable pathway for PCB transport is uptake of PCBs from sediment by benthic organisms and ingestion of these contaminated organisms and/or sediments by fish populations. Channel sediments from the South Branch Shiawassee River exceed sediment quality criteria derived by the equilibrium partitioning procedure, suggesting the role of channel sediments in the continued transport of PCBs in the riverine environment and their potential toxicity to aquatic macroinvertebrates."

Source: Reference A-745 (2001 ROD):

For carcinogenic risk "The future exposure scenario included a hypothetical individual who constructs a home on the Cast Forge property at some point in the future. This individual would be expected to come into contact with PCBs via their presence in soil, fish, backyard vegetables, beef, and milk. The overall excess lifetime cancer risk calculated for this receptor is (4.1×10^{-2}) . A non-carcinogenic chronic hazard index of 5.0 was estimated for this receptor with PCB contamination from fish providing the majority of the risk."

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“The current use scenario modeled an individual who currently lives near the Shiawassee River. This individual is presumed to come into contact with PCBs via their presence in soil, fish, backyard vegetables, beef, and milk. The overall excess lifetime cancer risk calculated for this receptor is (4.1×10^{-2}) . A non-carcinogenic chronic hazard index of 5.2 was estimated for this receptor with PCB contamination from fish providing the majority of the risk.”

“The ecological risk assessment was based upon the results of sampling of the Shiawassee River fauna (native fish and crayfish) conducted in April and May 1994. For the purpose of this assessment, Sediment Quality Objectives considered to be protective of wildlife and human receptors utilizing the aquatic resources of the river were developed for the PCB contaminated sediments. The range of values calculated for Sediment Guideline Values and Sediment Quality Guideline Values, as well as National Oceanic and Atmospheric Administration Effects levels and the State of Washington Sediment Quality Criteria, range from 0.0009 to 0.553 ppm. Comparison of these values with the sediment PCB data . . . shows that the Shiawassee River sediments have the potential to cause adverse effects in aquatic biota, fish-eating wildlife and humans consuming fish from the river.”

“ . . . the Preliminary Remediation Goals (PRGs) for the Shiawassee River Site were developed in August 2000. These PRGs are the result of a re-evaluation of the ecological risk assessment performed in 1995. The (new) ecological risk assessment identifies a range of 0.003 to 0.2 ppm as being protective of ecological receptors.”

POTENTIALLY RESPONSIBLE PARTIES

Project Name **SHIAWASSEE RIVER**

ProjectID: 05-15

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **SHIAWASSEE RIVER**

ProjectID: 05-15

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: A

ReferenceID: 1

Title: *Development of Sediment Quality Objectives for PCBs for South Branch Shiawassee River*

Location: AEM

Category: Contaminated Sediments: Remedial Options/Guidance

Prepared by/Author: Malcolm Pirnie Engineers

Preparer/Author Address: 411C West Lake Lansing Road
East Lansing, MI 48823

Prepared For: Michigan DNR

Date Published: June 1995

Key Words and Phrases:

Reference Type: A

ReferenceID: 122

Title: *Baseline Risk Assessment, South Branch Shiawassee River; Howell, Michigan, Report 12673*

Location: AEM

Category: Site Update

Prepared by/Author: Pace, Inc. and Warzyn, Inc.

Preparer/Author Address:

Prepared For: Michigan DNR

Date Published: January 1992

Key Words and Phrases:

Reference Type: A

ReferenceID: 123

Title: *Remedial Investigation Report, South Branch Shiawassee River, Howell, Michigan, Volume I, 12673*

Location: AEM

Category: Site Update

Prepared by/Author: Warzyn, Inc.

Preparer/Author Address: Novi, MI

Prepared For: Michigan DNR

Date Published: January 1992

Key Words and Phrases:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: A

ReferenceID: 124

Title: *Remedial Investigation Report, South Branch Shiawassee River
Howell, Michigan, Volume II, 12673 (Appendices A through C6)*

Location: AEM

Category: Site Update

Prepared by/Author: Warzyn, Inc.

**Preparer/Author
Address:** Novi, MI

Prepared For: Michigan DNR

Date Published: January 1992

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 125

Title: *Remedial Investigation Report, South Branch Shiawassee River
Howell, Michigan, Volume III, 12673 (Appendices D through K2)*

Location: AEM

Category: Site Update

Prepared by/Author: Warzyn, Inc.

**Preparer/Author
Address:** Novi, MI

Prepared For: Michigan DNR

Date Published: January 1992

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 349

Title: *Proposed Plan for the Remedial Action at the Shiawassee River
Superfund Site*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: Michigan Department of Environmental Quality, Environmental Response
Division

**Preparer/Author
Address:** Lansing, MI

Prepared For: General Public

Date Published: August 1998

**Key Words and
Phrases:**

REFERENCES

Project Name **SHIAWASSEE RIVER**

ProjectID: 05-15

Reference Type: A
Title: *Revised Site Review and Update (selected pages)*
Location: AEM
Category: Site Update
Prepared by/Author: Michigan Department of Public Health and US ATSDR
Preparer/Author Address:
Prepared For: General Public
Date Published: August 29, 1994
Key Words and Phrases:

ReferenceID: 391

Reference Type: A
Title: *Polychlorinated Biphenyl-Contaminated Sediment Removal from the South Branch Shiawassee River (selected pages)*
Location: AEM
Category: Close-Out Report
Prepared by/Author: Environmental Research Group, Inc.
Preparer/Author Address: Ann Arbor, MI 48104
Prepared For: A-1 Disposal, Plainwell, Michigan
Date Published: 1982
Key Words and Phrases:

ReferenceID: 392

Reference Type: A
Title: *Development of Sediment Quality Objectives (two summary pages only)*
Location: AEM
Category: Cleanup Levels and Risks
Prepared by/Author: Malcolm Pirnie Engineers
Preparer/Author Address:
Prepared For: General Public
Date Published: June 1995
Key Words and Phrases:

ReferenceID: 393

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: A

ReferenceID: 611

Title: *Final Supplemental Feasibility Study Report for the Shiawassee River Site (CD-ROM)*

Location: AEM

Category: RI/FS

Prepared by/Author: Tetra Tech EM, Inc.

**Preparer/Author
Address:**

Prepared For: US EPA Region V

Date Published: February 2001

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 709

Title: *Decision Summary for the Record of Decision (CD-ROM)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region V

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 28, 2001

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 735

Title: *Administrative Order (Unilateral)*

Location: AEM

Category: Legal

Prepared by/Author: US EPA Region V

**Preparer/Author
Address:** Chicago, IL

Prepared For:

Date Published: April 2002

**Key Words and
Phrases:**

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: A

ReferenceID: 736

Title: *Proposed Plan Fact Sheet for the Shiawassee River Superfund Site*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region V

**Preparer/Author
Address:** Chicago, IL

Prepared For: General Public

Date Published: July 2001

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 740

Title: *Data Evaluation Report for Remedial Investigation/Feasibility Study, Shiawassee River Site, Howell, Michigan*

Location: AEM

Category: RI/FS

Prepared by/Author: Tetra Tech EM, Inc.

**Preparer/Author
Address:**

Prepared For: US EPA Region V

Date Published: May 18, 2000

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 745

Title: *Record of Decision: Remedial Alternative Selection - Shiawassee River Site, Howell, Michigan*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region V

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 28, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name **SHIAWASSEE RIVER**

ProjectID: 05-15

Reference Type: A
Title: **Remedial Design/Remedial Action Work Plan**
Location: AEM
Category: Remedial Action Plan/Work Plan
Prepared by/Author: ENTACT & Associates, LLC
Preparer/Author Address: 1360 North Wood Dale Road, Suite A
Wood Dale, IL 60191
Prepared For: US EPA Region V
Date Published: August 20, 2002
Key Words and Phrases:

ReferenceID: 899

Reference Type: B
Title: **River Cleanup Decision Delayed While EPA Conducts More Studies**
Location: AEM
Category: Site Update
Prepared by/Author: Michigan Department of Environmental Quality
Preparer/Author Address: Environmental Response Division
P. O. Box 30426
Lansing, MI 48909
Prepared For: General Public
Date Published: July 1999
Key Words and Phrases:

ReferenceID: 4

Reference Type: B
Title: **EPA National Priorities List: Shiawassee River**
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region V
Preparer/Author Address: Internet Website
Prepared For: General Public
Date Published: February 1996
Key Words and Phrases:

ReferenceID: 130

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: B

ReferenceID: 338

Title: *Comments re: Proposed Plan for the Remedial Action at the Shiawassee River Superfund Site, August 1998*

Location: AEM

Category: Response Comments

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Public Comment to MDEQ

Date Published: September 24, 1998

Key Words and Phrases:

Reference Type: B

ReferenceID: 362

Title: *Administrative Record (Index): South Branch Shiawassee River*

Location: AEM

Category: Miscellaneous

Prepared by/Author:

Preparer/Author Address:

Prepared For: General Public

Date Published: February 1998

Key Words and Phrases:

Reference Type: B

ReferenceID: 766

Title: *Realizing Remediation I - Great Lakes Contaminated Sediments South Branch Shiawassee River - Cast Forge (see Reference A-905)*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: US EPA Great Lakes National Program Office (GLNPO)

Preparer/Author Address: 77 West Jackson Boulevard (G-17J)
Chicago, IL 60604

Prepared For: General Public

Date Published: August 1, 2002

Key Words and Phrases:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: B
Title: *e-mail re: Question Re Shiawassee*
Location: AEM
Category: Site Update
Prepared by/Author: Thomas Williams
Preparer/Author Address: US EPA Region V
Prepared For: AEM, Inc.
Date Published: January 12, 2004
Key Words and Phrases:

ReferenceID: 1041

Reference Type: C
Title: *Mich. reviews plan for Shiawassee River*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: April 10, 1998
Key Words and Phrases:

ReferenceID: 69

Reference Type: C
Title: *PCB Availability Assessment of River Dredging Using Caged Clams and Fish*
Location: AEM
Category: Fish/Biota
Prepared by/Author: C.P. Rice and D.S. White
Preparer/Author Address: Great Lakes Research Division
University of Michigan
Prepared For: Environmental Toxicology and Chemistry, Vol. 6, No. 4, pp 259-274
Date Published: 1987
Key Words and Phrases:

ReferenceID: 324

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: C

ReferenceID: 547

Title: *MDEQ Identifies Three Superfund Sites With Quickest Funding for Contracts*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: May 21, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 548

Title: *EPA Takes Over Shiawassee RI/FS; Proposed Plan Expected in Spring*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: December 10, 1999

**Key Words and
Phrases:**

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: C

ReferenceID: 586

Title: *Sediment Remediation Can Improve Great Lakes Water Quality*

Location: AEM

Category: Miscellaneous

Prepared by/Author: (1) John H. Hartig, (2) Lisa Maynard, (3) Michael A. Zarull, (4) Gail Krantzberg

Preparer/Author (1) Greater Detroit American Heritage River Institute

Address: Detroit, MI

(2) International Joint Commission

Windsor, Ontario, Canada

(3) National Water Research Institute

Burlington, Ontario, Canada

(4) Ontario Ministry of Environment

Prepared For: Water Environment & Technology (WE&T)

Date Published: October 1999

**Key Words and
Phrases:**

Reference Type: E

ReferenceID: 123

Title: *Sediment Management Seminar 2000 Proceedings (Reference E-121)*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: Blasland, Bouck & Lee, Inc.

Preparer/Author 6723 Towpath Road

Address: P.O. Box 66

Syracuse, NY 13214

Prepared For: Attendees

Date Published: February 10-11, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: E

ReferenceID: 258

Title: ***Restoration of an Aquatic Ecosystem: Polyhlorinated Biphenyl Removal from the South Branch of the Shiawassee River***

Location: AEM

Category: Fish/Biota

Prepared by/Author: James C. Miller

Preparer/Author Address: O.H. Materials Company
Grand Rapids, MI 49508

Prepared For: 1984 Hazardous Material Spills Conference: Prevention, Behavior, Control and Cleanup of Spills and Waste Sites

Date Published: April 1984

Key Words and Phrases:

Reference Type: H

ReferenceID: 9

Title: ***Map of South Branch Shiawassee River (Figure 1)***

Location: AEM

Category: Miscellaneous

Prepared by/Author: Michigan Department of Public Health

Preparer/Author Address:

Prepared For: Revised Site Review and Update Report

Date Published: February 4, 1993

Key Words and Phrases:

Reference Type: L

ReferenceID: 45

Title: ***Memo re: Shiawassee River***

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc. (Maribeth Dobbins)

Preparer/Author Address: Malvern, PA 19355

Prepared For: Internal file

Date Published: August 5, 1997

Key Words and Phrases:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: L

ReferenceID: 91

Title: *Memo re: Precedent for Extended Sediment Remediation in Rivers and Streams*

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: August 15, 2000

Key Words and Phrases:

Reference Type: L

ReferenceID: 169

Title: *Summary of Major Revisions to RODs and Proposed Plans - Sediment Sites*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Internal Distribution

Date Published: April 13, 2001

Key Words and Phrases:

Reference Type: L

ReferenceID: 207

Title: *Results of Research for Short-Term Impacts on Sediment and Fish PCB Concentrations Due to Sediment Removal*

Location: AEM

Category: Fish/Biota

Prepared by/Author: AEM, Inc.

Preparer/Author Address:

Prepared For: File

Date Published: March 19, 2001

Key Words and Phrases:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: M

ReferenceID: 257

Title: *Environmental Dredging: An Evaluation of Its Effectiveness in Controlling Risks*

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author: Blasland, Bouck & Lee, Inc.

Preparer/Author Address: 6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214

Prepared For: General Electric Company

Date Published: August 2000

Key Words and Phrases:

Reference Type: M

ReferenceID: 348

Title: *Memo re: Summary of the Impacts of Remedial Dredging*

Location: AEM

Category: Miscellaneous

Prepared by/Author: Quantitative Environmental Analysis, LLC.

Preparer/Author Address:

Prepared For: Internal Distribution

Date Published: February 27, 2001

Key Words and Phrases:

Reference Type: M

ReferenceID: 353

Title: *Assessment of the Effectiveness of the Cleanup of the PCBs from the South Branch of the Shiawassee River - Field Results*

Location: AEM

Category: Fish/Biota

Prepared by/Author: Clifford P. Rice, David S. White, Milagros S. Simmons, and Ronald Rossmann

Preparer/Author Address: Great Lakes Research Division
Institute of Science and Technology
The University of Michigan
Ann Arbor, MI 48109

Prepared For: Michigan Department of Natural Resources, Water Quality Division

Date Published: October 1984

Key Words and Phrases:

REFERENCES

Project Name SHIAWASSEE RIVER

ProjectID: 05-15

Reference Type: M

ReferenceID: 419

Title: *Results of Contaminated Sediment Cleanups Relevant to the Hudson River:
South Branch of the Shiawassee River, Michigan*

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author: Joshua Cleland

**Preparer/Author
Address:**

Prepared For: Scenic Hudson
9 Vassar Street
Poughkeepsie, NY 12601

Date Published: October 2000

**Key Words and
Phrases:**

Reference Type: S

ReferenceID: 1

Title: *Consent Judgment: Michigan vs Cast Forge, Incorporated*

Location: AEM

Category: Legal

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Circuit Court for the County of Livingston

Date Published: June 1981

**Key Words and
Phrases:**

FISH ADVISORIES

Project Name ***SHIAWASSEE RIVER***

ProjectID: 05-15

Advisory: Shiawassee River, South Branch

AdvisoryID: 1026

Extent: M-59 to Byron Road

Pollutant: PCBs (total)

Species: all fish

Population: NCSP

Population Definition: No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.

Advisory Type: River

Advisory Number: 265

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: David R. Wade

Contact Number: 517-335-8834

Advisory: Shiawassee River, South Branch

AdvisoryID: 169

Extent: M-59 to Byron Road

Pollutant: PCBs (total)

Species: all fish

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: River

Advisory Number: 265

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: David R. Wade

Contact Number: 517-335-8834
