

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>PIONEER LAKE</u>	ProjectID: 05-28
Last Updated:	03/31/99	
City:	Pioneer	
County:	Williams	
State:	OH	
Country:	USA	
Bodies of Water:	Pioneer Lake	
US EPA Region:	V	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	N/A	
ROD/ESD Date:	N/A	
Operable Unit:	N/A	
Areas of Concern (length or acres):	Southern sector of 65-acre Pioneer Lake; 200' x 240' x (depth varied from 0.5 to 3 feet) area of lake sediments; 60' x 50' x 8' area of asphalt pit.	
Other Characteristics of Water Body:	The 65 acre lake is fed by groundwater springs; sand and gravel quarry excavated from the 1930s through the 1960s; quarrying operation began as two gravel pits in the southern and northern portions of the lake; asphalt production facility began operations in the 1940s on the west shore; facility operated as an asphalt and ready-mix concrete producer until 1975. The lake discharges into the East Branch of the St. Joseph River through a spillway at the northeast corner of the lake.	
Contaminants of Concern:	VOCs; PAHs; coal tar	
Source of Contamination:	Asphalt manufacturing operations until about 1975 at a property west of the lake.	
Contaminated Area Physical Characteristics:	Initial assessment activities determined that the visibly contaminated sediments covered an approximately 115 by 150 foot area of the lake bottom in the southeast portion of the lake. The thickness of the contaminated area was estimated to range from 0.5 to 3 feet depth. Subsequently, after the start of remediation, the targeted lake bottom area was increased to a roughly square area of 200 by 240 feet.	
Type of Regulatory Action:	Removal action. Final. Funded through the US Coast Guard to US EPA under the Oil Pollution Act of 1990.	
Overall Status Summary:	The Pioneer Lake site consisted of coal-tar contaminated sediment in a one-acre target area in the southern portion of the 65-acre lake. A removal action was funded through the US Coast Guard to US EPA under the Oil Pollution Act of 1990. Removal was accomplished by hydraulic cutterhead dredging in two phases. In Phase I, conducted from August through November 1996, 2,100 in situ cy of sediment were removed. In Phase II, conducted from April through October 1997, about 4,500 in situ cy of sediment were removed (final bathymetry information was not reported; the 4,500 cy for Phase II is back-estimated from waste disposal quantities). Dredged slurry was pumped to a new 2.2 million gallon earthen settling basin, lined with PVC. Two one million gallon treated water holding basins were also constructed. Target cleanup levels for VOCs and PAHs were established by a risk assessment prepared by the Ohio EPA, and achievement of these levels was verified by collection of confirmation samples from the dredged areas. Total project cost was about \$2.5 million.	
Remedial Action Planned:	<input checked="" type="checkbox"/>	
Risk Assessment:	<input checked="" type="checkbox"/>	

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<i>Remedial Action Implemented:</i>	<input checked="" type="checkbox"/>
<i>Status of Dredging</i>	<input type="checkbox"/>
<i>PRPs:</i>	<input checked="" type="checkbox"/>
<i>Contacts:</i>	<input checked="" type="checkbox"/>
<i>References:</i>	<input checked="" type="checkbox"/>
<i>Modeling:</i>	<input type="checkbox"/>
<i>Fishing Advisory:</i>	<input type="checkbox"/>
<i>Key Conditions:</i>	commercial landfill, dredging, floating oil, water handling limitations

REMEDIAL ACTION PLANNED

Project Name	<u>PIONEER LAKE</u>	ProjectID: 05-28
Last Updated:	08/25/99	
Target Sediment Cleanup Standards (TSCS):	<1 x 10 ⁻⁴ excess lifetime cancer risk values in lake sediments resulting in target levels of 480 ppm ethylbenzene, 970 ppm toluene, 9700 ppm total xylene, 360 ppm naphthalene, 360 ppm fluorene, 2700 ppm anthracene, 360 ppm fluoranthene, and 270 ppm pyrene.	
How TSCS Established:	Pioneer Lake Risk Assessment and Cleanup Standards (Nov. 1995) Ohio EPA Division of Environment and Remedial Response	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	An onshore pit (60' x 50' x 8') in the southeast corner of the lake containing visibly contaminated material.	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment:• Water:• Fish:	
Estimated Target Volume:	1,800 cy	
Planned Disposal Method:	offsite landfill	
Estimated Calendar Time to Implement Remedy:	Unknown	
Estimated Time to Implement Remedy:	2 months - Phase I; 4 months - Phase II	
Estimated Cost to Implement Remedy:	\$442,000	
Stated Remedial Action Objectives (and Source):	Removal of 20'x40' asphalt pit and a 115'x150' (depth varied from 0.5 to 3 feet) area of lake sediment contaminated by PAHs (Source: Letter Report by ecology and environment, inc. Aug. 1998).	
Measures of Success to be Used:	Grid confirmation sampling (40'x40' intervals) of lake sediment to ascertain <1x10 ⁻⁴ RA target concentrations.	
Planned Monitoring and Restoration:	Post dredging grid sampling; restore pit area with clean fill and vegetation.	
Agency Position on Sediment Removal (and Source):		

RISK ASSESSMENT

Project Name PIONEER LAKE

ProjectID: 05-28

Last Updated: 08/25/99

RA Type: Human Health

RA Status: Complete

RA Objectives: 1x10⁻⁴ for COCs

Company Ohio EPA

Performing RA:

RA Reference Report: Pioneer Lake Risk Assessment and Cleanup Standards (Nov. 1995)

RA Summary and Not identified. Some relevant data are described below.

Conclusions:

(Source: Sediment, Waste Material, Surface Water and Fish Community Study of Pioneer Lake, July 10, 1995, Ohio EPA Div. of Emergency Remedial Response)

"Sediment samples were collected at 16 locations in Pioneer Lake and one location in the Pioneer Lake outlet channel to the East Branch St. Joseph River . . . Sample depths varied between 0 and 85 centimeters of bottom material, with a majority of the locations sampled in the 0 - 15 centimeter range. Samples were analyzed for volatile organic compounds, semivolatile compounds, pesticides, polychlorinated biphenyls (PCBs), target analyte list metals, total organic carbon (TOC), and grain size. . .

- Seventeen polycyclic aromatic hydrocarbons (PAHs) were identified and quantified . . . in sediment collected from Pioneer Lake. In addition, three tentatively identified compounds (TICs) of PAHs and numerous unknown PAHs were documented in sediments collected in the south end of Pioneer Lake. PAHs which were detected ranged between ND and 742 ppm, with the highest concentrations occurring in the southeast corner of Pioneer Lake.

- Eight PAH compounds (phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene) from three sediment sampling locations (SED03, SED04, and SRCE03) were within or above the range of sediment values associated with areas of high incidence of abnormal tissue growth (e.g., tumors) in fish (Baumann 1989).

- Sediment samples were evaluated using guidelines established by the Ontario Ministry of the Environment (Persaud et al. 1993). . . [T]hree sediment samples (SED03, SED04, SRCE03) were considered highly contaminated based on numerous PAH compounds and total PAHs exceeding the Severe Effect Level . . . In addition, one sediment sample (SED19) exceeded the Lowest Effect Level based on PAH contaminants. The guidelines detailed in Persaud et al. (1993) do not include evaluations of volatile organic compounds, several PAHs and metals, and most non-PAH semivolatile organic compounds.

- The concentrations of PAHs at the three most contaminated sediment sampling locations were comparable to levels documented in the Little Scioto River near Marion, Ohio (Ohio EPA 1994). The Ohio Department of Health has issued a fish advisory and primary contact advisory for the Little Scioto River as a result of the elevated levels of PAHs in the bottom sediments.

- Significant levels of BTEX (benzene, toluene, ethylbenzene, and xylene) compounds were measured in sediment samples with the highest PAH concentrations (SED03, SED04, SRCE03). Total BTEX levels ranged between 123 and 1,873 ppm at the three most contaminated sample locations. The other 14 sediment samples had reported BTEX concentrations at or near laboratory detection limits."

REMEDIAL ACTION IMPLEMENTED

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Physical Target:	Roughly one acre of lake bottom contaminated with coal-tar.	
Goals:	Risk-based levels ($<1 \times 10^{-4}$ excess cancer risk) for 3 VOCs and 5 PAHs as follows: Ethylbenzene 480 ppm; toluene 970 ppm; total xylene 9700 ppm; naphthalene 360 ppm; fluorene 360 ppm; anthracene 2700 ppm; fluoranthene 360 ppm; pyrene 270 ppm.	
Primary Contractor:	Superior Special Services	
Other Contractors:	Environmental Quality Management, Inc.; ecology and environment, inc.	
Generic Remediation Method:	Hydraulic dredging	
Equipment:	IMS 4010 Versi-Dredge, 10-inch hydraulic cutterhead dredge modified to allow 32 foot dredging depth (normal 20 foot); 18-inch skirted floating absorbent boom, and silt curtains.	
Material Handling:	Dredged slurry was transported through a 10-inch transfer pipeline and discharged into a coarse screen roll-off box. The coarse sediment was removed from the sediment screen box with a backhoe and was staged on an asphalt dewatering pad. The coarse sediments were later disposed of in a non-hazardous waste landfill. Fine suspended sediments and water passed through the coarse screen into the southern portion of the settling basin. Periodically, coal-tar froth was skimmed from the surface water in the basin and shoveled into 55-gallon drums. Water in the southern portion passed through silt curtains and flowed over a weir into the northern portion of the settling basin. Water was pumped from the northern portion of the settling basin into the water treatment system, where it was treated and discharged into one of the two treated water basins.	
Volume Removed:	About 6,600 cy (2,100 cy in Phase I and 4,500 cy in Phase II).	
Calendar Time:	August through November 1996 (Phase I) and April through October 1997 (Phase II). Dredging was conducted from September 28 - November 22, 1996; then from April 11 - May 10, 1997 and June 10 - September 19, 1997.	
Time To Implement:	Refer to "Calendar Time". Typically achieved 20 hours of total dredging time in a six-day work week.	
Total Cost:	\$2.5 million	
Dredging Cost:	Not available	
Disposal of Sediment:	Phase I: 556 tons of non-hazardous coarse sediments to Williams County Landfill (WCL), Bryan, OH; 189,450 gallons of non-hazardous pumpable sludge to City Environmental, Detroit, MI. Phase II: 916 tons of coarse sediment to WCL; 226,911 gallons of non-hazardous pumpable sludge to Evergreen RDF, Northwood, OH; and 4,360 tons of solidified sludge (including 1,193 tons of kiln dust) to Evergreen.	
Volume of Water:	Not available	
Method of Water Treatment:	As described in Reference A -129, the water treatment process consisted of pumping dredged water from the 2.2 million gallon settling basin through carbon filter units. After passing through the carbon units, treated water was pumped into one of the two treated water basins. Once one basin was full, the second basin was used. The full basin was then sampled and the water sample analyzed for oil and grease; lead; hardness; mercury; total PAHs; and benzene, toluene, ethylbenzene, and xylene. If the analytical results were below the discharge limits, the treated water from the basin was released back into Pioneer Lake. If analysis indicated that the levels of	

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contaminants exceeded the discharge limits, the water was pumped back into the settling basin, retreated, and a sample collected for reanalysis. The re-treatment process was continued until discharge limits were met and the water could be released to Pioneer Lake. Water treatment was on a 24-hour per day basis.

Throughout Phase I, failure to meet water quality discharge limits forced the contractor to re-evaluate the initial water treatment process. It was discovered that the contaminated water needed longer contact with the carbon. In response, the flow rate of water passing through the carbon units was decreased in order to increase the contact time and increase the absorption of contaminants by the carbon. Following these changes, analytical results were expected to be lower than discharge limits. However, failures to meet the Ohio EPA discharge limits continued. It was discovered that PAHs were adhering to the suspended solids which were passing through the carbon units. To remedy this problem, two additional 6,000 pound carbon filter units were mobilized and added in series to the water treatment system to increase the contact time further. In addition, 10-micron bag filters were placed before the carbon units and 5-micron bag filters were placed after the carbon units to remove suspended solids prior to discharge of the water into the treated water basins.

Water Discharge Limit:
Phase I: 0.31 ppb total PAHs
Phase II: 3.1 ppb total PAHs

Air Monitoring During Remediation: As described in Reference A -129, air monitoring was conducted at least three times a day during dredging, especially when dredging was occurring in an area of heavy contamination. Air monitoring readings were recorded along with the area in which they were taken. Standard locations for air monitoring around the site included the following: the top of the roll-off box where the transfer pipe discharged; around the perimeter of the roll-off box; in the cab of the backhoe located just above the roll-off; around the perimeter of the basins; around the water treatment system; around the decontamination and office trailers; and along the western, southern and eastern shores of Pioneer Lake. Air monitoring was also periodically conducted to the east of the lake, along the southern end of the residential area. Due to elevated air monitoring readings at the dredge outfall around the coarse screen roll-off box, personal protective equipment was evaluated and upgraded to level C in the outfall area.

Water Monitoring During Remediation: The lake was visually monitored in the early morning, throughout the afternoon, and in the evening after the completion of dredging for the day to check for any visible sheen.

Outcome: Removal of about 6,600 cy of coal-tar contaminated sediment was accomplished, by hydraulic dredging. Confirmation samples were collected in August 1997 from 30 40 by 40 foot sub-grids across the approximately one-acre dredging area. From each sub-grid, a composite sample of five locations was collected for PAH analysis and one grab sample was collected for VOC analysis. Based on confirmation sample results, additional dredging was performed in four of the 40 sub-grids in order to meet the target cleanup levels.

Restoration and Post-Monitoring: Dredged areas were not backfilled. No post monitoring identified.

Site-Specific Difficulties:

- Periodically, the dredge discharge hose became clogged. Dredging resumed after the removal of the sediments clogging the line. On one occasion, replacement teeth were welded onto the hydraulic dredge cutterhead because lake debris such as large rocks and pieces of broken concrete had torn away a number of the teeth.
- A treatability study conducted during Phase I determined that a product called Calciment could be used to solidify sludge onsite prior to landfill disposal. Based upon this study, one load of Calciment was delivered to the site to determine the cost effectiveness. The results of the field test

REMEDIAL ACTION IMPLEMENTED

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determined that the cost of Calciment, the cost of labor to conduct the solidification, plus the cost of landfilling the solidified sludge was greater than the cost of sending the sludge offsite for solidification and disposal.

- On August 4, 1997, dredging in one of the last lake bottom areas began. The cutterhead on the hydraulic dredge became entangled with approximately 30 feet of 3/4 inch wire cable. An acetylene torch was used to cut the tangled cable from the cutterhead. It was suspected, based upon stories from the local citizens, that the cable was attached to a car. It was necessary to remove the cable and whatever was attached to it from the lake because the area adjacent to and under the object was heavily contaminated. On August 5, 1997, a wrecker was used to pull the cable out of the lake. Attached to the other end of the cable was a heavily damaged 1951 Studebaker automobile.
- On October 6, 1997, the trackhoe became almost totally submerged in the sludge in the southern end of the settling lagoon. A wrecker was mobilized to the site and pulled the trackhoe out of the lagoon.
- Throughout Phase I, repeated failures to meet water quality discharge limits caused a re-evaluation and modification of the water treatment system. Refer to "Method of Water Treatment."

Monitoring Data

References:

- **Sediment**
- **Water:**
- **Fish:**

POTENTIALLY RESPONSIBLE PARTIES

Project Name **PIONEER LAKE**

ProjectID: 05-28

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **PIONEER LAKE**

ProjectID: 05-28

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 PIONEER LAKE

ProjectID: 05-28

Reference Type: A
Title: *Letter Report for the Pioneer Lake Site*
Location: AEM
Category: Contaminated Sediments: Remediation Final Report
Prepared by/Author: ecology and environment, inc.
Preparer/Author Address: 6777 Engle Road
Cleveland, OH 44130
Prepared For: US EPA Region V, Emergency Response Branch
Date Published: August 30, 1998
Key Words and Phrases:

ReferenceID: 129

Reference Type: A
Title: *Sediment, Waste Material, Surface Water and Fish Community Study of Pioneer Lake*
Location: BBL
Category: RI/FS
Prepared by/Author: D. Altfater, J. Giltner, R. Baker
Preparer/Author Address: Ohio Environmental Protection Agency
Division of Surface Water
1685 Westbelt Drive
Columbus, OH 43228
Prepared For: US EPA
Date Published: July 10, 1995
Key Words and Phrases:

ReferenceID: 329

Reference Type: A
Title: *United States Environmental Protection Agency Pollution Report*
Location: BBL
Category: RI/FS
Prepared by/Author: Karla Auker; Mark Durno
Preparer/Author Address: US EPA ERB-Westlake
Emergency Response Branch
Westlake, OH
Prepared For: US EPA
Date Published: June 12, 1998
Key Words and Phrases:

ReferenceID: 439

REFERENCES

Project Name **PIONEER LAKE**

ProjectID: 05-28

Reference Type: D

ReferenceID: 24

Title: ***EPA: Cleanup at Pioneer Lake Site Nearly Complete; Meeting
Nov. 12***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region V

***Preparer/Author
Address:*** Chicago, IL 60604

Prepared For: General Public

Date Published: November 6, 1997

***Key Words and
Phrases:***
