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US Army Corps of Engineers

INFORMATION SUMMARY, AREA OF CONCERN: ASHTABULA RIVER, OHIO

by

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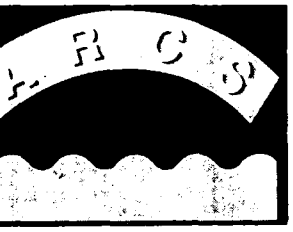

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The Water Quality Act of 1987, Section 118, authorizes the Great Lakes National Program Office (GLNPO) to carry out a 5-year study and demonstration project, Assessment and Remediation of Contaminated Sediments (ARCS), with emphasis on the removal of toxic pollutants from bottom sediments. Information from the ARCS program is to be used to guide the development of Remedial Action Plans (RAPs) for 42 identified Great Lakes Areas of Concern (AOCs) as well as Lake-wide Management Plans. The AOCs are areas where serious impairment of beneficial uses of water or biota (drinking, swimming, fishing, navigation, etc.) is known to exist, or where environmental quality criteria are exceeded to the point that such impairment is likely. Priority consideration was given to the following AOCs: Saginaw Bay, Michigan; Sheboygan Harbor, Wisconsin; Grand Calumet River, Indiana; Ashtabula River, Ohio; and Buffalo River, New York.

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13. ABSTRACT (Concluded).

The Environmental Laboratory of the US Army Engineer Waterways Experiment Station (WES) was asked to review existing data and information for each of the five priority AOCs. The approach used by WES was to bring together WES scientists who have been conducting research on the various aspects of contaminant mobility in the aquatic environment and develop a list of information required to evaluate the potential for contaminant mobility. A team of WES scientists then visited the RAP coordinator and associated staff for each AOC. Corps Districts responsible for the navigation projects in each AOC were also visited.

This report summarizes the information obtained for the Ashtabula River AOC. It is arranged for information retrieval by subject in a quick and easy manner (GLNPO Subject-Reference Matrix). Data and information from numerous reports have been included as figures and tables; wherever possible, the reference sources are identified.

14. SUBJECT TERMS (Concluded).

Ashtabula River
Groundwater
Land use
Metal contamination
Organic contaminants
Point and nonpoint source discharges
Risk assessment
Sediment contamination
Spills
Toxicity bioassay
Water quality

SUMMARY

The Water Quality Act of 1987, Section 118, authorizes the Great Lakes National Program Office (GLNPO) to carry out a 5-year study and demonstration project, Assessment and Remediation of Contaminated Sediments (ARCS), with emphasis on the removal of toxic pollutants from bottom sediments. Information from the ARCS program is to be used to guide the development of Remedial Action Plans (RAPs) for 42 identified Great Lakes Areas of Concern (AOC) as well as Lake-wide Management Plans. The AOCs are areas where serious impairment of beneficial uses of water or biota (drinking, swimming, fishing, navigation, etc.) is known to exist, or where environmental quality criteria are exceeded to the point that such impairment is likely.

Priority consideration was given to the following five AOCs: Saginaw Bay, Michigan; Sheboygan Harbor, Wisconsin; Grand Calumet River, Indiana; Ashtabula River, Ohio; and Buffalo River, New York.

The ARCS program is to be completed during the period 1988-1992. The overall objectives of the program are to

a. Assess the nature and extent of bottom sediment contamination at selected Great Lakes AOC.

b. Evaluate and demonstrate remedial options, including removal, immobilization, and advanced treatment technologies, as well as "no-action" alternatives.

c. Provide guidance on assessment and remedial action to the various levels of government in the United States and Canada in the implementation of RAPs for the areas of concern, as well as direction for future evaluations in other areas.

The Environmental Laboratory of the US Army Engineer Waterways Experiment Station (WES) was asked to review existing data and information for each of the five priority AOCs. The approach used by WES was to bring together WES scientists who have been conducting research on the various aspects of contaminant mobility in the aquatic environment and develop a list of information required to evaluate the potential for contaminant mobility (see Table 1 of main text). All contaminant migration pathways were considered, as shown in Figure 1 (main text). A team of WES scientists then visited the RAP coordinator and associated staff for each AOC. Corps Districts responsible for the navigation projects in each AOC were also visited. During these meetings, discussions centered around what information was available for each item on the list of information developed by WES. Sources of additional information were obtained from the discussions.

This report summarizes the information obtained for the Ashtabula River AOC. It is arranged for information retrieval by subject in a quick and easy manner (GLNPO Subject-Reference Matrix). Data and information from numerous reports have been included as figures and tables; wherever possible, the reference sources are identified.

PREFACE

The study reported herein was conducted by the US Army Engineer Waterways Experiment Station (WES) for the US Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO). The work was monitored by the US Army Engineer Division, North Central (NCD).

The report was prepared by Dr. H. E. Tatem, Aquatic Biologist, Mr. D. L. Brandon, Statistician, Dr. C. R. Lee, Soil Scientist, Dr. J. W. Simmers, Research Biologist, and Mr. J. G. Skogerboe, Physical Scientist, of the Contaminant Mobility and Regulatory Criteria Group (CMRCG), Ecosystem Research and Simulation Division (ERSD), Environmental Laboratory (EL), WES.

The authors wish to acknowledge the generous cooperation and assistance of the following individuals in locating existing data and information: Mr. R. Leonard, Agronomist; Mr. D. Melfi, Hydraulics Engineer, and Mr. Steve Yaksich, Chief, Water Quality Branch, US Army Engineer District, Buffalo; and Ms. Julie Letterhos, Ohio State Environmental Protection Agency. Mr. Larry Bird, ERSD, provided technical assistance in preparing tabulated data and the manuscript.

The work was conducted under the supervision of Dr. L. H. Saunders, Chief, CMRCG; Mr. D. L. Robey, Chief, ERSD; and Dr. John Harrison, Chief, EL. General supervision was provided by Mr. D. Cowgill, NCD, and Mr. T. Kizlauskas, USEPA, GLNPO, initially, and later under the supervision of Mr. J. Miller, NCD, and Mr. D. Cowgill, USEPA GLNPO.

Commander and Director of WES was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.

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CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic yards	0.7645549	cubic meters
gallons (US liquid)	3.785412	cubic decimeters
inches	2.54	centimeters
miles (US statute)	1.609347	kilometers
pounds (avoirdupois)	0.4535924	kilograms
square miles	2.589998	square kilometers
tons (2,000 pounds, mass)	907.1847	kilograms

INFORMATION SUMMARY, AREA OF CONCERN:
ASHTABULA RIVER, OHIO

INTRODUCTION

Background

The Water Quality Act of 1987, Section 118, authorizes the Great Lakes National Program Office (GLNPO) to carry out a 5-year study and demonstration project, Assessment and Remediation of Contaminated Sediments (ARCS), with emphasis on the removal of toxic pollutants from bottom sediments. Information from the ARCS program is to be used to guide the development of Remedial Action Plans (RAPs) for 42 identified Great Lakes Areas of Concern (AOCs) as well as Lake-wide Management Plans.

The AOCs are areas where serious impairment of beneficial uses of water or biota (drinking, swimming, fishing, navigation, etc.) is known to exist, or where environmental quality criteria are exceeded to the point that such impairment is likely. Priority consideration was given to the following five AOCs: Saginaw Bay, Michigan; Sheboygan Harbor, Wisconsin; Grand Calumet River, Indiana; Ashtabula River, Ohio; and Buffalo River, New York.

Each state has established RAP coordinators to develop a RAP for each AOC. Most RAP coordinators state that there is a need to develop guidance to interpret the information in a manner that will allow decisions to be made about each AOC. The following summarizes the status of the RAP Report for the five priority AOCs:

Area of Concern	Status
Saginaw Bay	Final RAP - September 1988
Grand Calumet River	Draft RAP - January 1988
Sheboygan Harbor	Draft RAP - December 1988
Buffalo River	Final RAP - November 1989
Ashtabula River	Draft RAP - September 1989

Purpose

The purpose of this report is to summarize the information collected during meetings with RAP coordinators and Corps Districts to find out what information was available on contaminant migration at each of the five priority AOCs.

Scope

Information collected during visits with RAP coordinators and Corps Districts is summarized. Sources of additional information have been referenced so that these can be contacted at a later date. Documents that were mentioned during meetings with RAP coordinators, but were not available at the time, are referenced so that they can be obtained, if desired. Retrieval of information by subject in a quick and easy manner was a goal of this report.

SUMMARY OF INFORMATION

Boundary of AOC

The Ashtabula River is in northeastern Ohio and flows into Lake Erie at the city of Ashtabula. The Ashtabula River AOC includes the lower 2 miles* of the Ashtabula River and Ashtabula Harbor, including the outer harbor and nearby Lake Erie shore areas. Fields Brook and Strong Brook, tributaries to the Ashtabula River, are in the AOC (R6 and R7**). Fields Brook sediments have been classified as toxic under the Toxic Substances Control Act (TSCA). The boundary of the AOC is shown in Figure 2.

Contaminants of concern

Sediments in the Ashtabula River AOC have been contaminated from past industrial discharges to Fields Brook. Some sediment samples contain PCBs at concentrations that place this sediment in a toxic category under the TSCA. The Ashtabula Remedial Action Plan (RAP) (R7) states that the contaminants of greatest concern are PCBs, hexachlorobenzene (HCB), hexachlorobutadiene (HCBD), mercury, zinc, chromium, and volatile organic compounds (VOCs). Tables 2 and 3 contain summaries of the contaminants of concern at the Ashtabula AOC for water, sediment, and fish. Figure 3 shows polluted and toxic sediments in the Ashtabula River (R8).

Levels of contaminants

Numerous contaminants have been identified in samples from the Ashtabula River AOC. Data were obtained for five metals (As, Cr, Pb, Hg, and Zn), PCBs, HCBD, HCB, and chlorobenzenes. The highest concentrations shown were 56 ppm for As, 2,200 ppm for Cr, 350 ppm for Pb, 4.7 ppm for Hg, 830 ppm for Zn,

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* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 7.

** See References list at the conclusion of the main text.

120 ppm for PCBs, 22 ppm for HCBD, 32 ppm for HCB, and 306 ppm for chlorobenzenes. Total base/neutral chlorinated organics have been measured as high as 2,176 ppm; total base/neutral hydrocarbons were 68 ppm for one sample (Table 4). Table 5 shows some very high numbers for organic compounds in sediments at Fields Brook and in the Ashtabula River. For example, total PAHs ranged as high as 188,000 ppm, and total phthalate compounds were measured as high as 156,250 ppm. Total VOCs ranged as high as 900 ppm. The highest concentration of PCBs, found at a Fields Brook site, was 518 ppm. Mercury was found as high as 14 ppm.

Volume of contaminated sediments

The volume of sediments to be dredged in Ashtabula Harbor has been estimated by Mr. Dick Leonard, USAED, Buffalo, in September 1989 to be approximately 575,000 cu yd, with 200,000 cu yd containing PCBs. Reference R5 discusses the volumes of sediment at the Fields Brook site but does not contain actual numbers and only discusses Fields Brook. A large number of core samples were taken in late 1989 by Woodward-Clyde to provide information on the volume of contaminated sediment at this Superfund site. There is concern that the contaminants are present in lower sediment depths. The Corps dredging at Ashtabula has been planned to ensure that dredging does not result in exposure of more highly contaminated sediments.

Sediment data

Since the 1970s there have been at least five investigations of the sediments at this AOC, especially those located either in Fields Brook or downstream from where Fields Brook enters the Ashtabula River. Figure 4 shows sediment sampling locations for these five studies. The most intensive sediment sampling has been conducted in the Fields Brook area where sediments have been analyzed and found to contain elevated concentrations of USEPA priority pollutants including metals and volatile organic compounds. Tables 4-13 list the contaminants of concern at this AOC from references R1, R2, R4, R5, R7, and R10. Figures 5-8 show sample locations for the sediment data in Tables 4-13.

Some soil samples adjacent to Fields Brook are contaminated with trichloroethylene. Most of the USEPA priority pollutants have been found in these sediments, and some samples from the early 1980s showed PCBs in harbor sediments at concentrations >50 ppm. Data for numerous (as many as 150 or more) other contaminants can be found in Tables 2-13. Table 12a is a summary

of heavily polluted Ashtabula sediments. Figure 8a shows sediment and effluent sample locations for this AOC with most samples being from Fields Brook.

Water quality data

Water quality and elutriate data are available in references R2, R4, and R7. There are organic compounds in surface waters at this AOC (Figure 9). Stations were located along Fields Brook, Ashtabula River, and at the mouth of the Ashtabula River. More compounds were found in Fields Brook compared to the river and harbor. Elutriate data for 1988 Corps samples are shown in Table 13. The US Geological Survey has one data collection station on the Fields Brook tributary. The parameters measured include water temperature, pH, specific conductance, and dissolved oxygen (R9). The average flow of the Ashtabula River is 160 cfs; dry weather flow can be as low as 10 to 0 cfs (R7). Table 14 shows mean flow data for Ashtabula River.

Water quality standards for the Ashtabula River are discussed in R7. The river is not generally used for swimming, although the Ashtabula outer harbor is used occasionally. Drinking water is taken from Lake Erie west of the river mouth, an area rarely affected by the river. Industrial water users take water from Lake Erie and release water to Fields Brook. The Ashtabula Remedial Action Plan (R7) describes the water quality upstream from the AOC area as generally acceptable, but water in the AOC at times exceeds Ohio water quality standards. Water quality in the Lake Erie section of the AOC violated standards for some metals (Table 15). This was not unusual, however, for much of the Lake Erie nearshore.

Groundwater impacts

The potential impact of contaminants leaching from dredged material to groundwater was evaluated by Seger and Leonard (R8). Table 16 presents the data from these tests.

Point source discharges

At least 21 dischargers are identified in R4. Figure 10 shows sample locations and lists the dischargers. Most of them are located on Fields Brook and not on the Ashtabula River. Most of the industrial facilities in this AOC are located along Fields Brook or Lake Erie, to the east of Ashtabula Harbor. At this AOC the primary source of contaminants is from point sources rather than from nonpoint sources. Table 17 lists the current dischargers at Fields Brook.

Nonpoint source discharges

Little information was available on nonpoint source discharges.

Air quality and spills

No information was located in relation to air quality or oil or contaminant spills at the Ashtabula River AOC.

Superfund sites

Fields Brook is the Superfund site at this AOC and appears to be the primary reason why the Ashtabula River contains contaminated sediments. Contaminants of concern at this site include metals, organics, and PCBs. Land adjacent to Fields Brook contains chlorinated alkanes and trichloroethylene. No definite schedule has been established for the cleanup of Fields Brook, although there are plans for more sediment samples to be taken in 1989.

Adjacent land use contaminant sources

The general land use patterns for this AOC are shown in Figure 11. Most of the land in the Ashtabula watershed is agricultural (70 percent) or forests (20 percent). Land in the AOC, however, is mostly industrial or residential (R7). There are two public beaches on Lake Erie--Walnut Beach, located west of the harbor mouth, and Lakeshore, east of the harbor mouth. These areas do not appear to be in the AOC but are nearby.

Bioassay data

Sediments from Ashtabula Harbor, taken in May 1988, were evaluated with 96-hr sediment bioassays using the mayfly *Hexagenia*, fathead minnows, and *Daphnia*. The reported mortalities were generally below 20 percent, with a single exception being the *Daphnia* exposed to sediment from site R-1 (R10). Bioassay data are shown in Tables 18-20. Sample sites are shown in Figures 6 and 7.

Biological data

Fisheries studies at this AOC were conducted from 1975-1977 in connection with dredged material disposal operations (R7). Species found were typical of the warmwater fish community in Lake Erie river mouths. Tables 21 and 22a list fish species found during a 1984 study of sediment disposal sites. Results from three benthic studies of Ashtabula Harbor indicated that oligochaete worms were the most abundant species (R7). These animals are normally found in association with highly organic sediments. Additional benthic data are presented in Table 22b. Numerous bird and animal (mammals) species exist in the Ashtabula Harbor area. The GLNPO Toxicity/Chemistry Work Group plans to collect additional biological data in 1990 (Figure 12a). Endangered animals and threatened plant species have been reported by the Ohio DNR (Figure 12b and Table 23).

Risk assessment

Calculations of the potential human exposure to contaminated sediments at the Ashtabula AOC have been made (R5). People that live and work in the area could be exposed to contaminants, especially during dry weather. Table 24 presents data on potential cancer risks from ingestion of Fields Brook sediment over one lifetime.

GLNPO SUBJECT-REFERENCE MATRIX

AREA OF CONCERN: Ashtabula River, Ohio

Subject	Reference*,**	Point of Contact†
Sediment		
Metals	R4, R2, R10, R1, R3, R8, R7, R6 (1, 2)	P1, P4
PCBs	R4, R2, R10, R1, R3, R8, R7, R6 (1, 2)	P1
PAHs (PNAs)	R4, R2, R10, R1, R7 (1)	P1
Pesticides	R4, R2, R10, R1, R3 (1, 2)	P1
TOC		
VOCs (volatile organics)	R4, R2, R1, R8, R7	P2
Phthalates	R4, R5, R7	P2
Others		
COD, TVS, O&G	R2, R3, R7 (1, 2)	P1, P2
TKN, TP	R2, R3 (1, 2)	
CN	R10, R8	
Particle Size	R4, R2, R1 (1, 2)	P1
Engineering Properties		P1
Deposition Data	R8	P2
Transport Data	R7	P2
Depth Data	R7	P2
Horizontal Distribution	R4	P1, P2
Volume To Be Considered	R2, R7	P1
EP Toxicity Tests	R1	P1
Column Leach Tests	R1, R8	P1
Settling Tests	R1	P1
Water Quality	R4, R9, R7	P1, P2, P4, P5
Elutriate Analyses	R2	P1
Physical Data		
Temperature	R9	
DO	R9	
Conductivity	R9	

* Numbers refer to sources listed in the References section.
** Numbers in parentheses refer to sources listed in Literature Cited (Appendix 1).
† Points of contact are listed on page 18.

Subject	Reference	Point of Contact
Hardness		
Total Solids	R7	P2
Chemical Data	R4, R5, R7, R10	P1
pH	R9	
TOC		
Metals	R4, R7	
PCBs		
PAHs		
Pesticides		
BOD		
VOCs	R4	
Waterway Hydraulics	R5, R7	P1
Flow Data	R5, R7	
Water Depth	R7	
Flood Data		
Point Discharges	R4, R7	P2
Concentration Data		
Volume Data		
Waste Load Data		
Nonpoint Discharges	R7	P2, P5
Concentration Data		
Volume Data		
Waste Load Data		
Spills	R7	P2, P3
Watershed Hydrology	R5, R7	P1
Rainfall Data		
Acid Rain		
Runoff Data	R7	P2
Volume	R7	
Solids		
Chemical Data	R7	
Air		
Air Quality Data		
Atmospheric Deposition		
Superfund Sites	R4, R5, R7	P1, P2, P3

Subject	Reference	Point of Contact
Adjacent Land Use	R4, R7	P2
Contaminant sources	R4, R7	P2
Risk Assessment	R5, R7	P2
Bioassay Data		
Acute	R2, R10	P1
Chronic		
Bioaccumulation	R7	
Biological Data	R4, R7	P1, P2
Fish	R4, R7	P2
Diversity	R7	
Quantity	R7	
Tissue Content	R4, R7	
Advisory	R4, R7	
Benthic	R7	P2
Diversity	R7 (3)	
Abundance	(3)	
Content	R7	
Birds	R7	
Diversity		
Quantity		
Plants		
Diversity		
Abundance		
Mammals		
Endangered Species	R7	P2
Human Exposure Assessment	R5, R7	

REFERENCES*

R1 Aqua Tech Environmental Consultants, Inc. 1983. Analysis of Sediment from Ashtabula River, Ashtabula, Ohio; Report to Buffalo District, USACE, Contract No. DACW 49-82-C-0062.

R2 Aqua Tech Environmental Consultants, Inc. 1984. Analysis of Sediment from Ashtabula Harbor, Ashtabula, Ohio; Report to Buffalo District, USACE, Contract No. DACW 49-83-D-0006.

R3 Aqua Tech Environmental Consultants, Inc. 1986. The Analyses of Sediment and Water Samples from the Ashtabula Dewatering Pilot Plant Project; Report to Buffalo District, USACE, Contract No. DACW 49-86-D-0001.

R4 CH2M Hill. 1985. Final Remedial Investigation Report, Fields Brook Site, Ashtabula, Ohio; report to USEPA Hazardous Site Control Division, Contract No. 68-01-6692.

R5 CH2M Hill. 1986. Feasibility Study, Fields Brook Site, Sediment Operable Unit, Ashtabula, Ohio; Report to USEPA Hazardous Site Control Division, Contract No. 68-01-6692.

R6 International Joint Commission. 1987. 1987 Report on Great Lakes Water Quality-Appendix A-Progress in Developing Remedial Action Plans for AOCs in the Great Lakes Basin, Report to IJC, p 113-115.

R7 Ohio Environmental Protection Agency-Division of Water Quality Planning and Assessment. 1989. Ashtabula River Remedial Action Plan-Stage 1 DRAFT (September 1989) Columbus, Ohio.

R8 Seger, E. S., and Leonard, R. P. 1984. Slurry Clarification and Column Leachate Tests on Polluted Harbor Sediments, Unpublished report to Buffalo District, CE.

R9 Shindal, H. L., et al. 1988. US Geological Survey Water Data Report OHB-88-2, Vol 2, USGS Columbus, Ohio.

R10 T. P. Associates International, Inc. 1988. The Analyses of Sediments from Ashtabula Harbor; Report to Buffalo District, USACE, Contract No. DACW 49-87-D-0002.

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* Additional references are included in Appendix 1: Literature Cited.

POINTS OF CONTACT

Person	Area of Expertise	Location/Telephone
1. Mr. Dick Leonard	Water Quality	USAED, Buffalo 1776 Niagara St. Buffalo, NY 14207 716-879-4270
2. Ms. Julie Letterhos	Rap Coordinator	Ohio EPA 1800 WaterMark Dr. Columbus, OH 43266 614-644-2866
3. Mr. Peter Sanders	Remedial Project Manager	USEPA Region V 230 S. Dearborn Chicago, IL 60604 312-353-9288
4. USEPA	Storet Data S=NCB16010-NCB160260 S=NCB170010-NCB170160 A=11COEBUF	Office of Administration Resources Management, National Data Processing Division, Research Triangle Park, NC 27711
5. Dr. Steve Yaksich	Water Quality	USAED, Buffalo 1766 Niagara St. Buffalo, NY 14207 716-879-4272

Table 1

Information Required to Evaluate the Potential for Contaminant Mobility

1. SEDIMENT DATA
   - Water Content
   - Hydrous Oxides (Manganese, ferrous)
   - Total PAHs
   - Total PCBs (Aroclors and Congeners)
   - TOC
   - Total Solids
   - OM
   - EP Test
   - CEC (plus calcium, magnesium phosphorus, potassium concentration in extractant)
   - Atterberg Limits
   - Specific Gravity Determination
   - Dispersion Coefficients
   - Sediment Particle Density
   - Bulk Density
   - Permeability
   - Particle Size Distribution (hydrometer method); (include sand, fine sand, silt and clay)
   - Wet Sediment pH (1:2 sediment to distilled water solution)
   - Dry Sediment pH (1:2 sediment to distilled water solution)
   - % Base Saturation
   - % Free Calcium Carbonate
   - Potential pH or Lime Requirement (using titration or similar method)
   - Total Carbon Content
   - Total Soluble Heavy Metal Content
   - Total Heavy Metal Content
   - Surface Runoff Suspended Solids
   - Wet Sediment Extractable Heavy Metal Content (DTPA preferred)
   - Dry Sediment Extractable Heavy Metal Content (DTPA preferred)
   - Depth (thickness) of Mixed Top Sediment Layer
   - Depth (thickness) of Contaminated Sediment Layers
   - Sedimentation Rate (possibly through core dating)
   - Sediment Deposition History
   - Suspended Solids Settling Rates (possibly through sediment traps)
   - Consolidation Characteristics
   - Sediment Porosity (mixed layer and deeper layers)
   - Pesticides
   - Priority Pollutants (40 CFR Part 136)
   - Dioxin
   - Reference Site
   - OG
   - EC
   - Redox
   - Sulfides
   - SOD
   - Volatile Solids
   - Salinity
   - NH3

2. POINT DISCHARGES INTO WATERWAY
   - Contaminant Loads Based on Concentration and Volumetric Flow Rates
   - Surface Runoff During Storm Events
   - Combined Sewer Overflow

(Continued)

Table 1 (Continued)

3. NONPOINT DISCHARGES INTO WATERWAY
   - Ground Water: Information on Geohydrology and Ground Water Characteristics
   - Atmospheric Deposition

4. LAND USE OF ADJACENT PROPERTIES

5. CONTAMINATED SITES
   - Hazardous Waste
   - Superfund
   - Spill

6. WATERSHED HYDROLOGY
   - Wetlands

7. WATERWAY HYDRAULICS & FLOW
   - Hydrology or Flows Through the System
   - Area of Bottom Contamination
   - Water Depth at Area of Contamination
   - Contaminant Waste Loads to System
   - Floods

8. WATER QUALITY DATA

DOC	TOC
DO	Hardness
BOD	PH
Metals	Conductivity
PAHs	Temperature
PCBs	Total Solids

   - Total Suspended Solids (distributed in time and space)
   - Best Estimates of Partition Coefficients for Low (water column) and High (bottom sediments) Sediment Concentrations
   - Sediment-Water Contaminant Distribution Coefficients
   - Bacteriological Quality
   - Priority Pollutants
   - Interstitial Water Contaminant Concentration

9. BIOASSAY TEST DATA
   - Rapid:
     - microtox
     - *Daphnia*
     - *Ceriodaphnia*
     - *Pontoporeia*
     - Ames Test
   - Chronic:
     - *C. tentans*
     - *Daphnia*
     - fathead minnows
     - macroinvertebrate

(Continued)

Table 1 (Concluded)

Plant bioassay data:
- Total PCB Content (aroclor content)
- Specific PCB Congeners
- PAHs
- Heavy Metal Uptake

10. BIOLOGICAL DATA

Fisheries Surveys, including:
- body weight/size
- diet/stomach contents
- feeding type
- lipid content
- phytoplankton
- zooplankton

Benthic Community
- overall benthic "health"
- benthic indicators/low diversity

11. MISCELLANEOUS INFORMATION

Climatological Data
- Air Quality

12. RISK ASSESSMENT
- Human Health
- Ecological

13. WILDLIFE USAGE
- Birds
- Mammals

14. ENDANGERED SPECIES
- Federal
- State

Table 2

Contaminants of Concern in the Ashtabula River Area of Concern

(Contaminants of particular concern are noted by capitals).

(R7)

	Water			Sediment			Fish	Air
Parameter	Ashtabula River and Outer Harbor	Fields Brook	Lake Erie	Ashtabula River and Outer Harbor	Fields Brook	Lake Erie		
MERCURY	X	X	X	X	X	X	X	
Cadmium	X	X	X	X	X			
Copper		X	X		X	X	X	
Lead	X			X	X		X	
CHROMIUM				X	X	X		
Nickel						X		
Arsenic					X	X	X	
Oil and Grease				X		X		
Total Dissolved Solids		X						
PCB				X	X		X	
HEXACHLOROBENZENE				X	X		X	
HEXACHLOROBUTADIENE					X		X	
Octachlorostyrene							X	
1,1,2,2-tetrachloroethane	X	X			X		X	
Tetrachloroethene (TTCE)	X	X			X		X	
Trichloroethene (TCE)	X	X			X		X	
Ethylbenzene				X	X			
Other Chlorinated Benzenes					X	X		
Other Chlorinated Styrenes					X		X	
1,1,2-trichloroethane					X			
Hexachloroethane					X			
Zinc	X	X	X	X			X	
Vinyl Chloride					X			

(Continued)

Table 2 (Concluded)

Parameter	Water			Sediment			Fish	Air
	Ashtabula River and Outer Harbor	Fields Brook	Lake Erie	Ashtabula River and Outer Harbor	Fields Brook	Lake Erie		
1,1-dichloroethene					X			
1,1,1-trichloroethane					X			
1,2-transdichloroethene		X			X			
2-butanone					X			
Benzene					X			
Chloroform					X			
Methylene Chloride	X	X			X			
Fluorotrichloromethane					X			
Toluene					X			
Acetone					X			
O-xylene					X			
Bis(2-ethylhexyl)phthalate					X			
Benzl butyl phthalate					X			
di-n-butyl phthalate					X			
diethyl phthalate					X			
dimethyl phthalate					X			
Other phthalates					X			
Phenanthrene					X			
Benzo(a)pyrene					X			
Other PAH's					X			
Fluoranthene							X	
Aldrin + Dieldrin	X							

Table 3

Substances Detected in the Surface Water or Sediment of Fields Brook During the Remedial Investigation. (R4)

A. Substances Quantitatively Assessed in the Exposure Assessment[a]

Acid:	Phenol	**Pesticide/PCB:**	Aldrin
			Heptachlor
Base/Neutral:	1,4-Dichlorobenzene		Dieldrin
	Benzidine		α-Hexachlorocyclohexane
	Hexachlorobenzene		γ-Hexachlorocyclohexane
	Hexachloroethane		PCB-1016
	Hexachlorobutadiene		PCB-1242
	Isophorone		PCB-1248
	N-nitrosodiphenylamine		PCB-1254
	Benzo(a)pyrene		
	Bis(2-ethylhexyl)phthalate		
	Di-n-butyl phthalate	**Inorganic:**	Antimony
	Diethyl phthalate		Arsenic
	Dimethyl phthalate		Beryllium
	Fluoranthene		Cadmium
			Chromium
Volatile:	Benzene		Cyanide
	Chloroform		Lead
	Carbon Tetrachloride		Mercury
	Chlorbenzene		Nickel
	1,2-dichloroethane		Selenium
	1,1-dichloroethene		Silver
	Ethylbenzene		Thallium
	1,1,1-trichloroethane		
	1,1,2-trichloroethane		
	1,1,2,2-tetrachloroethane		
	Methylene chloride		
	Fluorotrichloromethane		
	Tetrachloroethene		
	Toluene		
	Trichloroethene		
	Vinyl chloride		

B. Compounds Detected But Not Quantitatively Assessed in the Exposure Assessment[b]

Acids:	Benzoic acid	**Volatile:**	Acetone
	2-chlorophenol		2-Butanone
			2-Hexanone
			1,1-dichloroethane
			Trans-1,2-dichloroethene
Base/Neutral	Acenaphthene		
	Anthracene	**Pesticide:**	β-endosulfan
	Benzo(a)anthracene		Heptachlor epoxide
	Benzo(b and k)fluoranthene		Endrin aldehyde
	Chrysene		
	1,2,4-Trichlorobenzene	**Inorganic:**	Aluminum
	1,2-Dichlorobenzene		Barium
	1,3-Dichlorobenzene		Iron
	Nitrobenzene		Magnesium
	Butyl benzyl phthalate		Tin
	Acenaphthylene		Copper
	Benzo(ghi)perylene		Zinc
	Indeno(1,2,3-cd)pyrene		
	Dibenzofuran		
	2-methylnaphthalene		
	Dibenzo(a,h)anthracene		
	Di-n-octyl phthalate		
	Fluorene		
	Naphthalene		
	Phenanthrene		
	Pyrene		

[a] Based on information available as of June, 1985.
[b] Cancer potency and Acceptable Chronic Daily Intakes are not available to assess these compounds quantitatively.
Note: Tentatively identified compounds were not quantitatively assessed in the exposure assessment.

Table 4

Concentrations of Constituents Identified in Previous Fields Brook and Ashtabula River Sediment Studies. (R4)

Study	Sample Location[b] Number	Major Contaminant (mg/kg)[a] Zn	Hg	Cr	Pb	PCB's	Chlorinated Styrenes	Total Volatile Chlorinated Organics	Total Volatile Hydrocarbons	Total Base/Neutral Chlorinated Organics	Total Base/Neutral Hydrocarbons
1. Survey of Ashtabula River and Fields Brook, Ohio Aqua Tech, September 1979	1	167	<1	25	98	3.57	0.14			14.0	22.80
	2	114	<1	31	53					0.10	3.8
	3	127	<0.7	49	37					2.9	5.5
	4	830	<0.1	38	350	0.4		8.62	4.04	0.051	0.025
	5	170	0.35	86	47			2.77	0.65	0.008	0.11
	8	190	<0.1	23	110			4.55	0.084	0.057	0.16
	10	210	2.4	37	130	4.1		2,935	1.49	3.33	0.151
	11	130	4.9	36	48	0.57		31.0		0.07	0.159
	12	146	4.2	39	27			11.52	0.018	0.026	
2. Ashtabula Sediment Sampling and Analysis Program,TRW, September 1980	1 (Top)	480	<3.0	7.8	9.0			2.60	0.020	100.6	8.50
	1 (Mid)	470	<3.0	13.0	12.0			5.02	0.020	46.4	2.0
	1 (Bot)	120	<3.0	8.1	2.4			2.65	0.016	55.6	2.6
	2 (Top)	900	<9.0	15.0	28.0			0.47	0.012	2,176.5	31.1
	2 (Mid)	760	<7.0	13.0	38.0			0.25	0.007	452	68.3
	2 (Bot)	1,000	<6.0	12.0	21.0			0.15	0.016	33.6	8.1
	3	73.5	45.0	18	21			0.57	0.016	7.9	11.62
	4	89.6	<2.0	16	15			0.033	0.002	0.8	7.7
3. Field Sampling Analysis of Core Sediment Samples, Environmental Research Group, June 1979	1 (Top)	390	0.83	2,200	66	8.9		1.06			
	1 (Mid)	180	0.52	300	29	2.5		0.20			
	1 (Bot)	150	0.26	270	52	12		1.71			
	2 (Top)	140	1.6	57	31	10		9.3			
	2 (Bot)	110	2.0	45	24	5.1		2.00			
	3 (Top)	250	1.2	83	50	22		3.83		2.4	29
	3 (Bot)	180	0.3	430	43	13		1.63			
	4 (A)	300	0.89	120	55	4.2		0.54		0.5	24
	4 (B)	240	3.4	300	61	27		4.82			
	5	320	1.3	440	52	72		34.0		28	28
	6 (Top)	660	1.4	1,000	96	63		16.7		37	39
	6 (Bot)	190	3.0	90	34	2.6		0.55			
4. U.S. Army Corps of Engineers Sampling and Analysis of Sediments from Ashtabula, Ohio	4	240	1.0	100	48	6.7				<3.1	<6.25
	5	110	0.31	37	11	0.85				<3.1	<5.00
	8	97	0.04	14	4.1	<0.1				<3.1	<4.54
	9	140	0.32	43	18	1.8				<3.1	<5.06
	11	120	<0.07	17	12	1.3				<3.1	<4.48
	17	390	0.32	40	22	1.4				<3.1	<4.70
5. Mass Spectral Determination of Octachlorostyrene in Fields Brook Sediment, U.S. EPA, March 1982	1						0.99				
	2						0.65				
	1						0.05				
	4						0.28				
	5						0.35				
	6						0.18				
	7										

[a] Blanks mean constituent not analyzed for.
[b] See Figure 4 for locations.
Source: Data summarized in Remedial Action Master Plan for the Fields Brook Superfund Site, U.S. EPA - 1983.

Table 5

Concentration Ranges of Organic Compounds More Frequently Detected in Sediment Samples. (R4)

Reach	Stationing Along Fields Brook[b]	Range[a] (ug/kg) Total Polychlorinated Biphenyl Compounds (PCB's)	Total Hexachloro-butadiene	Total Volatile Organic Compounds (VOC)	Total Polynuclear Aromatic Compounds (PNA)	Total Chlorinated Benzene Compounds	Total Phthalate Compounds
Detrex Tributary	10600	ND	1,716-389,300	ND-24,987	ND-2,408	1,320-387,000	ND-1,699
DS Tributary	7900	ND	250-140,000	22-466,000	ND-46,194	300-815,400	ND-2,547
Route 11 Tributary	6500	ND-1,544	ND	3-202	ND-2,300		
Unnamed Tributary (Location 9)	3600	57	ND	7.5	ND	ND	806
Unnamed Tributary (Location 22)	13000	ND	ND	34.5	ND	ND	532
Fields Brook above Detrex Tributary	10600 to 19900	ND	ND	4-144,000	ND-188,265	ND-330	ND
Fields Brook from STH11 to Detrix Tributary	6400 to 10600	ND-518,300	ND-600,000	23-820,000	ND-47,204	ND-322,712	ND-29,730
Fields Brook from Ashtabula River to STH11	0 to 6400	ND-11,450	ND-2,700	ND-797	ND-5,400	ND-5,880	ND-2,700
Ashtabula River	--	ND-63,125	ND	5-4,825	ND-78,892	ND-9,360	ND-156,250

Note: The ranges of concentration shown in this table are for sediment samples taken from 0 to 20 inches in depth.

[a]Totals are calculated using concentrations reported in Appendix E. Compounds detected at concentrations below the quantitation limit have been included in the totals assuming a value equal to the quantitation limit.

[b]See Figure 3-1 for stream stationing of the tributaries from the confluence with Fields Brook.

ND indicates "none detected."

Table 6

Inorganic Chemistry of Sediments Sampled from the Ashtabula River, Ashtabula, Ohio on November 30 and December 3, 1982. (R1)

Lab No. Identification	3207-82 Site #1	3208-82 Site #2	3209-82 Site #3	3210-82 Site #4	3211-82 Site #5
pH, S.U.	7.4	7.5	7.2	7.1	7.6
Total Solids, %	40.9	29.8	29.6	24.0	29.7
T. Cyanide, mg/kg	1.4	0.86	1.1	2.1	6.6
Phenols, mg/kg	0.27	0.45	<0.10	<0.12	<0.10
Antimony, mg/kg	<0.5	<0.5	<0.5	0.8	0.8
Arsenic, mg/kg	23	56	47	39	20
Barium, mg/kg	660	600	220	200	690
Beryllium, mg/kg	8	4	6	7	8
Cadmium, mg/kg	8	7	6	3	9
Chromium, mg/kg	629	214	64	132	541
Copper, mg/kg	50	66	35	34	69
Lead, mg/kg	89	79	63	56	88
Mercury, mg/kg	1.7	3.7	2.2	1.8	4.7
Nickel, mg/kg	51	46	32	28	55
Selenium, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Silver, mg/kg	14	8	7	11	10
Thallium, mg/kg	<5	<5	<5	<5	<5
Zinc, mg/kg	278	172	138	144	173
Asbestos, Fibers/gram	<2000	<2000	<2000	<2000	<2000

Table 7

Organic Chemistry of Sediments Sampled from the Ashtabula River, Ashtabula, Ohio on November 30 and December 2, 1982. (R1)

Lab No. Identification	3207-82 Site #1	3208-82 Site #2	3209-82 Site #3	3210-82 Site #4	3211-82 Site #5
	(All concentrations are mg/kg dry weight)				
VOLATILE ORGANICS					
acrolein	<1.0	<1.0	<1.0	<1.0	<1.0
acrylonitrile	<1.0	<1.0	<1.0	<1.0	<1.0
benezene	<0.01	<0.01	<0.01	<0.01	<0.01
toluene	0.07	<0.01	<0.01	<0.01	0.04
ethyl benzene	<0.02	<0.02	<0.02	<0.02	<0.02
carbon tetrachloride	<0.01	<0.01	<0.01	<0.01	<0.01
chlorobenzene	0.15	0.06	0.03	0.06	0.14
1,2-dichloroethane	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,1-trichloroethane	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-dichloroethylene	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-trichloroethane	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-tetrachloroethane	<0.01	<0.01	<0.01	<0.01	<0.01
chloroethane	<0.1	<0.1	<0.1	<0.1	<0.1
2-chloroethyl vinyl ether	<0.05	<0.05	<0.05	<0.05	<0.05
chloroform	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-dichloropropane	<0.02	<0.02	<0.02	<0.02	<0.02
cis-1,3-dichloropropene	<0.02	<0.02	<0.02	<0.02	<0.02
trans-1,3-dichloropropene	<0.02	<0.02	<0.02	<0.02	<0.02
methylene chloride	<0.01	<0.01	<0.01	<0.01	<0.01
methyl chloride	<0.1	<0.1	<0.1	<0.1	<0.1
methyl bromide	<0.1	<0.1	<0.1	<0.1	<0.1
bromoform	<0.05	<0.05	<0.05	<0.05	<0.05
dichlorobromomethane	<0.01	<0.01	<0.01	<0.01	<0.01
trichlorofluoromethane	<0.01	<0.01	<0.01	<0.01	<0.01
dichlorodifluoromethane	<0.01	<0.01	<0.01	<0.01	<0.01
chlorodibromomethane	<0.01	<0.01	<0.01	<0.01	<0.01
tetrachloroethylene	<0.01	<0.01	<0.01	<0.01	<0.01
trichloroethylene	<0.01	<0.01	<0.01	<0.01	<0.01
vinyl chloride	<0.1	<0.1	<0.1	<0.1	<0.1
1,2-trans-dichloroethylene	<0.01	<0.01	<0.01	<0.01	<0.01
bis(chloromethyl)ether	*	*	*	*	*

*Due to the instability of this compound and the related analytical obstacles, it has been removed from the Priority Pollutant List.

(Continued

Table 7 (Continued)

Lab No. Identification	3207-82 Site #1	3208-82 Site #2	3209-82 Site #3	3210-82 Site #4	3211-82 Site #5
	(All concentrations are mg/kg dry weight)				
ACID FRACTION					
phenol	<0.6	<0.6	<0.6	<0.6	<0.6
2-nitrophenol	<1.1	<1.1	<1.1	<1.1	<1.1
4-nitrophenol	<1.2	<1.2	<1.2	<1.2	<1.2
2,4-dinitrophenol	<2.9	<2.9	<2.9	<2.9	<2.9
4,6-dinitro-o-cresol	<1.3	<1.3	<1.3	<1.3	<1.3
pentachlorophenol	<3.1	<3.1	<3.1	<3.1	<3.1
p-chloro-m-cresol	<0.8	<0.8	<0.8	<0.8	<0.8
2-chlorophenol	<2.8	<2.8	<2.8	<2.8	<2.8
2,4-dichlorophenol	<1.2	<1.2	<1.2	<1.2	<1.2
2,4,6-trichlorophenol	<1.4	<1.4	<1.4	<1.4	<1.4
2,4-dimethylphenol	<0.6	<0.6	<0.6	<0.6	<0.6

(Continued)

Table 7 (Continued)

Lab No. Identification	3207-82 Site #1	3208-82 Site #2	3209-82 Site #3	3210-82 Site #4	3211-82 Site #5
	(All concentrations are mg/kg dry weight)				
BASE NEUTRAL FRACTION					
1,2-dichlorobenzene	44	8.1	4.0	1.7	30
1,3-dichlorobenzene	12	4.8	1.9	2.5	20
1,4-dichlorobenzene	110	76	24	15	220
hexachloroethane	< 0.7	< 0.9	< 0.3	< 0.3	< 1.5
hexachlorobutadiene	2.0	0.2	0.1	0.1	0.5
hexachlorobenzene	9.9	10	2.1	1.5	32
1,2,4-trichlorobenzene	13	15	7.0	4.4	36
bis (2-chloroethoxy) methane	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
naphthalene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
2-chloronaphthalene	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
isophorone	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
nitrobenzene	< 18	< 18	< 18	< 18	< 18
2,6-dinitrotoluene	< 5.5	< 5.5	< 5.5	< 5.5	< 5.5
2,4-dinitrotoluene	< 6.3	< 6.3	< 6.3	< 6.3	< 6.3
4-bromophenyl phenyl ether	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
bis (2-ethylhexyl) phthalate	8.4	7.9	2.7	5.5	21
di-n-octyl phthalate	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
dimethyl phthalate	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
diethyl phthalate	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
di-n-butyl phthalate	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
acenaphthylene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
acenaphthene	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
butyl benzylphthalate	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
fluorene	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
fluoranthene	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
chrysene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
pyrene	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
phenanthrene	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
anthracene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
benzo(a)anthracene	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
benzo(b)fluoranthene	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
benzo(k)fluoranthene	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
benzo(a)pyrene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
indeno (1,2,3-cd)pyrene	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
dibenzo(a,h)anthracene	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
benzo(ghi)perylene	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
4-chlorophenyl phenyl ether	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
3,3'-dichlorobenzidine	< 10	< 10	< 10	< 10	< 10
benzidine	< 10	< 10	< 10	< 10	< 10
bis(2-chloroethyl)ether	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3
1,2-diphenylhydrazine	< 2.7	< 2.7	< 2.7	< 2.7	< 2.7
hexachlorocyclopentadiene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
N-nitrosodiphenylamine	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
N-nitrosodimethylamine	< 6.2	< 5.2	< 5.2	< 6.2	< 6.2
N-nitroso-n-propylamine	< 13	< 13	< 13	< 13	< 13
bis(s-chloroisopropyl)ether	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

(Continued)

Table 7 (Concluded)

Lab No. Identification	3207-82 Site #1	3208-82 Site #2	3209-82 Site #3	3210-82 Site #4	3211-82 Site #5
	(All concentrations are mg/kg) dry weight)				
PESTICIDE/PCB FRACTION					
β-endosulfan	<0.06	<0.06	<0.03	<0.03	<0.12
endosulfan sulfate	<0.30	<0.30	<0.12	<0.12	<0.60
α- BHC	<0.06	<0.06	<0.03	<0.03	<0.12
β- BHC	<0.15	<0.15	<0.06	<0.06	<0.30
γ- BHC (lindane)	<0.07	<0.07	<0.03	<0.03	<0.14
δ- BHC	<0.09	<0.09	<0.04	<0.04	<0.18
aldrin	<0.05	<0.05	<0.02	<0.02	<0.10
dieldrin	<0.07	<0.07	<0.03	<0.03	<0.14
4,4'-DDE	<0.07	<0.07	<0.03	<0.03	<0.14
4,4'-DDD	<0.19	<0.19	<0.08	<0.08	<0.38
4,4'-DDT	<0.26	<0.26	<0.10	<0.10	<0.52
endrin	<0.23	<0.23	<0.09	<0.09	<0.46
endrin aldehyde	<0.14	<0.14	<0.06	<0.06	<0.28
heptachlor	<0.20	<0.20	<0.08	<0.08	<0.40
heptachlor epoxide	<0.10	<0.10	<0.04	<0.04	<0.20
chlordane	<0.71	<0.71	<0.29	<0.29	<1.4
toxaphene	<2.2	<2.2	<0.9	<0.9	<4.4
aroclor 1016	<3.0	<3.0	<1.2	<1.2	<6.0
aroclor 1221	<3.0	<3.0	<1.2	<1.2	<6.0
aroclor 1232	<3.0	<3.0	<1.2	<1.2	<6.0
aroclor 1242	120	31	11	24	70
aroclor 1248	<3.0	<3.0	<1.2	<1.2	<6.0
aroclor 1254	<3.0	<3.0	<1.2	<1.2	<6.0
aroclor 1260	<3.0	<3.0	<1.2	<1.2	<6.0
methoxychlor	<2.0	<2.0	<1.0	<1.0	<4.0
mirex	<2.0	<2.0	<1.0	<1.0	<4.0
ι-Endosulfan	<0.09	<0.09	<0.05	<0.05	<0.18
WA HERBICIDES					
',4-D	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-TP(silvex)	<0.5	<0.5	<0.5	<0.5	<0.5
DIOXIN SCREENING BY GC/MS					
2,3,7,8-Tetrachloro-Dibenzodioxin (TCDD)	<0.7	<0.4	<0.2	<0.4	<0.5

Table 8

Bulk Chemical Analyses (Inorganic Parameters) Conducted on Sediments from Ashtabula Harbor. (R2)

ATEC Lab No. COE Site No.	1757-84 4	1758-84 5	1759-84 6	1760-84 7	1761-84 8
Total Solids, %	51.6	59.9	61.0	67.7	62.3
T. Volatile Solids, %	6.49	7.20	3.97	2.68	2.88
Cyanide	0.5	0.4	< 0.1	< 0.1	< 0.1
Phenols	0.9	0.3	< 0.2	< 0.2	< 0.2
Arsenic	10	10	13	15	14
Cadmium	3	2	2	3	1
Chromium	22	21	20	18	16
Copper	37	29	35	32	27
Lead	27	31	38	28	28
Mercury	0.5	0.3	0.2	< 0.1	0.2
Nickel	33	32	32	33	27
Zinc	125	114	108	124	117
Iron	28,900	27,200	28,900	27,800	22,500
Manganese	521	562	642	649	599
COD	72,400	64,300	53,100	41,900	32,700
Ammonia N	304	122	82	47	34
TKN	2,380	1,590	635	782	888
Total P	604	455	455	434	435

All results reported in mg/kg unless otherwise noted.

(Continued)

Table 8 (Continued)

ATEC Lab No. COE Site No.	1762-84 9	1763-84 10	1764-84 11	1765-84 12	1766-84 13
Total Solids, %	57.7	58.7	63.0	59.8	59.9
T. Volatile Solids, %	3.36	2.92	3.80	2.77	2.93
Cyanide	< 0.1	0.1	0.1	0.2	< 0.1
Phenols	< 0.2	0.1	0.3	0.5	0.7
Arsenic	15	14	14	14	15
Cadmium	1	2	2	2	2
Chromium	29	23	26	21	20
Copper	40	37	35	37	36
Lead	34	17	16	16	13
Mercury	0.3	< 0.1	0.4	0.2	0.3
Nickel	38	36	38	37	36
Zinc	146	118	130	118	114
Iron	33,200	32,500	31,400	30,100	30,500
Manganese	811	714	673	697	759
COD	56,500	52,800	52,500	45,700	46,700
Ammonia N	75	51	64	58	85
TKN	1,110	1,030	1,050	1,080	974
Total P	558	504	508	501	537

All results reported in mg/kg unless otherwise noted.

(Continued)

Table 8 (Concluded)

ATEC Lab No. COE Site No.	1767-84 14	1768-84 Disposal	1769-84 Ref-1	1770-84 Ref-2	1771-84 Ref-3
Total Solids, %	54.7	47.3	51.7	53.1	53.6
T. Volatile Solids, %	8.09	3.32	2.30	3.67	3.27
Cyanide	0.2	0.2	0.3	0.1	0.5
Phenols	2.4	< 0.2	0.3	0.3	< 0.2
Arsenic	11	12	9.4	12	11
Cadmium	1	2	3	2	2
Chromium	28	46	27	37	30
Copper	34	43	41	51	44
Lead	27	40	32	38	35
Mercury	0.2	0.4	0.2	0.3	0.2
Nickel	35	42	40	42	41
Zinc	120	208	164	360	254
Iron	30,200	27,700	28,700	30,900	32,900
Manganese	618	623	590	593	584
COD	98,000	55,000	43,800	49,200	47,900
Ammonia N	579	83	62	71	51
TKN	2,430	1,560	1,190	1,070	1,060
Total P	711	509	553	603	546

All results reported in mg/kg unless otherwise noted.

Table 9

Bulk Chemical Analyses (Organic Parameters) Conducted on Sediments from Ashtabula Harbor, Ashtabula, Ohio, (R2)

ATEC Lab No.	11577	11578	11579	11580
COE Site No.	4	5	6	7
Sediments, PCB's (Item No. 28)				
Aroclor 1016	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1221	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1232	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1242	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1248	0.81	0.65	0.22	0.17
Aroclor 1254	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1260	< 0.10	< 0.10	< 0.10	< 0.10
Sediments, Polynuclear Aromatic Hydrocarbons (Item No. 36)				
Phenanthrene	0.88	0.82	0.94	0.62
Anthracene	0.93	0.56	0.48	0.53
Fluoranthene	1.42	< 0.20	< 0.20	0.62
Pyrene	0.96	0.62	0.20	0.40
Benzo(a)Anthracene	< 0.20	< 0.20	0.52	0.20
Chrysene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(g)Fluoranthene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(k)Fluoranthene	2.57	0.96	1.01	2.99
Benzo(a)Pyrene	< 0.20	< 0.20	< 0.20	< 0.20
Dibenzo(a,h)Anthracene	< 0.20	< 0.20	< 0.20	< 0.20
Indeno(1,2,3-cd)Pyrene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(ghi)Perylene	< 0.20	< 0.20	< 0.20	< 0.20
Sediments, Other Base-Neutral Organics (Item No. 14)				
Hexachloroethane	0.03	0.02	< 0.01	< 0.01
Hexachlorobutadiene	0.06	0.02	< 0.01	< 0.01
Hexachlorobenzene	0.65	0.22	0.07	0.04
1,2,4-Trichlorobenzene	< 0.10	< 0.10	< 0.10	< 0.10
2-Chloronaphthalene	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Diphenylhydrazine	< 0.10	< 0.10	< 0.10	< 0.10
Hexachlorocyclopentadiene	0.04	< 0.10	< 0.10	< 0.10
Oil and Grease (Item No. 12)				
Oil & Grease	940	746	577	512

(Continued)

Table 9 (Continued)

ATEC Lab No. COE Site No.	11577 4	11578 5	11579 6	11580 7
Sediments, Pesticides (Item No. 26)				
β-Endosulfan	< 0.02	< 0.02	< 0.02	< 0.02
α-Endosulfan	< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan Sulfate	< 0.03	< 0.03	< 0.03	< 0.03
α-BHC	< 0.01	< 0.01	< 0.01	< 0.01
β-BHC	< 0.01	< 0.01	< 0.01	< 0.01
γ-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01
δ-BHC	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDE	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDD	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDT	< 0.02	< 0.02	< 0.02	< 0.02
Endrin	< 0.03	< 0.03	< 0.03	< 0.03
Endrin Aldehyde	< 0.03	< 0.03	< 0.03	< 0.03
Heptachlor	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor Epoxide	< 0.03	< 0.03	< 0.03	< 0.03
Chlordane	< 0.10	< 0.10	< 0.10	< 0.10
Toxaphene	< 0.50	< 0.50	< 0.50	< 0.50
Methoxychlor	< 0.10	< 0.10	< 0.10	< 0.10
Mirex	< 0.05	< 0.05	< 0.05	< 0.05
Sediments, Pthalates (Item No. 32)				
Dimethyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Diethyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Di-n-Butyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Butyl Benzyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Bis(2-ethylhexyl)Phthalate	1.05	1.07	0.53	0.12
Di-n-Octyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Sediments, Purgeable Aromatics (Item No. 34)				
Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	< 0.02	< 0.02	< 0.02	< 0.02
1,2-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,3-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,4-Dichlorobenzene	< 0.04	< 0.04	< 0.04	< 0.04
Ethyl Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	1.76	2.00	0.60	< 0.01

All results reported as mg/kg (dry weight basis).

(Continued)

Table 9 (Continued)

ATEC Lab No. COE Site No.	11581 8	11582 9	11583 10	11584 11
Sediments, PCB's (Item No. 28)				
Aroclor 1016	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1221	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1232	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1242	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1248	0.35	0.38	0.18	0.33
Aroclor 1254	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1260	< 0.10	< 0.10	< 0.10	< 0.10
Sediments, Polynuclear Aromatic Hydrocarbons (Item No. 36)				
Phenanthrene	0.28	0.77	0.32	0.64
Anthracene	0.31	0.97	0.50	0.91
Fluoranthene	< 0.20	1.01	< 0.20	0.84
Pyrene	< 0.20	0.77	0.31	0.60
Benzo(a)Anthracene	< 0.20	0.33	< 0.20	< 0.20
Chrysene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(g)Fluoranthene	< 0.30	0.47	< 0.30	< 0.30
Benzo(k)Fluoranthene	0.67	3.27	0.47	2.29
Benzo(a)Pyrene	< 0.40	< 0.40	< 0.40	< 0.40
Dibenzo(a,h)Anthracene	< 0.80	< 0.80	< 0.80	< 0.80
Indeno(1,2,3-cd)Pyrene	< 0.80	< 0.80	< 0.80	< 0.80
Benzo(ghi)Perylene	< 1.00	< 1.00	< 1.00	< 1.00
Sediments, Other Base-Neutral Organics (Item No. 14)				
Hexachloroethane	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	< 0.01	0.17	0.01	0.02
Hexachlorobenzene	0.02	0.08	0.04	0.06
1,2,4-Trichlorobenzene	< 0.10	< 0.10	< 0.10	< 0.10
2-Chloronaphthalene	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Diphenylhydrazine	< 0.10	< 0.10	< 0.10	< 0.10
Hexachlorocyclopentadiene	< 0.01	< 0.01	< 0.01	< 0.01
Oil and Grease (Item No. 12)				
Oil & Grease	446	608	500	542

(Continued)

Table 9 (Continued)

ATEC Lab No. / COE Site No.	11581 / 8	11582 / 9	11583 / 10	11584 / 11
Sediments, Pesticides (Item No. 26)				
β-Endosulfan	< 0.02	< 0.02	< 0.02	< 0.02
α-Endosulfan	< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan Sulfate	< 0.04	< 0.02	0.04	0.03
α-BHC	< 0.02	< 0.02	< 0.02	< 0.02
β-BHC	< 0.02	< 0.02	< 0.02	< 0.02
γ-BHC (Lindane)	< 0.02	< 0.02	< 0.02	< 0.02
δ-BHC	< 0.02	< 0.02	< 0.02	< 0.02
Aldrin	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDE	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDD	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDT	< 0.02	0.08	< 0.02	< 0.02
Endrin	< 0.02	< 0.02	< 0.02	< 0.02
Endrin Aldehyde	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor Epoxide	< 0.02	< 0.02	< 0.02	< 0.02
Chlordane	< 0.02	< 0.02	< 0.02	< 0.02
Toxaphene	< 0.02	< 0.02	< 0.02	< 0.02
Methoxychlor	< 0.02	< 0.02	< 0.02	< 0.02
Mirex	< 0.02	< 0.02	< 0.02	< 0.02
Sediments, Pthalates (Item No. 32)				
Dimethy Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Diethyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Di-n-Butyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Butyl Benzyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Bis(2-ethylhexyl)Phthalate	0.67	0.84	< 0.20	1.03
Di-n-Octyl Phthalate	0.26	0.03	< 0.20	< 0.20
Sediments, Purgeable Aromatics (Item No. 34)				
Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	< 0.02	< 0.02	< 0.02	< 0.02
1,2-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,3-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,4-Dichlorobenzene	< 0.04	< 0.04	< 0.04	< 0.04
Ethyl Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	< 0.01	< 0.01	< 0.01	< 0.01

All results reported as mg/kg (dry weight basis).

(Continued)

Table 9 (Continued)

ATEC Lab No. / COE Site No.	11585 / 12	11586 / 13	11587 / 14	11588 / Disposal
Sediments, PCB's (Item No. 28)				
Aroclor 1016	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1221	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1232	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1242	< 0.10	< 0.10	< 0.10	< 0.10
Aroclor 1248	0.17	0.35	1.08	0.77
Aroclor 1254	< 0.10	< 0.01	< 0.10	< 0.10
Aroclor 1260	< 0.10	< 0.01	< 0.10	< 0.10
Sediments, Polynuclear Aromatic Hydrocarbons (Item No. 36)				
Phenanthrene	0.30	0.83	0.81	0.63
Anthracene	0.48	0.47	< 0.20	0.63
Fluoranthene	0.40	0.29	< 0.20	0.59
Pyrene	0.35	< 0.20	< 0.20	0.60
Benzo(a)Anthracene	< 0.20	< 0.20	< 0.20	< 0.20
Chrysene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(g)Fluoranthene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(k)Fluoranthene	0.46	< 0.20	1.70	< 0.20
Benzo(a)Pyrene	< 0.20	< 0.20	< 0.20	< 0.20
Dibenzo(a,h)Anthracene	< 0.20	< 0.20	< 0.20	< 0.20
Indeno(1,2,3-cd)Pyrene	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(ghi)Perylene	< 0.20	< 0.20	< 0.20	< 0.20
Sediments, Other Base-Neutral Organics (Item No. 14)				
Hexachloroethane	< 0.01	< 0.01	0.03	< 0.01
Hexachlorobutadiene	< 0.01	< 0.01	0.05	0.02
Hexachlorobenzene	0.04	0.03	0.36	0.04
1,2,4-Trichlorobenzene	< 0.10	< 0.10	< 0.10	< 0.10
2-Chloronaphthalene	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Diphenylhydrazine	< 0.10	< 0.10	< 0.10	< 0.10
Hexachlorocyclopentadiene	< 0.01	< 0.01	< 0.01	< 0.01
Oil and Grease (Item No. 12)				
Oil & Grease	522	419	1430	777

(Continued)

Table 9 (Continued)

ATEC Lab No. COE Site No.	11585 12	11586 13	11587 14	11588 Disposal
Sediments, Pesticides (Item No. 26)				
β-Endosulfan	< 0.02	< 0.02	< 0.02	< 0.02
α-Endosulfan	< 0.02	< 0.02	0.07	< 0.02
Endosulfan Sulfate	< 0.03	< 0.02	< 0.02	< 0.02
α-BHC	< 0.02	< 0.02	< 0.02	< 0.02
β-BHC	< 0.02	< 0.02	< 0.02	< 0.02
γ-BHC (Lindane)	< 0.02	< 0.02	< 0.02	< 0.02
δ-BHC	< 0.02	< 0.02	< 0.02	< 0.02
Aldrin	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDE	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDD	< 0.02	< 0.02	< 0.02	< 0.02
4,4'-DDT	< 0.02	< 0.02	< 0.02	< 0.02
Endrin	< 0.02	< 0.02	< 0.02	< 0.02
Endrin Aldehyde	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor Epoxide	< 0.02	< 0.02	< 0.02	< 0.02
Chlordane	< 0.02	< 0.02	< 0.02	< 0.02
Toxaphene	< 0.02	< 0.02	< 0.02	< 0.02
Methoxychlor	< 0.02	< 0.02	< 0.02	< 0.02
Mirex	< 0.02	< 0.02	< 0.02	< 0.02
Sediments, Pthalates (Item No. 32)				
Dimethy Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Diethyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Di-n-Butyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Butyl Benzyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Bis(2-ethylhexyl)Phthalate	1.87	1.17	3.26	1.33
Di-n-Octyl Phthalate	< 0.20	< 0.20	< 0.20	< 0.20
Sediments, Purgeable Aromatics (Item No. 34)				
Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	< 0.02	< 0.02	< 0.02	< 0.02
1,2-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,3-Dichlorobenzene	< 0.03	< 0.03	< 0.03	< 0.03
1,4-Dichlorobenzene	< 0.04	< 0.04	< 0.04	< 0.04
Ethyl Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	< 0.01	< 0.01	21.3	< 0.01

All results reported as mg/kg (dry weight basis).

(Continued)

Table 9 (Continued)

ATEC Lab No. COE Site No.	11589 Ref 1	11590 Ref 2	11591 Ref 2
Sediments, PCB's (Item No. 28)			
Aroclor 1016	< 0.10	< 0.10	< 0.10
Aroclor 1221	< 0.10	< 0.10	< 0.10
Aroclor 1232	< 0.10	< 0.10	< 0.10
Aroclor 1242	< 0.10	< 0.10	< 0.10
Aroclor 1248	0.43	0.37	0.40
Aroclor 1254	< 0.10	< 0.10	< 0.10
Aroclor 1260	< 0.10	< 0.10	< 0.10
Sediments, Polynuclear Aromatic Hydrocarbons (Item No. 36)			
Phenanthrene	0.64	0.40	0.56
Anthracene	0.48	< 0.20	0.41
Fluoranthene	0.49	0.85	0.62
Pyrene	0.51	0.56	0.69
Benzo(a)Anthracene	< 0.20	< 0.20	< 0.20
Chrysene	< 0.20	< 0.20	< 0.20
Benzo(g)Fluoranthene	< 0.30	0.51	< 0.30
Benzo(k)Fluoranthene	1.84	2.43	< 0.30
Benzo(a)Pyrene	< 0.40	< 0.40	< 0.40
Dibenzo(a,h)Anthracene	< 0.80	< 0.80	< 0.80
Indeno(1,2,3-cd)Pyrene	< 0.80	< 0.80	< 0.80
Benzo(ghi)Perylene	< 1.00	< 1.00	< 1.00
Sediments, Other Base-Neutral Organics (Item No. 14)			
Hexachloroethane	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	0.02	< 0.01
1,2,4-Trichlorobenzene	< 0.10	< 0.10	< 0.10
2-Chloronaphthalene	< 0.10	< 0.10	< 0.10
1,2-Diphenylhydrazine	< 0.10	< 0.10	< 0.10
Hexachlorocyclopentadiene	< 0.01	< 0.01	< 0.01
Oil and Grease (Item No. 12)			
Oil & Grease	513	875	631

(Continued)

Table 9 (Concluded)

ATEC Lab No. COE Site No.	11589 Ref-1	11590 Ref-2	11591 Ref-3
Sediments, Pesticides (Item No. 26)			
β-Endosulfan	< 0.02	< 0.02	< 0.02
α-Endosulfan	< 0.02	< 0.02	< 0.02
Endosulfan Sulfate	< 0.02	< 0.02	< 0.02
α-BHC	< 0.02	< 0.02	< 0.02
β-BHC	< 0.02	< 0.02	< 0.02
γ-BHC (Lindane)	< 0.02	< 0.02	< 0.02
δ-BHC	< 0.02	< 0.02	< 0.02
Aldrin	< 0.02	< 0.02	< 0.02
Dieldrin	< 0.02	< 0.02	< 0.02
4,4'-DDE	< 0.02	< 0.02	< 0.02
4,4'-DDD	< 0.02	< 0.02	< 0.02
4,4'-DDT	< 0.02	< 0.02	< 0.02
Endrin	< 0.02	< 0.02	< 0.02
Endrin Aldehyde	< 0.02	< 0.02	< 0.02
Heptachlor	< 0.02	< 0.02	< 0.02
Heptachlor Epoxide	< 0.02	< 0.02	< 0.02
Chlordane	< 0.02	< 0.02	< 0.02
Toxaphene	< 0.02	< 0.02	< 0.02
Methoxychlor	< 0.02	< 0.02	< 0.02
Mirex	< 0.02	< 0.02	< 0.02
Sediments, Pthalates (Item No. 32)			
Dimethy Phthalate	< 0.20	< 0.20	< 0.20
Diethyl Phthalate	< 0.20	< 0.20	< 0.20
Di-n-Butyl Phthalate	< 0.20	< 0.20	< 0.20
Butyl Benzyl Phthalate	< 0.20	< 0.20	< 0.20
Bis(2-ethylhexyl)Phthalate	1.36	1.12	1.58
Di-n-Octyl Phthalate	< 0.20	< 0.20	< 0.20
Sediments, Purgeable Aromatics (Item No. 34)			
Benzene	< 0.01	< 0.01	< 0.01
Chlorobenzene	< 0.02	< 0.02	< 0.02
1,2-Dichlorobenzene	< 0.03	< 0.03	< 0.03
1,3-Dichlorobenzene	< 0.03	< 0.03	< 0.03
1,4-Dichlorobenzene	< 0.04	< 0.04	< 0.04
Ethyl Benzene	< 0.01	< 0.01	< 0.01
Toluene	< 0.01	< 0.01	< 0.01

All results reported as mg/kg (dry weight basis).

Table 10

Bulk Analyses Conducted on Sediments from Ashtabula Harbor - Inorganic Parameters, (R10)

LAB NO. / IDENTIFICATION	6053-88 DISPOSAL SITE	6054-88 R-1	6055-88 R-2	6056-88 R-3	6057-88 #4	6058-88 #5	6059-88 #6
ARSENIC, TOTAL, AS, MG/KG	18	13	14	14	14	15	18
BARIUM, TOTAL, BA, MG/KG	88	66	80	69	100	110	83
CADMIUM, TOTAL, CD, MG/KG	3	1	2	1	2	2	1
CHROMIUM, TOTAL, CR, MG/KG	34	15	31	13	24	23	14
COD, MG/KG	70000	61000	67000	49000	84000	63000	65000
COPPER, TOTAL, CU, MG/KG	47	32	44	27	31	33	29
CYANIDE, TOTAL, CN, MG/KG	<0.40	<0.28	<0.49	<0.21	<0.25	<0.27	<0.23
IRON, TOTAL, FE, MG/KG	24800	23100	23900	24500	23900	24700	26200
LEAD, TOTAL, PB, MG/KG	45	24	40	16	43	38	18
MANGANESE, TOTAL, MN, MG/KG	380	390	360	400	290	300	430
MERCURY, TOTAL, HG, MG/KG	0.2	<0.1	0.2	<0.1	0.2	0.1	<0.1
NICKEL, TOTAL, NI, MG/KG	34	27	32	23	26	26	25
NITRATE N, MG/KG	<5.60	<5.07	<5.28	<4.11	<4.31	<3.72	<3.82
NITROGEN, AMMONIA, N, MG/KG	62	35	46	24	53	41	38
OIL/GREASE, MG/KG	1100	700	1000	600	1300	680	550
PHENOLS, 4-AAP, MG/KG	0.19	0.24	0.18	0.09	<0.10	0.33	<0.10
PHOSPHORUS, TOTAL, P, MG/KG	610	570	650	620	590	620	540
RESIDUE, T. VOLATILE, %	4.22	2.65	2.75	2.67	8.58	5.24	3.47
RESIDUE, TOTAL (TS), %	44.6	48.6	45.9	62.4	54.5	64.0	63.9
TOTAL KJELDAHL N, MG/KG	1250	580	510	566	1210	547	479
ZINC, TOTAL, ZN, MG/KG	300	110	290	94	130	120	93

LAB NO. / IDENTIFICATION	6061-88 #8	6062-88 #9	6063-88 #10	6064-88 #11	6065-88 #12	6066-88 #13	6067-88 #14
ARSENIC, TOTAL, AS, MG/KG	12	15	16	15	16	15	12
BARIUM, TOTAL, BA, MG/KG	59	87	79	82	80	81	100
CADMIUM, TOTAL, CD, MG/KG	1	1	1	1	1	2	1
CHROMIUM, TOTAL, CR, MG/KG	10	16	12	15	13	12	17
COD, MG/KG	35000	58000	60000	56000	57000	50000	85000
COPPER, TOTAL, CU, MG/KG	20	28	29	29	28	29	25
CYANIDE, TOTAL, CN, MG/KG	<0.32	<0.26	0.58	0.49	<0.20	<0.29	<0.32
IRON, TOTAL, FE, MG/KG	19800	27600	26400	26700	26500	25800	25300
LEAD, TOTAL, PB, MG/KG	18	17	18	16	19	19	33
MANGANESE, TOTAL, MN, MG/KG	330	430	410	400	400	430	320
MERCURY, TOTAL, HG, MG/KG	0.1	0.2	0.2	<0.1	0.1	<0.1	0.1
NICKEL, TOTAL, NI, MG/KG	20	27	27	26	25	25	24
NITRATE N, MG/KG	<3.15	<4.04	<4.17	<4.01	<3.71	<3.58	<4.08
NITROGEN, AMMONIA, N, MG/KG	30	51	47	34	30	47	47
OIL/GREASE, MG/KG	470	580	520	330	655	620	960
PHENOLS, 4-AAP, MG/KG	0.20	0.13	0.18	0.16	0.10	<0.08	<0.07
PHOSPHORUS, TOTAL, P, MG/KG	450	590	540	610	580	630	570
RESIDUE, T. VOLATILE, %	2.12	3.29	2.95	2.45	1.88	2.48	5.15
RESIDUE, TOTAL (TS), %	72.7	60.6	59.4	59.7	67.0	68.0	61.6
TOTAL KJELDAHL N, MG/KG	532	697	576	343	759	463	656
ZINC, TOTAL, ZN, MG/KG	83	95	96	99	93	95	140

Table 11

Bulk Chemical Analyses Conducted on Sediments from

Ashtabula Harbor - Organic Parameters. (R10)

ATEC Lab No.	13276	13277	13278	13279	13280
COE Site No.	Disposal	R-1	R-2	R-3	4
Sediments, Purgeable Halocarbons (Schedule D, - Item 2)					
Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Bromoform	<0.010	<0.010	<0.010	<0.010	<0.010
Bromodichloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
Carbon Tetrachloride	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Chloroethane	<0.020	<0.020	<0.020	<0.020	<0.020
2-Chloroethyl Vinyl Ether	<0.010	<0.010	<0.010	<0.010	<0.010
Chloroform	<0.005	<0.005	<0.005	<0.005	<0.005
Dibromochloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Dichlorodifluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
trans-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
Ethyl Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Bromide	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020
Methylene Chloride	<0.010	<0.010	<0.010	<0.010	<0.010
1,1,2,2-Tetrachloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Tetrachloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	<0.005	<0.005	<0.005	<0.005	0.009
trans-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Trichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
Vinyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020

All results reported as mg/kg (dry weight basis).

(Continued)

Table 11 (Continued)

ATEC Lab No.	13281	13282	13283	13284	13285
COE Site No.	5	6	7	8	9
Sediments, Purgeable Halocarbons (Schedule D, - Item 2)					
Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Bromoform	<0.010	<0.010	<0.010	<0.010	<0.010
Bromodichloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
Carbon Tetrachloride	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Chloroethane	<0.020	<0.020	<0.020	<0.020	<0.020
2-Chloroethyl Vinyl Ether	<0.010	<0.010	<0.010	<0.010	<0.010
Chloroform	<0.005	<0.005	<0.005	<0.005	<0.005
Dibromochloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Dichlorodifluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
trans-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
Ethyl Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Bromide	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020
Methylene Chloride	<0.010	<0.010	<0.010	<0.010	<0.010
1,1,2,2-Tetrachloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Tetrachloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	<0.005	0.550	0.068	0.007	<0.005
trans-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Trichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
Vinyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020

All results reported as mg/kg (dry weight basis).

(Continued)

Table 11 (Continued)

ATEC Lab No.	13286	13287	13288	13289	13290
COE Site No.	10	11	12	13	14
Sediments, Purgeable Halocarbons (Schedule D, - Item 2)					
Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Bromoform	<0.010	<0.010	<0.010	<0.010	<0.010
Bromodichloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
Carbon Tetrachloride	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Chloroethane	<0.020	<0.020	<0.020	<0.020	<0.020
2-Chloroethyl Vinyl Ether	<0.010	<0.010	<0.010	<0.010	<0.010
Chloroform	<0.005	<0.005	<0.005	<0.005	<0.005
Dibromochloromethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005
Dichlorodifluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
trans-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005
Ethyl Benzene	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Bromide	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020
Methylene Chloride	<0.010	<0.010	<0.010	<0.010	<0.010
1,1,2,2-Tetrachloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Tetrachloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	0.014	0.170	0.182	1.080	0.135
trans-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005
Trichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010
Vinyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020

All results reported as mg/kg (dry weight basis).

(Continued)

Table 11 (Continued)

Atec Sample No.	13276	13277	13278	13279
Client Sample No.	Disposal	R-1	R-2	R-3
Sediments, Base-Neutral Extractables (Schedule D, Item 30)				
Acenaphthene	< 0.25	< 0.25	< 0.25	< 0.25
Acenaphthylene	< 0.25	< 0.25	< 0.25	< 0.25
Anthracene	< 0.25	< 0.25	< 0.25	< 0.25
Benzidine	< 1.25	< 1.25	< 1.25	< 1.25
Benzo(a)anthracene	< 0.25	0.33	0.46	0.30
Benzo(a)pyrene	< 0.25	< 0.25	0.41	< 0.25
Benzo(b)fluoroanthene	0.75	0.54	0.76	0.41
Benzo(k)fluoroanthene	< 0.25	< 0.25	< 0.25	< 0.25
Benzo(ghi)perylene	< 1.25	< 1.25	< 1.25	< 1.25
Bis(2-chloroethoxy)methane	< 0.25	< 0.25	< 0.25	< 0.25
Bis(2-chloroethyl)ether	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-chloroisopropyl)ether	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-ethylhexyl)phthalate	< 0.50	0.62	0.57	0.70
4-Bromophenyl phenyl ether	< 0.50	< 0.50	< 0.50	< 0.50
Butyl benzyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
2-Chloronaphthalene	< 0.25	< 0.25	< 0.25	< 0.25
4-Chlorophenyl phenyl ether	< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	0.58	< 0.50	< 0.50	< 0.50
Dibenzo(a,h)anthracene	< 1.00	< 1.00	< 1.00	< 1.00
o-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
m-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
p-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
3,3'-Dichlorobenzidene	< 2.50	< 2.50	< 2.50	< 2.50
Diethyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
Dimethyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
Di-n-butyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
2,4-Dinitrotoluene	< 1.25	< 1.25	< 1.25	< 1.25
2,6-Dinitrotoluene	< 1.25	< 1.25	< 1.25	< 1.25
Di-n-octyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
1,2-Diphenylhydrazine	< 1.00	< 1.00	< 1.00	< 1.00
Fluoranthene	0.72	0.75	0.94	0.60
Fluorene	< 0.25	< 0.25	< 0.25	< 0.25
Hexachlorobenzene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachlorobutadiene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachlorocyclopentadiene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachloroethane	< 1.25	< 1.25	< 1.25	< 1.25
Indeno(1,2,3-cd)pyrene	< 1.00	< 1.00	< 1.00	< 1.00
Isophorone	< 0.25	< 0.25	< 0.25	< 0.25
Naphthalene	< 0.25	< 0.25	< 0.25	< 0.25
Nitrobenzene	< 1.25	< 1.25	< 1.25	< 1.25
N-nitrosodimethylamine	< 2.50	< 2.50	< 2.50	< 2.50
N-nitroso-n-propylamine	< 0.75	< 0.75	< 0.75	< 0.75
N-nitrosodiphenylamine	< 1.25	< 1.25	< 1.25	< 1.25
Phenanthrene	0.52	0.49	0.56	0.46
Pyrene	< 0.75	< 0.75	< 0.75	< 0.75
1,2,4-Trichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75

(Continued)

Table 11 (Continued)

Atec Sample No.		13280		13281		13282		13283
Client Sample No.		4		5		6		7
Sediments, Base-Neutral Extractables (Schedule D, Item 30)								
Acenaphthene		0.34	<	0.25	<	0.25	<	0.25
Acenaphthylene	<	0.25	<	0.25	<	0.25	<	0.25
Anthracene		0.45	<	0.25	<	0.25	<	0.25
Benzidine	<	1.25	<	1.25	<	1.25	<	1.25
Benzo(a)anthracene		1.98		0.66		0.32	<	0.25
Benzo(a)pyrene		1.36		0.51	<	0.25	<	0.25
Benzo(b)fluoroanthene		2.53		0.92	<	0.25	<	0.25
Benzo(k)fluoroanthene	<	0.75	<	0.75	<	0.75	<	0.75
Benzo(ghi)perylene	<	1.25	<	1.25	<	1.25	<	1.25
Bis(2-chloroethoxy)methane	<	0.25	<	0.25	<	0.25	<	0.25
Bis(2-chloroethyl)ether	<	0.50	<	0.50	<	0.50	<	0.50
Bis(2-chloroisopropyl)ether	<	0.50	<	0.50	<	0.50	<	0.50
Bis(2-ethylhexyl)phthalate		2.39		0.77		0.58	<	0.50
4-Bromophenyl phenyl ether	<	0.50	<	0.50	<	0.50	<	0.50
Butyl benzyl phthalate	<	0.75	<	0.75	<	0.75	<	0.75
2-Chloronaphthalene	<	0.25	<	0.25	<	0.25	<	0.25
4-Chlorophenyl phenyl ether	<	0.50	<	0.50	<	0.50	<	0.50
Chrysene		2.15		0.73	<	0.50	<	0.50
Dibenzo(a,h)anthracene	<	1.00	<	1.00	<	1.00	<	1.00
o-Dichlorobenzene	<	0.75	<	0.75	<	0.75	<	0.75
m-Dichlorobenzene	<	0.75	<	0.75	<	0.75	<	0.75
p-Dichlorobenzene	<	0.75	<	0.75	<	0.75	<	0.75
3,3'-Dichlorobenzidene	<	2.50	<	2.50	<	2.50	<	2.50
Diethyl phthalate	<	0.75	<	0.75	<	0.75	<	0.75
Dimethyl phthalate	<	0.75	<	0.75	<	0.75	<	0.75
Di-n-butyl phthalate	<	0.75	<	0.75	<	0.75	<	0.75
2,4-Dinitrotoluene	<	1.25	<	1.25	<	1.25	<	1.25
2,6-Dinitrotoluene	<	1.25	<	1.25	<	1.25	<	1.25
Di-n-octyl phthalate	<	0.75	<	0.75	<	0.75	<	0.75
1,2-Diphenylhydrazine	<	1.00	<	1.00	<	1.00	<	1.00
Fluoranthene		3.96		1.28		0.73	<	0.50
Fluorene		0.49	<	0.25	<	0.25	<	0.25
Hexachlorobenzene	<	1.25	<	1.25	<	1.25	<	1.25
Hexachlorobutadiene	<	1.25	<	1.25	<	1.25	<	1.25
Hexachlorocyclopentadiene	<	1.25	<	1.25	<	1.25	<	1.25
Hexachloroethane	<	1.25	<	1.25	<	1.25	<	1.25
Indeno(1,2,3-cd)pyrene	<	1.00	<	1.00	<	1.00	<	1.00
Isophorone	<	0.25	<	0.25	<	0.25	<	0.25
Naphthalene		1.07		0.57	<	0.25	<	0.25
Nitrobenzene	<	1.25	<	1.25	<	1.25	<	1.25
N-nitrosodimethylamine	<	2.50	<	2.50	<	2.50	<	2.50
N-nitroso-n-propylamine	<	0.75	<	0.75	<	0.75	<	0.75
N-nitrosodiphenylamine	<	1.25	<	1.25	<	1.25	<	1.25
Phenanthrene		2.54		1.00		0.58	<	0.25
Pyrene		2.94		0.95	<	0.75	<	0.75
1,2,4-Trichlorobenzene	<	0.75	<	0.75	<	0.75	<	0.75

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Continued)

Atec Sample No.	13284	13285	13286	13287
Client Sample No.	8	9	10	11
Sediments, Base-Neutral Extractables (Schedule D, Item 30)				
Acenaphthene	< 0.25	< 0.25	< 0.25	< 0.25
Acenaphthylene	< 0.25	< 0.25	< 0.25	< 0.25
Anthracene	< 0.25	< 0.25	< 0.25	< 0.25
Benzidine	< 1.25	< 1.25	< 1.25	< 1.25
Benzo(a)anthracene	< 0.25	< 0.25	< 0.25	< 0.30
Benzo(a)pyrene	< 0.25	< 0.25	< 0.25	< 0.25
Benzo(b)fluoroanthene	< 0.25	0.40	< 0.25	< 0.25
Benzo(k)fluoroanthene	< 0.75	< 0.75	< 0.75	< 0.75
Benzo(ghi)perylene	< 1.25	< 1.25	< 1.25	< 1.25
Bis(2-chloroethoxy)methane	< 0.25	< 0.25	< 0.25	< 0.25
Bis(2-chloroethyl)ether	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-chloroisopropyl)ether	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-ethylhexyl)phthalate	< 0.50	0.86	< 0.50	< 0.50
4-Bromophenyl phenyl ether	< 0.50	< 0.50	< 0.50	< 0.50
Butyl benzyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
2-Chloronaphthalene	< 0.25	< 0.25	< 0.25	< 0.25
4-Chlorophenyl phenyl ether	< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	< 0.50	< 0.50	< 0.50	< 0.50
Dibenzo(a,h)anthracene	< 1.00	< 1.00	< 1.00	< 1.00
o-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
m-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
p-Dichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75
3,3'-Dichlorobenzidene	< 2.50	< 2.50	< 2.50	< 2.50
Diethyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
Dimethyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
Di-n-butyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
2,4-Dinitrotoluene	< 1.25	< 1.25	< 1.25	< 1.25
2,6-Dinitrotoluene	< 1.25	< 1.25	< 1.25	< 1.25
Di-n-octyl phthalate	< 0.75	< 0.75	< 0.75	< 0.75
1,2-Diphenylhydrazine	< 1.00	< 1.00	< 1.00	< 1.00
Fluoranthene	0.70	0.55	< 0.50	< 0.50
Fluorene	< 0.25	< 0.25	< 0.25	< 0.25
Hexachlorobenzene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachlorobutadiene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachlorocyclopentadiene	< 1.25	< 1.25	< 1.25	< 1.25
Hexachloroethane	< 1.25	< 1.25	< 1.25	< 1.25
Indeno(1,2,3-cd)pyrene	< 1.00	< 1.00	< 1.00	< 1.00
Isophorone	< 0.25	< 0.25	< 0.25	< 0.25
Naphthalene	< 0.25	< 0.25	< 0.25	< 0.25
Nitrobenzene	< 1.25	< 1.25	< 1.25	< 1.25
N-nitrosodimethylamine	< 2.50	< 2.50	< 2.50	< 2.50
N-nitroso-n-propylamine	< 0.75	< 0.75	< 0.75	< 0.75
N-nitrosodiphenylamine	< 1.25	< 1.25	< 1.25	< 1.25
Phenanthrene	0.50	0.41	0.32	0.33
Pyrene	< 0.75	< 0.75	< 0.75	< 0.75
1,2,4-Trichlorobenzene	< 0.75	< 0.75	< 0.75	< 0.75

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Continued)

Atec Sample No.	13288	13289	13290
Client Sample No.	12	13	14
Sediments, Base-Neutral Extractables (Schedule D, Item 30)			
Acenaphthene	< 0.25	< 0.25	< 0.25
Acenaphthylene	< 0.25	< 0.25	< 0.25
Anthracene	< 0.25	< 0.25	< 0.25
Benzidine	< 1.25	< 1.25	< 1.25
Benzo(a)anthracene	< 0.25	< 0.25	< 0.25
Benzo(a)pyrene	< 0.25	< 0.25	< 0.25
Benzo(b)fluoroanthene	< 0.25	< 0.25	< 0.25
Benzo(k)fluoroanthene	< 0.75	< 0.75	< 0.75
Benzo(ghi)perylene	< 1.25	< 1.25	< 1.25
Bis(2-chloroethoxy)methane	< 0.25	< 0.25	< 0.25
Bis(2-chloroethyl)ether	< 0.50	< 0.50	< 0.50
Bis(2-chloroisopropyl)ether	< 0.50	< 0.50	< 0.50
Bis(2-ethylhexyl)phthalate	1.13	1.19	< 0.50
4-Bromophenyl phenyl ether	< 0.50	< 0.50	< 0.50
Butyl benzyl phthalate	< 0.75	< 0.75	< 0.75
2-Chloronaphthalene	< 0.25	< 0.25	< 0.25
4-Chlorophenyl phenyl ether	< 0.50	< 0.50	< 0.50
Chrysene	< 0.50	< 0.50	0.60
Dibenzo(a,h)anthracene	< 1.00	< 1.00	< 1.00
o-Dichlorobenzene	< 0.75	< 0.75	< 0.75
m-Dichlorobenzene	< 0.75	< 0.75	< 0.75
p-Dichlorobenzene	< 0.75	< 0.75	< 0.75
3,3'-Dichlorobenzidene	< 2.50	< 2.50	< 2.50
Diethyl phthalate	< 0.75	< 0.75	< 0.75
Dimethyl phthalate	< 0.75	< 0.75	< 0.75
Di-n-butyl phthalate	< 0.75	< 0.75	< 0.75
2,4-Dinitrotoluene	< 1.25	< 1.25	< 1.25
2,6-Dinitrotoluene	< 1.25	< 1.25	< 1.25
Di-n-octyl phthalate	< 0.75	< 0.75	< 0.75
1,2-Diphenylhydrazine	< 1.00	< 1.00	< 1.00
Fluoranthene	< 0.50	< 0.50	0.88
Fluorene	< 0.25	< 0.25	< 0.25
Hexachlorobenzene	< 1.25	< 1.25	< 1.25
Hexachlorobutadiene	< 1.25	< 1.25	< 1.25
Hexachlorocyclopentadiene	< 1.25	< 1.25	< 1.25
Hexachloroethane	< 1.25	< 1.25	< 1.25
Indeno(1,2,3-cd)pyrene	< 1.00	< 1.00	< 1.00
Isophorone	< 0.25	< 0.25	< 0.25
Naphthalene	< 0.25	< 0.25	0.32
Nitrobenzene	< 1.25	< 1.25	< 1.25
N-nitrosodimethylamine	< 2.50	< 2.50	< 2.50
N-nitroso-n-propylamine	< 0.75	< 0.75	< 0.75
N-nitrosodiphenylamine	< 1.25	< 1.25	< 1.25
Phenanthrene	< 0.25	0.35	0.74
Pyrene	< 0.75	< 0.75	0.80
1,2,4-Trichlorobenzene	< 0.75	< 0.75	< 0.75

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Continued)

ATEC Sample No.	13276	13277	13278	13279
Client Sample No.	Disposal	R-1	R-2	R-3
Sediments, Acid Extractables, Semi-Volatiles (Schedule D, Item 30)				
2-Chlorophenol	< 2.00	< 2.00	< 2.00	< 2.00
2,4-Dichlorophenol	< 2.00	< 2.00	< 2.00	< 2.00
2,4-Dimethylphenol	< 2.00	< 2.00	< 2.00	< 2.00
4,6-Dinitro-o-cresol	< 3.00	< 3.00	< 3.00	< 3.00
2,4-Dinitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
2-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
4-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
p-Chloro-m-cresol	< 2.00	< 2.00	< 2.00	< 2.00
Pentachlorophenol	< 4.00	< 4.00	< 4.00	< 4.00
Phenol	< 4.00	< 4.00	< 4.00	< 4.00
2,4,6-Trichlorophenol	< 3.00	< 3.00	< 3.00	< 3.00
Aldrin	< 1.00	< 1.00	< 1.00	< 1.00
alpha-BHC	< 1.50	< 1.50	< 1.50	< 1.50
beta-BHC	< 2.50	< 2.50	< 2.50	< 2.50
gamma-BHC	< 2.50	< 2.50	< 2.50	< 2.50
delta-BHC	< 2.00	< 2.00	< 2.00	< 2.00
Chlordane	< 5.00	< 5.00	< 5.00	< 5.00
4,4'-DDD	< 1.50	< 1.50	< 1.50	< 1.50
4,4'-DDE	< 2.00	< 2.00	< 2.00	< 2.00
4,4'-DDT	< 2.00	< 2.00	< 2.00	< 2.00
Dieldrin	< 1.50	< 1.50	< 1.50	< 1.50
Endosulfan I	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan II	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan Sulfate	< 10.0	< 10.0	< 10.0	< 10.0
Endrin	< 5.50	< 5.50	< 5.50	< 5.50
Endrin Aldehyde	< 4.00	< 4.00	< 4.00	< 4.00
Heptachlor	< 1.00	< 1.00	< 1.00	< 1.00
Heptachlor Epoxide	< 2.00	< 2.00	< 2.00	< 2.00
Toxaphene	< 5.00	< 5.00	< 5.00	< 5.00
PCB-1016	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1221	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1232	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1242	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1248	< 0.10	< 0.10	< 0.10	2.53
PCB-1254	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1260	< 0.10	< 0.10	0.39	< 0.10
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	< 0.50	< 0.50	< 0.50	< 0.50

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Continued)

Atec Sample No.	13280	13281	13282	13283
Client Sample No.	4	5	6	7
Sediments, Acid Extractables, Semi-Volatiles (Schedule D, Item 30)				
2-Chlorophenol	< 2.00	< 2.00	< 2.00	< 2.00
2,4-Dichlorophenol	< 2.00	< 2.00	< 2.00	< 2.00
2,4-Dimethylphenol	< 2.00	< 2.00	< 2.00	< 2.00
4,6-Dinitro-o-cresol	< 3.00	< 3.00	< 3.00	< 3.00
2,4-Dinitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
2-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
4-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
p-Chloro-m-cresol	< 2.00	< 2.00	< 2.00	< 2.00
Pentachlorophenol	< 4.00	< 4.00	< 4.00	< 4.00
Phenol	< 4.00	< 4.00	< 4.00	< 4.00
2,4,6-Trichlorophenol	< 3.00	< 3.00	< 3.00	< 3.00
Aldrin	< 1.00	< 1.00	< 1.00	< 1.00
alpha-BHC	< 1.50	< 1.50	< 1.50	< 1.50
beta-BHC	< 2.50	< 2.50	< 2.50	< 2.50
gamma-BHC	< 2.50	< 2.50	< 2.50	< 2.50
delta-BHC	< 2.00	< 2.00	< 2.00	< 2.00
Chlordane	< 5.00	< 5.00	< 5.00	< 5.00
4,4'-DDD	< 1.50	< 1.50	< 1.50	< 1.50
4,4'-DDE	< 2.00	< 2.00	< 2.00	< 2.00
4,4'-DDT	< 2.00	< 2.00	< 2.00	< 2.00
Dieldrin	< 1.50	< 1.50	< 1.50	< 1.50
Endosulfan I	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan II	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan Sulfate	< 10.0	< 10.0	< 10.0	< 10.0
Endrin	< 5.50	< 5.50	< 5.50	< 5.50
Endrin Aldehyde	< 4.00	< 4.00	< 4.00	< 4.00
Heptachlor	< 1.00	< 1.00	< 1.00	< 1.00
Heptachlor Epoxide	< 2.00	< 2.00	< 2.00	< 2.00
Toxaphene	< 5.00	< 5.00	< 5.00	< 5.00
PCB-1016	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1221	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1232	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1242	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1248	5.26	1.78	2.01	1.20
PCB-1254	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1260	< 0.10	< 0.10	< 0.10	< 0.10
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	< 0.50	< 0.50	< 0.50	< 0.50

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Continued)

Atec Sample No.	13284	13285	13286	13287
Client Sample No.	8	9	10	11
Sediments, Acid Extractables, Semi-Volatiles (Schedule D, Item 30)				
2-Chlorophenol	< 2.00	< 2.00	< 2.00	< 2.00
2,4-Dichlorophenol	< 2.00	< 2.00	< 2.00	2.00
2,4-Dimethylphenol	< 2.00	< 2.00	< 2.00	< 2.00
4,6-Dinitro-o-cresol	< 3.00	< 3.00	< 3.00	< 3.00
2,4-Dinitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
2-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
4-Nitrophenol	< 4.00	< 4.00	< 4.00	< 4.00
p-Chloro-m-cresol	< 2.00	< 2.00	< 2.00	< 2.00
Pentachlorophenol	< 4.00	< 4.00	< 4.00	< 4.00
Phenol	< 4.00	< 4.00	< 4.00	< 4.00
2,4,6-Trichlorophenol	< 3.00	< 3.00	< 3.00	< 3.00
Aldrin	< 1.00	< 1.00	< 1.00	< 1.00
alpha-BHC	< 1.50	< 1.50	< 1.50	< 1.50
beta-BHC	< 2.50	< 2.50	< 2.50	< 2.50
gamma-BHC	< 2.50	< 2.50	< 2.50	< 2.50
delta-BHC	< 2.00	< 2.00	< 2.00	< 2.00
Chlordane	< 5.00	< 5.00	< 5.00	< 5.00
4,4'-DDD	< 1.50	< 1.50	< 1.50	< 1.50
4,4'-DDE	< 2.00	< 2.00	< 2.00	< 2.00
4,4'-DDT	< 2.00	< 2.00	< 2.00	< 2.00
Dieldrin	< 1.50	< 1.50	< 1.50	< 1.50
Endosulfan I	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan II	< 10.0	< 10.0	< 10.0	< 10.0
Endosulfan Sulfate	< 10.0	< 10.0	< 10.0	< 10.0
Endrin	< 5.50	< 5.50	< 5.50	< 5.50
Endrin Aldehyde	< 4.00	< 4.00	< 4.00	< 4.00
Heptachlor	< 1.00	< 1.00	< 1.00	< 1.00
Heptachlor Epoxide	< 2.00	< 2.00	< 2.00	< 2.00
Toxaphene	< 5.00	< 5.00	< 5.00	< 5.00
PCB-1016	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1221	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1232	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1242	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1248	< 0.10	2.00	1.53	1.95
PCB-1254	< 0.10	< 0.10	< 0.10	< 0.10
PCB-1260	< 0.10	< 0.10	< 0.10	< 0.10
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	< 0.50	< 0.50	< 0.50	< 0.50

All results are reported as mg/kg (ppm) dry weight.

(Continued)

Table 11 (Concluded)

Atec Sample No.	13288	13289	13290
Client Sample No.	12	13	14
Sediments, Acid Extractables, Semi-Volatiles (Schedule D, Item 30)			
2-Chlorophenol	< 2.00	< 2.00	< 2.00
2,4-Dichlorophenol	< 2.00	< 2.00	< 2.00
2,4-Dimethylphenol	< 2.00	< 2.00	< 2.00
4,6-Dinitro-o-cresol	< 3.00	< 3.00	< 3.00
2,4-Dinitrophenol	< 4.00	< 4.00	< 4.00
2-Nitrophenol	< 4.00	< 4.00	< 4.00
4-Nitrophenol	< 4.00	< 4.00	< 4.00
p-Chloro-m-cresol	< 2.00	< 2.00	< 2.00
Pentachlorophenol	< 4.00	< 4.00	< 4.00
Phenol	< 4.00	< 4.00	< 4.00
2,4,6-Trichlorophenol	< 3.00	< 3.00	< 3.00
Aldrin	< 1.00	< 1.00	< 1.00
alpha-BHC	< 1.50	< 1.50	< 1.50
beta-BHC	< 2.50	< 2.50	< 2.50
gamma-BHC	< 2.50	< 2.50	< 2.50
delta-BHC	< 2.00	< 2.00	< 2.00
Chlordane	< 5.00	< 5.00	< 5.00
4,4'-DDD	< 1.50	< 1.50	< 1.50
4,4'-DDE	< 2.00	< 2.00	< 2.00
4,4'-DDT	< 2.00	< 2.00	< 2.00
Dieldrin	< 1.50	< 1.50	< 1.50
Endosulfan I	< 10.0	< 10.0	< 10.0
Endosulfan II	< 10.0	< 10.0	< 10.0
Endosulfan Sulfate	< 10.0	< 10.0	< 10.0
Endrin	< 5.50	< 5.50	< 5.50
Endrin Aldehyde	< 4.00	< 4.00	< 4.00
Heptachlor	< 1.00	< 1.00	< 1.00
Heptachlor Epoxide	< 2.00	< 2.00	< 2.00
Toxaphene	< 5.00	< 5.00	< 5.00
PCB-1016	< 0.10	< 0.10	< 0.10
PCB-1221	< 0.10	< 0.10	< 0.10
PCB-1232	< 0.10	< 0.10	< 0.10
PCB-1242	< 0.10	< 0.10	< 0.10
PCB-1248	0.65	0.18	3.20
PCB-1254	< 0.10	< 0.10	< 0.10
PCB-1260	< 0.10	< 0.10	< 0.10
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	< 0.50	< 0.50	< 0.50

All results are reported as mg/kg (ppm) dry weight.

Table 12a

Summary of Heavily Polluted Ashtabula River Sediments (Concentrations Expressed in mg/kg) (R7)

		USEPA Guidelines for Heavily Polluted Sediments (U.S. EPA Region V)								
Study	Station	As 8	Cr 75	Pb 60	Hg 1	Zn 200	PCB 10	HCBD NA	HCB NA	Chloro-benzenes NA
Aqua Tech 1979	11	11.1	25	98		167	3.57			
	12	11.0	31	53		114				
	13	?	49	37		127				
	14		38	350		830				
	15		86	47	0.35	170	0.4			
ERG 1979*	1a	17	2,200	66	0.83	390	8.9	1.2	0.86	
	1b	19	300	29	0.52	150	2.5	0.1	0.10	
	1c	11	270	52	0.26	150	12	0.3	1.40	
	2a	33	57	31	1.6	140	10	6.5	2.80	
	2b	37	45	24	2.0	110	5.1	0.9	1.10	
	3a	12	83	50	1.2	250	22	0.6	3.20	
	3b	26	430	43	0.3	180	13	0.3	1.30	
	4a	17	120	55	0.89	300	4.2	0.2	0.39	
	4b	17	300	61	3.4	240	27	22.0	4.60	
	5	30	440	52	1.3	320	72	12.0	22.00	
	6a	8	1,000	96	1.4	660	63	1.7	15.00	
	6b	31	90	34	3.0	190	2.6	0.2	0.36	
Aqua Tech 1983	1	12** 23**	501 629	78 89	0.78 1.70	604 278	29 120	0.26 2.0	0.67 9.9	23.4 179
	2	14 56	787 214	54 79	2.70 3.70	188 172	25 31	0.31 0.2	3.2 10.0	89.4 103.9
	3	25 47	72 64	38 63	2.00 2.20	187 138	7.8 11	0.02 0.1	0.31 2.1	7.8 36.9
	4	27 39	98 132	45 56	1.00 1.80	206 144	9.7 24	0.02 0.1	0.46 1.5	7.3 23.6
	5	26 20	82 541	45 88	0.90 4.70	157 173	7.5 70	0.03 0.5	1.1 32.0	8.1 306

Note: As - arsenic, Cr - chromium, Pb - lead, Hg - mercury, Zn - zinc, PCB - polychlorinated biphenol, HCBD - hexachlorobutadiene, and HCB - hexachlorobenzene.

* Lettered stations indicate increasing sediment depth.

** For each pair of values, the left represents sampling to 10 ft below LWD; the right value is for sampling to 14 ft below LWD.

Table 12b

Composite Core Analysis. (1)*

Parameter*	Client I.D. - ERG Sample No./Matrix					
	Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Acid Fraction (Prior. Polls. Meth. 625)						
Chlorophenol, 2-	0.036	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Nitrophenol, 2-	0.041	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Phenol	0.030	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dimethylphenol, 2,4-	0.044	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorophenol, 2,4-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Trichlorophenol, 2,4,6-	0.098	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Chloro-3-Methylphenol, 4-	0.067	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrophenol, 2,4-	0.032	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Methyl-4,6-Dinitrophenol, 2	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Pentachlorophenol	0.064	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Nitrophenol, 4-	<0.025	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Arsenic, total	13	15	15	20	15	13
B/N Fraction (Prior. Polls. Meth. 625)						
Acenapthene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Acenapthylene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Anthracene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025

(Continued)

Source: Environmental Research Group, Inc., Ann Arbor, MI.

Notes: FR - see field report for result; NA - not applicable to test requested; ND - nondetected, detection limit in parentheses; SD - sample damaged; SR - see attached report for result; < - positive result but at unquantifiable concentration below indicated level; ---, test not requested for this sample.

* Results expressed in milligrams per kilogram unless specified otherwise.

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Benzidine	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Benzo(A)anthracene	<0.025	<0.025	<0.025	0.031	<0.025	<0.025
Benzo(A)pyrene	ND (0.025)	ND (0.025)	ND (0.025)	0.047	ND (0.025)	ND (0.025)
Benzo(B)fluoranthene	<0.025	<0.025	<0.025	0.028	<0.025	<0.025
Benzo(K)fluoranthene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Benzo(G,H,I)perylene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroethyl)ether	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroethoxy)methane	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroisopropyl)ether	ND (0.025)	ND (0.025)	ND (0.025	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Ethylhexyl)phthalate	0.062	0.08	0.067	0.027	0.077	0.023
Bromophenyl phenyl ether, 4	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Butyl benzyl phthalate	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Chloronaphthalene, 2-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Chlorophenyl phenyl ether	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Chrysene	0.026	<0.025	0.033	0.038	<0.025	<0.025
Di-N-Butylphthalate	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dibenzo(A,H)anthracene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025	ND (0.025)
Dichlorobenzene, 1,2-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzene, 1,3-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzene, 1,4-	<0.025	0.046	0.038	0.034	<0.025	ND (0.025)
Dichlorobenzidine, 3,3'-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Diethylphthalate	ND (0.025)	ND (0.025)	<0.025	ND (0.025)	<0.025	ND (0.025)
Dimethylphthalate	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrotoluene 2,4-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrotoluene 2,6-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Dioctylphthalate	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Diphenylhydrazine 1,2-	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Fluoranthene	0.043	0.043	0.059	0.062	0.045	0.033
Fluorene	<0.025	ND (0.025)	<0.025	<0.025	ND (0.025)	ND (0.025)
Hexachlorobenzene	ND (0.025)	<0.025	ND (0.025)	<0.025	ND (0.025)	ND (0.025)
Hexachlorobutadiene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Hexachlorocyclopentadiene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Hexachloroethane	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Indeno(1,2,3-CD)pyrene	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Isophorone	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
N-Nitrosodi-W-Propylamine	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
N-Nitrosodimethylamine	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
N-Nitrosodiphenylamine	ND (0.025)	ND (0.025)	0.047	0.074	0.055	ND (0.025)
Naphthalene	ND (0.025)	<0.025	<0.025	<0.025	ND (0.025)	ND (0.025)
Nitrobenzene	ND (0.023)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Phenanthrene	0.035	0.034	0.051	0.041	0.037	<0.025
Pyrene	0.035	0.034	0.047	0.048	0.037	<0.025
Tethachlorodibenzo-P-Dioxin	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Trichlorobenzene, 1,2,4-	ND (0.025)	ND (0.025)	ND (0.025)	<0.025	ND (0.025)	ND (0.025)
Barium, total	ND (500)*	ND (500)	ND (500)	ND (500)	ND (500)	ND (500)
Cadmium, total	1.0	1.2	<0.8	1.7	0.9	1.2
Organic carbon, total	8400	7000	8300	16000	7000	1600
Chemical oxygen demand	35000	33000	35000	44000	34000	30000

(Continued)

* Barium has higher detection limit due to matrix interference.

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Chromium, total	36	54	45	84	43	33
Copper, total	28	32	33	50	30	33
In place density (g/cm^3)	1.7	1.8	1.9	1.7	1.9	1.8
Iron, total	34000	33000	29000	35000	29000	30000
Lead, total	24	29	27	44	26	26
Manganese, total	460	480	420	430	390	450
Mercury	ND (0.1)	0.1	ND (0.1)	0.4	ND (0.1)	0.1
Nickel, total	34	36	37	44	35	35
Ammonia nitrogen	80	110	100	140	82	46
Kjeldahl nitrogen, total	24000	2700	1800	1900	1700	3500
Oil and grease	380	530	350	830	490	370
P. Poll. Pest. and PCB's*						
Aldrin	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
a-BHC	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
b-BHC	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
d-BHC	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
g-BHC	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
Chlordane	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
4,4'-DDD	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
4,4'-DDE	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
4,4'-DDT	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
Dieldrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan I	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan II	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

(Continued)

* Pesticides and PCB results are reported on a dry-weight basis.

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Endosulfan sulfate	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin aldehyde	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
Heptachlor epoxide	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.010)
Toxaphene	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.10)
PCB 1016*	*	*	*	*	*	*
PCB 1221	*	*	*	*	*	*
PCB 1232	*	*	*	*	*	*
PCB 1242	*	*	*	*	*	*
PCB 1248	0.42	0.81	1.1	1.5	0.70	0.23
PCB 1254	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.020)
PCB 1260	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.020)
Particle Sizing (5 Pt)**						
Particle sizing >2 mm	<1	<1	<1	<1	11	<1
Particle sizing >0.43 mm	1	<1	<1	<1	15	<1
Particle sizing >0.25 mm	4	<1	1	<1	16	3
Particle sizing >0.075 mm	36	14	8	24	29	6
Particle sizing <0.075 mm	64	86	92	76	71	94
Percent solids**	67	71	74	66	77	71
Phosphorus, total	390	360	410	510	390	490
Volatile solids**	3	3	3	4	3	3

(Continued)

* Presence of PCB 1221, 1232, 1242, 1248, or 1016 precludes the determination of the detection limit of the other four aroclors.

** Expressed as percentage.

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Volatile Fraction (Prior. Polls. EPA Meth. 624)						
Acrolein	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Acrylonitrile	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Benzene	0.001	0.002	ND (0.001)	0.002	0.014	ND (0.001)
Bromodichloromethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Bromoform	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Bromomethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Carbon tetrachloride	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Chlorobenzene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Chloroethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Chloroethylvinylether, 2	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Chloroform	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Chloromethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Cis-1,3-Dichloropropene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Dibromochloromethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Dichloroethane, 1,1-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	0.002
Dichloroethane, 1,2-	ND (0.001)	0.001	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Dichloroethene, 1,1-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Dichloropropane, 1,2-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	0.007	ND (0.001)
Methylene chloride	0.03	ND (0.001)	ND (0.001)	0.06	ND (0.001)	ND (0.001)
Tetrachloroethane, 1,1,2,2-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Tetrachloroethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	0.007	ND (0.001)

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #4 Composite #1-3 09/096374 Sediment	Core #4 Composite #4-6 09/096375 Sediment	Core #4 Composite #7-9 09/096376 Sediment	Core #4 Composite #10-11 09/096377 Sediment	Core #4 Composite #12-15 09/096378 Sediment	Core #6 Composite #1-3 09/096379 Sediment
Toluene	ND (0.001)	0.001	ND (0.001)	ND (0.001)	0.012	ND (0.001)
Trans-1,3-Dichloropropene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trans-1,2-Dichloroethylene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethane, 1,1,1-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethane, 1,1,2-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	0.006	0.002	0.005	0.001	0.001	ND (0.001)
Trichlorofluoromethane	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl chloride	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Zinc	160	230	170	430	220	150

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
Acid Fraction (Prior. Polls. Meth. 625)			
Chlorophenol, 2-	ND (0.025)	ND (0.025)	ND (0.025)
Nitrophenol, 2-	ND (0.025)	ND (0.025)	ND (0.025)
Phenol	ND (0.025)	ND (0.025)	ND (0.025)
Dimethylphenol, 2,4-	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorophenol, 2,4-	ND (0.025)	ND (0.025)	ND (0.025)
Trichlorophenol, 2,4,6-	ND (0.025)	ND (0.025)	ND (0.025)
Chloro-3-Methylphenol, 4-	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrophenol, 2,4-	ND (0.025)	ND (0.025)	ND (0.025)
Methyl-4,6-Dinitrophenol, 2	ND (0.025)	ND (0.025)	ND (0.025)
Pentachlorophenol	ND (0.025)	ND (0.025)	ND (0.025)
Nitrophenol, 4-	ND (0.025)	ND (0.025)	ND (0.025)
Arsenic, total	16	14	10
B/N Fraction (Prior. Polls. Meth. 625)			
Acenapthene	ND (0.025)	ND (0.025)	ND (0.025)
Acenapthylene	ND (0.025)	ND (0.025)	ND (0.025)
Anthracene	<0.025	<0.025	<0.025
Benzidine	ND (0.025)	ND (0.025)	ND (0.025)
Benzo(A)anthracene	0.033	0.025	<0.025
Benzo(A)pyrene	ND (0.025)	ND (0.025)	ND (0.025)
Benzo(B)fluoranthene	0.030	0.029	ND (0.025)
Benzo(K)fluoranthene	ND (0.025)	ND (0.025)	ND (0.025)
Benzo(G,H,I)perylene	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroethyl)ether	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroethoxy)methane	ND (0.025)	ND (0.025)	ND (0.025)
Bis(2-Chloroisopropyl)ether	ND (0.025)	ND (0.025)	ND (0.025)

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
Bis(2-Ethylhexyl)phthalate	0.035	0.043	0.041
Bromophenyl phenyl ether, 4	ND (0.025)	ND (0.025)	ND (0.025)
Butyl benzyl phthalate	ND (0.025)	ND (0.025)	ND (0.025)
Chloronaphthalene, 2-	ND (0.025)	ND (0.025)	ND (0.025)
Chlorophenyl phenyl ether	ND (0.025)	ND (0.025)	ND (0.025)
Chrysene	0.032	0.043	<0.025
Di-N-Butylphthalate	ND (0.025)	ND (0.025)	ND (0.025)
Dibenzo(A,H)anthracene	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzene, 1,2-	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzene, 1,3-	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzene, 1,4-	ND (0.025)	ND (0.025)	ND (0.025)
Dichlorobenzidine, 3,3'-	ND (0.025)	ND (0.025)	ND (0.025)
Diethylphthalate	ND (0.025)	ND (0.025)	ND (0.025)
Dimethylphthalate	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrotoluene 2,4-	ND (0.025)	ND (0.025)	ND (0.025)
Dinitrotoluene 2,6-	ND (0.025)	ND (0.025)	ND (0.025)
Dioctylphthalate	ND (0.025)	ND (0.025)	ND (0.025)
Diphenylhydrazine 1,2-	ND (0.025)	ND (0.025)	ND (0.025)
Fluoranthene	0.062	0.054	0.037
Fluorene	ND (0.025)	ND (0.025)	ND (0.025)
Hexachlorobenzene	ND (0.025)	ND (0.025)	ND (0.025)
Hexachlorobutadiene	ND (0.025)	ND (0.025)	ND (0.025)
Hexachlorocyclopentadiene	ND (0.025)	ND (0.025)	ND (0.025)
Hexachloroethane	ND (0.025)	ND (0.025)	ND (0.025)
Indeno(1,2,3-CD)pyrene	ND (0.025)	ND (0.025)	ND (0.025)
Isophorone	ND (0.025)	ND (0.025)	ND (0.025)
N-Nitrosodi-W-Propylamine	ND (0.025)	ND (0.025)	ND (0.025)

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
N-Nitrosodimethylamine	ND (0.025)	ND (0.025)	ND (0.025)
N-Nitrosodiphenylamine	0.047	0.041	ND (0.025)
Naphthalene	ND (0.025)	ND (0.025)	ND (0.025)
Nitrobenzene	ND (0.025)	ND (0.025)	ND (0.025)
Phenanthrene	0.048	0.044	0.039
Pyrene	0.056	0.047	0.030
Tetrachlorodibenzo-P-Dioxin	ND (0.025)	ND (0.025)	ND (0.025)
Trichlorobenzene,1,2,4-	ND (0.025)	ND (0.025)	ND (0.025)
Barium, total	ND (500)	ND (500)	ND (500)
Cadmium, total	1.5	1.2	<0.8
Organic carbon, total	7500	9300	2200
Chemical oxygen demand	32000	29000	25000
Chromium, total	45	30	26
Copper, total	36	32	18
In place density (g/cm^3)	1.8	1.8	2.3
Iron, total	30000	30000	27000
Lead, total	28	29	8
Manganese, total	430	360	240
Mercury	ND (0.1)	ND (0.1)	ND (0.1)
Nickel, total	38	33	26
Ammonia nitrogen	110	84	24
Kjeldahl nitrogen, total	3400	5700	1100
Oil and grease	540	330	60
P. Poll. Pest. and PCB's			
Aldrin	ND (0.010)	ND (0.010)	ND (0.010)
a-BHC	ND (0.010)	ND (0.010)	ND (0.010)
b-BHC	ND (0.010)	ND (0.010)	ND (0.010)
d-BHC	ND (0.010)	ND (0.010)	ND (0.010)

(Continued)

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
g-BHC	ND (0.010)	ND (0.010)	ND (0.010)
Chlordane	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDD	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDE	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDT	ND (0.010)	ND (0.010)	ND (0.010)
Dieldrin	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan I	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan II	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan sulfate	ND (0.010)	ND (0.010)	ND (0.010)
Endrin	ND (0.010)	ND (0.010)	ND (0.010)
Endrin aldehyde	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor epoxide	ND (0.010)	ND (0.010)	ND (0.010)
Toxaphene	ND (0.10)	ND (0.10)	ND (0.10)
PCB 1016*	*	ND (0.020)	ND (0.020)
PCB 1221	*	ND (0.020)	ND (0.020)
PCB 1232	*	ND (0.020)	ND (0.020)
PCB 1242	*	ND (0.020)	ND (0.020)
PCB 1248	0.17	ND (0.020)	ND (0.020)
PCB 1254	ND (0.020)	ND (0.020)	ND (0.020)
PCB 1260	ND (0.020)	ND (0.020)	ND (0.020)
Particle Sizing (5 Pt)**			
Particle sizing >2 mm	1	<1	61
Particle sizing >0.43 mm	14	4	66

(Continued)

* Presence of PCB 1221, 1232, 1242, 1248, or 1016 precludes the determination of the detection limit of the other four aroclors.

** Expressed as percentage.

Table 12b (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
Particle sizing >0.25 mm	18	14	70
Particle sizing >0.075 mm	50	26	82
Particle sizing <0.075 mm	50	74	18
Percent solids*	71	69	90
Phosphorus, total	450	530	310
Volatile solids*	3	3	2
Volatile Fraction (Prior. Polls. EPA Meth. 624)			
Acrolein	ND (0.001)	ND (0.001)	ND (0.001)
Acrylonitrile	ND (0.001)	ND (0.001)	ND (0.001)
Benzene	ND (0.001)	ND (0.001)	ND (0.001)
Bromodichloromethane	ND (0.001)	ND (0.001)	ND (0.001)
Bromoform	ND (0.001)	ND (0.001)	ND (0.001)
Bromomethane	ND (0.001)	ND (0.001)	ND (0.001)
Carbon tetrachloride	ND (0.001)	ND (0.001)	ND (0.001)
Chlorobenzene	ND (0.001)	ND (0.001)	ND (0.001)
Chloroethane	ND (0.001)	ND (0.001)	ND (0.001)
Chloroethylvinylether, 2	ND (0.001)	ND (0.001)	ND (0.001)
Chloroform	0.001	ND (0.001)	ND (0.001)
Chloromethane	ND (0.001)	ND (0.001)	ND (0.001)
Cis-1,3-Dichloropropene	ND (0.001)	ND (0.001)	ND (0.001)
Dibromochloromethane	ND (0.001)	ND (0.001)	ND (0.001)
Dichloroethane, 1,1-	ND (0.001)	ND (0.001)	ND (0.001)
Dichloroethane, 1,2-	ND (0.001)	ND (0.001)	ND (0.001)
Dichloroethane, 1,1-	ND (0.001)	ND (0.001)	ND (0.001)

(Continued)

* Expressed as percentage.

Table 12b (Concluded)

Parameter	Client I.D. - ERG Sample No./Matrix Core #6 Composite #4-6 09/096380 Sediment	Core #6 Composite #7-9 09/096381 Sediment	Core #6 Composite #10 09/096382 Sediment
Dichloropropane, 1,2-	ND (0.001)	ND (0.001)	ND (0.001)
Ethylbenzene	ND (0.001)	ND (0.001)	ND (0.001)
Methylene chloride	ND (0.001)	ND (0.001)	ND (0.001)
Tetrachloroethane, 1,1,2,2-	ND (0.001)	ND (0.001)	ND (0.001)
Tetrachloroethene	0.004	ND (0.001)	ND (0.001)
Toluene	ND (0.001)	ND (0.001)	ND (0.001)
Trans-1,3-Dichloropropene	ND (0.001)	ND (0.001)	ND (0.001)
Trans-1,2-Dichloroethylene	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethane, 1,1,1-	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethane, 1,1,2-	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND (0.001)	ND (0.001)	0.012
Trichlorofluoromethane	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl chloride	ND (0.001)	ND (0.001)	ND (0.001)
Zinc	280	160	80

Table 12c

Sediment Analysis. (2)

Parameter*	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
Arsenic, total	16	15	16	16	16	14
Barium, total	58	60	63	52	47	60
Cadmium, total	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Organic carbon, total	6000	5200	5300	5200	6000	3600
Chemical oxygen demand	34000	35000	34000	34000	28000	30000
Chromium, total	45	38	38	41	34	25
Copper, total	31	30	30	31	31	21
Cyanide, total**	ND (0.4)	<0.4	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
In place density (g/cm^3)	1.7	1.8	1.9	1.7	1.7	2.1
Iron, total	33000	32000	35000	33000	33000	32000
Lead, total	26	20	20	23	20	59
Manganese, total	510	420	430	460	390	290
Mercury	0.2	0.2	0.1	0.1	<0.1	ND (0.1)
Nickel, total	38	36	38	36	34	31
Ammonia nitrogen	1	<1	3	5	23	5
Kjeldahl nitrogen, total	380	480	440	430	370	450
Oil and grease	480	430	490	540	390	<200

(Continued)

Source: Environmental Research Group, Inc., Ann Arbor, MI.

Notes: FR - see field report for result; NA - not applicable to test requested; ND - nondetected, detection limit in parentheses; SD - sample damaged; SR - see attached report for result; < - positive result but at unquantifiable concentration below indicated level; ---, test not requested for this sample.

* Results expressed in milligrams per kilogram unless specified otherwise.

** Total cyanides for this project had low spike recoveries due to matrix interference.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
P. Poll. Pest. and PCB's						
Aldrin	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
a-BHC	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
b-BHC	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
d-BHC	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
g-BHC	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Chlordane	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDD	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDE	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
4,4'-DDT	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Dieldrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan I	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan II	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan sulfate	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin aldehyde	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor epoxide	ND (0.10)	ND (0.040)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Toxaphene	ND (1.0)	ND (0.40)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
PCB 1016*	*	*	*	*	ND (0.020)	ND (0.020)
PCB 1221	*	*	*	*	ND (0.020)	ND (0.020)

(Continued)

* Presence of PCB 1221, 1232, 1242, 1248, or 1016 precludes the determination of the detection limit of the other four aroclors.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
PCB 1232	*	*	*	*	ND (0.020)	ND (0.020)
PCB 1242	*	*	*	*	ND (0.020)	ND (0.020)
PCB 1248	0.41	0.15	0.14	0.22	ND (0.020)	ND (0.020)
PCB 1254	ND (0.20)	ND (0.080)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
PCB 1260	ND (0.20)	ND (0.080)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Particle Sizing (5 pt)*						
Particle sizing >2 mm	<1	8	4	<1	<1	57
Particle sizing >0.43 mm	3	9	6	<1	1	61
Particle sizing >0.25 mm	3	9	7	<1	1	63
Particle sizing >0.075 mm	6	11	9	2	3	67
Particle sizing <0.075 mm	94	89	91	98	97	33
Percent solids*	70	74	75	71	73	85
Phenols	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Phosphorus, total	420	410	440	420	340	280
Volatile solids*	4	3	3	3	3	3
Zinc	170	240	280	250	200	93
Arsenic, total	16	16	17	17	9	8
Barium, total	37	32	57	56	27	22
Cadmium, total	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Organic carbon, total	3800	3400	4900	5700	1300	1400
Chemical oxygen demand	27000	36000	32000	35000	14000	13000

(Continued)

* Expressed as percentage.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
Chromium, total	25	26	38	34	8	12
Copper, total	22	33	32	50	6	9
Cyanide, total*	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
In place density (g/cm^3)	1.9	2.1	1.7	1.7	1.9	2.0
Iron, total	29000	33000	36000	37000	14000	14000
Lead, total	19	15	24	23	4	11
Manganese, total	330	280	490	470	220	180
Mercury	<0.1	<0.1	0.2	<0.1	<0.1	ND (0.1)
Nickel, total	30	35	41	41	15	16
Ammonia nitrogen	6	8	7	19	ND (1)	ND (1)
Kjeldahl nitrogen, total	450	340	480	420	89	160
Oil and grease	200	<200	400	660	<200	<200
P. Poll. Pest. and PCB's						
Aldrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
a-BHC	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
b-BHC	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
d-BHC	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
g-BHC	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
Chlordane	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
4,4'-DDD	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
4,4'-DDE	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)

(Continued)

* Total cyanides for this project had low spike recoveries due to matrix interference.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
4,4'-DDT	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
Dieldrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan I	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan II	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endosulfan sulfate	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Endrin aldehyde	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Heptachlor	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
Heptachlor epoxide	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050)	ND (0.010)	ND (0.010)
Toxaphene	ND (0.10)	ND (0.10)	ND (0.01)	ND (0.50)	ND (0.10)	ND (0.10)
PCB 1016	ND (0.020)	ND (0.020)	*	*	ND (0.020)	ND (0.020)
PCB 1221	ND (0.020)	ND (0.020)	*	*	ND (0.020)	ND (0.020)
PCB 1232	ND (0.020)	ND (0.020)	*	*	ND (0.020)	ND (0.020)
PCB 1242	ND (0.020)	ND (0.020)	*	*	ND (0.020)	ND (0.020)
PCB 1248	ND (0.020)	ND (0.020)	0.081	0.10	ND (0.020)	ND (0.020)
PCB 1254	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.10)	ND (0.020)	ND (0.020)
PCB 1260	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.10)	ND (0.020)	ND (0.020)
Particle Sizing (5 Pt)*						
Particle sizing >2 mm	14	41	<1	1	5	23
Particle sizing >0.43 mm	18	49	<1	1	6	31
Particle sizing >0.25 mm	21	49	<1	2	8	42
Particle sizing >0.075 mm	28	52	2	4	73	74
Particle sizing <0.075 mm	72	47	98	96	27	26

(Continued)

* Expressed as percentage.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
Percent solids*	76	85	71	70	82	86
Phenols	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Phosphorus, total	370	320	490	400	300	390
Volatile solids*	3	3	3	3	1	1
Zinc	120	77	240	240	52	40
Arsenic, total	16	15	18	16		
Barium, total	54	56	76	44		
Cadmium, total	<0.8	<0.8	1.0	<0.8		
Organic carbon, total	4500	5800	4200	4100		
Chemical oxygen demand	28000	28000	41000	26000		
Chromium, total	34	34	48	30		
Copper, total	28	27	34	25		
Cyanide, total**	ND (0.4)	ND (0.4)	ND (0.4)	ND 0.4)		
In place density (g/cm^3)	1.7	1.7	1.8	1.8		
Iron, total	33000	31000	34000	32000		
Lead, total	19	19	29	19		
Manganese, total	460	440	470	370		
Mercury	0.2	0.2	0.4	0.1		
Nickel, total	37	33	42	33		
Ammonia nitrogen	8	4	11	7		

(Continued)

* Expressed as percentage.

** Total cyanides for this project had low spike recoveries due to matrix interference.

Table 12c (Continued)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
Kjeldahl nitrogen, total	450	510	500	400		
Oil and grease	380	320	520	340		
P. Poll. Pest. and PCB's						
Aldrin	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
a-BHC	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
b-BHC	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
d-BHC	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
g-BHC	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
Chlordane	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
4,4'-DDD	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
4,4'-DDE	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
4,4'-DDT	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)		
Dieldrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Endosulfan I	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Endosulfan II	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Endosulfan sulfate	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Endrin	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Endrin aldehyde	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)		
Heptachlor	ND (0.050)	ND (0.050)	ND (0.10)	ND (0.050)		
Heptachlor epoxide	ND (0.050)	ND (0.050)	ND (0.10)	ND (0.050)		
Toxaphene	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)		

(Continued)

Table 12c (Concluded)

Parameter	Client I.D. - ERG Sample No./Matrix					
	C-1 Sections 1-3 11-098495 Sediment	C-1 Sections 4-6 11/098496 Sediment	C-1 Sections 7-9 11/098497 Sediment	C-2 Sections 1-4 11/098498 Sediment	C-2 Sections 5-7 11/098499 Sediment	C-2 Sections 8-9 11/098500 Sediment
PCB 1016*	*	*	*	*		
PCB 1221	*	*	*	*		
PCB 1232	*	*	*	*		
PCB 1242	*	*	*	*		
PCB 1248	0.22	0.21	0.67	0.082		
PCB 1254	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)		
PCB 1260	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)		
Particle Sizing (5 Pt)**						
Particle sizing >2 mm	<1	<1	<1	2		
Particle sizing >0.43 mm	<1	<1	<1	3		
Particle sizing >0.25 mm	<1	<1	<1	4		
Particle sizing >0.075 mm	2	2	3	18		
Particle sizing <0.075 mm	98	98	97	82		
Percent solids**	69	71	72	78		
Phenols	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)		
Phosphorus, total	430	430	550	380		
Volatile solids**	3	3	3	2		
Zinc	150	140	250	210		

* Presence of PCB 1221, 1232, 1242, 1248, or 1016 precludes the determination of the detection limit of the other four aroclors.

** Expressed as percentage.

Table 13

Elutriate Data - Ashtabula Harbor. (R10)

LAB NO. IDENTIFICATION	6529-88 DISPOSA SITE	6530-88 R-1	6531-88 R-2	6532-88 R-3	6533-88 #4	6534-88 #5	6535-88 #6	6536-88 #7	6537 #7 RPT
ARSENIC, TOTAL, AS, UG/L	5	<5	5	<5	8	10	7	6	
BARIUM, TOTAL, BA, UG/L	190	200	220	190	230	200	200	200	22
CADMIUM, TOTAL, CD, UG/L	<1	<1	<1	<1	<1	1	<1	<1	<1
CHROMIUM, TOTAL, CR, UG/L	<30	<30	<30	<30	<30	<30	<30	<30	30
COD, MG/L	<20	<20	<20	36	29	53	49	39	29
COPPER, TOTAL, CU, UG/L	25	22	30	33	<20	48	<20	<20	2
CYANIDE, TOTAL, CN, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0
IRON, TOTAL, FE, UG/L	300	<40	650	<40	870	590	<40	<40	<40
LEAD, TOTAL, PB, UG/L	<5	<5	<5	<5	<5	29	8	<5	<5
MANGANESE, TOTAL, MN, UG/L	870	1200	1200	730	630	640	980	1000	100
MERCURY, TOTAL, HG, UG/L	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
NICKEL, TOTAL, NI, UG/L	<30	<30	<30	<30	<30	56	<30	<30	<30
NITRATE N, MG/L	0.35	0.36	0.34	0.40	0.30	0.61	0.50	0.47	0.4
NITROGEN, AMMONIA, N, MG/L	2.79	2.44	2.65	1.70	3.46	3.91	3.60	2.48	3.1
PHENOLS, 4-AAP, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0
PHOSPHORUS, TOTAL, P, MG/L	0.08	0.05	0.05	0.05	0.05	<0.05	<0.05	<0.05	0.1
TOTAL KJELDAHL N, MG/L	3.34	2.47	3.09	2.16	5.24	5.13	5.03	3.79	3.6
ZINC, TOTAL, ZN, UG/L	52	42	57	59	61	120	52	45	4
OIL/GREASE, MG/L	<1	<1	<1	<1	1	5	9	3	

LAB NO. IDENTIFICATION	6538-88 #8	6539-88 #9	6540-88 #10	6541-88 #11	6542-88 #12	6543-88 #12 RPT.	6544-88 #13	6545-88 #14	6546- SITE WATE
ARSENIC, TOTAL, AS, UG/L	<5	6	5	5	6	<5	6	7	
BARIUM, TOTAL, BA, UG/L	230	200	220	210	230	220	230	220	9
CADMIUM, TOTAL, CD, UG/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHROMIUM, TOTAL, CR, UG/L	<30	<30	<30	<30	<30	<30	<30	<30	<30
COD, MG/L	56	33	33	26	<20	<20	<20	66	<20
COPPER, TOTAL, CU, UG/L	32	24	22	29	32	<20	<20	20	20
CYANIDE, TOTAL, CN, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
IRON, TOTAL, FE, UG/L	<40	<40	<40	<40	<40	<40	49	110	<40
LEAD, TOTAL, PB, UG/L	<5	<5	5	5	<5	5	5	7	5
MANGANESE, TOTAL, MN, UG/L	1500	1200	1100	590	880	810	1200	410	<20
MERCURY, TOTAL, HG, UG/L	<2.0	<2.0	2.0	<2.0	2.0	2.3	<2.0	<2.0	<2.0
NICKEL, TOTAL, NI, UG/L	<30	<30	<30	<30	<30	<30	<30	<30	<30
NITRATE N, MG/L	0.51	0.45	0.40	0.47	0.41	0.49	0.41	0.44	0.56
NITROGEN, AMMONIA, N, MG/L	2.81	3.09	3.32	1.94	2.80	3.48	5.91	3.18	0.20
PHENOLS, 4-AAP, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PHOSPHORUS, TOTAL, P, MG/L	<0.05	<0.05	<0.05	0.10	0.10	0.05	0.10	0.05	<0.05
TOTAL KJELDAHL N, MG/L	3.03	4.15	4.53	2.30	4.09	2.71	6.99	3.59	0.37
ZINC, TOTAL, ZN, UG/L	64	49	58	57	49	46	61	54	24
OIL/GREASE, MG/L	8	6	<1	<1	<1	<1	<1	<1	<1

Table 14

Mean Flow in cubic feet per second for Ashtabula River near Ashtabula. (R7)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1970	7.86	117	154	164	319	282	150	137	76.1	14.6	14.7	151
1971	230	383	249	121	514	267	85.3	37.1	55.4	4.09	2.57	7.80
1972	19.8	130	428	210	277	746	286	105	395	117	24.2	56.5
1973	73.7	289	324	149	137	486	317	235	121	3.81	17.5	2.10
1974	37.3	229	266	205	163	444	323	230	33.9	164	6.20	7.02
1975	31.8	442	328	323	373	393	106	26.5	180	1.72	75.6	53.8
1976	43.3	57.6	376	369	638	366	143	49.0	4.23	96.0	28.1	81.5
1977	126	190	281	48.4	393	519	340	28.6	5.46	193	222	260
1978	120	410	672	170	89.8	432	218	211	7.25	1.03	1.42	2.89
1979	21.4	13.6	166	295	231	466	333	120	18.9	17.2	33.2	272
1980	412	314	568									

Source: U.S. Department of Interior-Geological Survey. 1987 streamflow data through discontinuation in 1980.

Table 15

Water Quality Violations in the Ashtabula River AOC. (R7)

Site Parameter	Concentration (ug/l)	Ohio WQS (ug/l)	GLWQA Objective (ug/l)
Lake Erie at Public* Water Supply Intake			
Copper	10–30	5	5
Nickel	40–50	25	25
Zinc	10–115	30	30
Ashtabula River**			
Zinc	130	HD	30
Cadmium	1.4–5.9	HD	0.2
Mercury	0.2–0.3	0.2	0.2
1,1,2,2 tetrachlorethane	5.3 and 23	360	DL
Tetrachloroethene	detected	73	<DL
Trichloroethene	detected	75	<DL
Aldrin + Dieldrin	.108	0.01	0.001
Methylene chloride	detected	430	<DL
Fields Brook**			
Zinc	160	HD	NA
Cadmium	1.0–13.0	HD	NA
Mercury	0.2–0.7	0.2	NA
Chromium	81 and 51	HD	NA
1,1,2,2-tetrachlorethane	31–1900	360	NA
Tetrachloroethene	5.1–230	73	NA
Trichloroethene	7.5–1300	75	NA
1,1,2-trichloroethane	6.5–50	620	NA
Chloroform	6.7–9.5	79	NA
1,2-trans-dichloroethene	8.1–150	310	NA
Total dissolved solids		3500 mg/l	NA

* Data from 1986 monthly sampling of the Ashtabula water supply intake

** Data from CH_2M Hill 1985 Remedial Investigation Report for Fields Brook

HD Hardness dependent

NA no applicable standard

<DL less than detection limit

Table 16

Summary of Results from Column Leachate Studies Based on Three Replicate Tests. (R8)

Average Composition of Sediments in Columns (ng/g)	Average Concentration of Leachate (ug/L)	Maximum Concentration of Leachate (ug/L)	National Drinking Water Standards (Max. Conc.) (ug/L)
Ba 474,000	760-925	1,300-1,800	1,000
Cd 6,600	<3	4-5	10
Cr 316,000	<6-<9	12-16	50
Cu 50,800	8-12	55-80	1,000
Fe No Data	790-1,530	3,230-3,250	300
Mn No Data	1,170-1,830	3,400-4,300	50
Hg 2,820	<0.2	0.6	2
Ni 42,400	10-15	32-36	-
Tl <5,000	<2-<3	4	-
Zn 181,000	7-15	60-84	5,000
As 37,000	<4	6-7	50
Pb 75,000	<6	16-20	50
PCB's (1242) 51,200	<0.5	<0.5	-
1,2,4-Trichlorobenzene 15,800	<1.0	<1.0	-
1,4-Dichlorobenzene 89,000	<1.0	<1.0	-
Hexachlorobenzene 11,100	<0.01 <0.01	<0.01	-
Toluene 30	<1.0	1.4-1.7	-
1,2-Dichlorobenzene* 17,560	<2	4-5	-
1,3-Dichlorobenzene 8,240	13-14	26-33	-
Chlorobenzene - 90	6	10-11	-
Bis (2-ethyl Hexyl) Phthalate* 9,100	<11-<23	42-86	-
Oil & Grease	<4-<5 mg/L	21-25 mg/L	-

No National Standard

* Not Detected Last Six Periods

Table 17

Summary of Direct Dischargers to the Ashtabula River Area of Concern. (R4)

Discharger	NPDES Permit # (Expiration Date)	Ohio Permit #	River Mile	Average Discharge (MGD)	Parameters of Concern and Comments
1. Ashtabula WTP	OH0023914 (8/1/93)	3PE00002	Lake Erie	4.45	Suspended Solids, Oil & Grease, Total Phosphorus, Fecal Coliform, $CBOD_5$, pH, TCR, CN, Cd, Cr, Cu, Pb, Ni, Zn, Hex Cr, Phenolics, Mercury, Ammonia, COD, Nitrite, Nitrate, Bis(2-ethylhexyl)phthalate
2. Ohio American Water Co.	OH0033723 (1/6/91)	31V00010	Lake Erie	0.25	Total Nonfilterable Solids, Total Phosphorus, pH
3. Cleveland Electric Illuminating Co. (CEI)	OH0001121 (6/30/90)	31B00012	Lake Erie	913.5	TCR, pH, Total Suspended Solids, Oil and Grease, Iron, Total Phosphorus, Temperature
4. Elkem Metals Company	OH0000027 (8/2/90)	31H00036	Lake Erie	25.54	Total Suspended Solids, CN, Phenolics, Cr, Hex. Cr, Manganese, pH, BOD
5. Linden Chemical and Plastics (LCP)	OH0000752 (12/20/88)	31E00016	Lake Erie	4.3	Total Suspended Solids, Mercury, TCR, antimony, Cu, Pb, Zn, total phenolics, bis(2-ethylhexyl)phthalate, and DDT
6. L-TEC	OH0063789 (8/20/89)	31C00071	Lake Erie	0.78	Cu, Total Suspended Solids, Oil and Grease, Total Toxic Organics, pH
7. Union Carbide, Industrial Gases, Inc. Linde Div.	Draft	Draft	Lake Erie	11.3	Cooling water only. Temperature, TCR, pH
8. Consolidated Rail Corporation (Conrail) Coal Dock	OH0064122 (4/12/90)	31T00011	Lake Erie	.22	Discharge is stormwater runoff from coal yard. Total Suspended Solids, Total phosphorus, Manganese, Iron, pH
9. Consolidated Rail Corp. Diesel Fuel Facility	OH0083861 (12/27/90)	31T00012	Strong Brook Storm Sewer	.005	Stormwater runoff, Oil and Grease, pH
10. Iten Fibre Company	OH0051888 (4/13/91)	31Q00021	Storm Brook Storm Sewer	<.001	Storm water only. No Monitoring Required.

(Continued)

Table 17 (Concluded)

11. Reliance Electric	OH0038431 (1/7/91)	31S00076	Storm Brook Storm Sewer	<.03	Discharge consists of noncontact cooling water and stormwater runoff.
FIELDS BROOK DISCHARGERS					
12. RMI Metals Reduction Plant	OH0002305 (12/24/89)	31E00011	1.34	2.3	TDS, TSS, Cu, Pb, Zn
13. RMI Extrusion Plant	OH0000442 (9/27/92)	31C00023	1.67	.07	
14. RMI Sodium Plant	OH0002313 (5/26/90)	31E00012	1.83		TDS, TSS, TCR
15. Datrex	OH0001872 (5/13/90)	31F00017	1.83 2.03	.39	TSS, TCR, TDS, Mercury, Oil and Grease
16. Acme Scrap Metal	OH0088005 (4/13/91)	31N00093	2.10	.77	Total Suspended Solids, Oil and Grease, pH, TCR, Ammonia, Fecal Coliform, PCB
17. Occidental Chemical	OH0029149 (9/30/88)	31F00002	1.83	.50	TDS, Cr, Cu, Mercury, CN, methylene chloride, chloroform, carbon tetrachloride, 1,1,1-trichloroethane, t-1,2-dichloroethylene, trichloroethene, tetrachloroethene, phenol and bis(2-ethylhexyl)phthalate
18. VyGen	OH0002283 (Permit in Draft)	31F00006	2.28	.40	BOD, COD, TSS, TDS, mono vinyl chloride, pH
19. SCM #1	OH0000523 (9/25/89)	31E00013			
20. SCM #2	OH0000493 (9/25/89)	31E00017	2.23	2.24	TSS, TDS, Iron, TCR, Zinc, lead, chromium

CBOD	Bio Chemical oxygen demand	Cu	Copper	COD	Chemical oxygen demand
TCR	Total chlorine residual	Pb	Lead	TDS	Total dissolved solids
CN	Cyanide	Ni	Nickel	TSS	Total suspended solids
Cd	Cadmium	Zn	Zinc	PCB	Polychlorinated biphenol
Cr	Chromium	Hex Cr	Hexavalent Chromium		

Table 18

Mortality (number and percent) of *Pimephales promelas* in a 96-hour Sediment Bioassay of Ashtabula Harbor, Ohio, October 17-21, 1988. (R10)

Site Number		Number Dead	x	Percent Dead	x
Control -	A	0		0	
	B	0	0	5	0.0
	C	0		0	
ASH R-1 -	A	1		10	
	B	0	.3	0	3.3
	C	0		0	
ASH R-2 -	A	0		0	
	B	1	.3	10	3.3
	C	0		0	
ASH R-3 -	A	0		0	
	B	1	.3	10	3.3
	C	0		0	
ASH DISP-	A	0		0	
	B	0	0	0	0.0
	C	0		0	
ASH - 4 -	A	0		0	
	B	0	1	0	10.0
	C	3		30	
ASH - 5 -	A	0		0	
	B	1	.3	10	3.3
	C	0		0	
ASH - 6	A	0		0	
	B	0	.3	0	6.6
	C	1		10	
ASH - 7	A	1		10	
	B	1	.6	10	6.6
	C	0		0	
ASH - 8	A	0		0	
	B	1	.6	10	6.6
	C	1		10	
ASH - 9	A	0		0	
	B	1	.3	10	3.3
	C	0		0	

(Continued)

Table 18 (Concluded)

Site Number	Number Dead	x	Percent Dead	x
ASH -10 - A	0		0	
B	0	.3	0	3.3
C	1		10	
ASH -11 - A	0		0	
B	0	.3	0	3.3
C	1		10	
ASH -12 - A	0		0	
B	1	.6	10	6.6
C	1		10	
ASH -13 - A	0		0	
B	0	.3	0	8
C	1		10	
ASH -14 - A	0		0	
B	0	.3	0	3.3
C	1		10	

Table 19

Mortality (number and percent) of *Hexagenia limbata* used in a 96-hour Sediment Bioassay of Ashtabula Harbor, Ohio, October 17-21, 1988. (R10)

Site Number		Number Dead	x	Percent Dead	x
Control	A	2		10	
	B	0	.6	0	3.3
	C	0		0	
ASH R-1	A	0		0	
	B	1	1.3	5	6.6
	C	3		15	
ASH R-2	A	2		10	
	B	2	1.3	10	6.6
	C	0		0	
ASH R-3	A	1		5	
	B	1	.6	5	3.3
	C	0		0	
ASH DISP-	A	0		0	
	B	0	.3	0	1.6
	C	1		5	
ASH - 4	A	3		15	
	B	2	2.0	10	10.0
	C	1		5	
ASH - 5	A	2		10	
	B	0	1.3	0	6.6
	C	2		10	
ASH - 6	A	3		15	
	B	2	2.3	10	11.6
	C	2		10	
ASH - 7	A	2		10	
	B	1	2.0	5	10.0
	C	3		15	
ASH - 8	A	2		10	
	B	5	2.3	25	11.6
	C	0		0	
ASH - 9	A	3		15	
	B	0	1.6	0	8.3
	C	2		10	

(Continued)

Table 19 (Concluded)

Site Number	Number Dead	x	Percent Dead	x
ASH -10 - A	2		10	
B	1	1.0	5	5.0
C	0		0	
ASH -11 - A	2		10	
B	1	1.6	5	8.3
C	2		10	
ASH -12 - A	4		20	
B	0	2.0	0	10.0
C	2		10	
ASH -13 - A	0		0	
B	1	1.0	5	5.0
C	2		10	
ASH -14 - A	3		15	
B	4	3.0	20	15.0
C	2		10	

Table 20

Mortality (number and percent) of *Daphnia magna* used in a 96-hour Sediment Bioassay of Ashtabula Harbor, Ohio, October 17-22, 1988. (R10)

Site Number	Number Dead	x	Percent Dead	x
Control - A	2		6.6	
B	0	1.0	0.0	3.3
C	1		3.3	
ASH R-1 - A	10		33.3	
B	0	3.6	0.0	12.2
C	1		3.3	
ASH R-2 - A	1		3.3	
B	2	2.0	6.6	6.6
C	3		10.0	
ASH R-3 - A	2		6.6	
B	1	1.6	3.3	5.2
C	2		6.6	
ASH DISP- A	2		6.6	
B	2	1.3	6.6	4.4
C	0		0.0	
ASH - 4 - A	7		23.3	
B	12	7.3	40.0	24.4
C	3		10.0	
ASH - 5 - A	2		6.6	
B	16	7.0	53.3	23.3
C	3		10.0	
ASH - 6 - A	2		6.6	
	1	1.3	3.3	4.4
	1		3.3	
ASH - 7 - A	1		3.3	
B	3	2.0	10.0	6.6
C	2		6.6	
ASH - 8 - A	2		6.6	
B	0	1.3	0.0	4.4
C	2		6.6	
ASH - 9 - A	1		3.3	
B	2	1.0	6.6	3.3
C	0		0.0	

(Continued)

Table 20 (Concluded)

Site Number	Number Dead	x	Percent Dead	x
ASH -10 - A	0		0.0	
B	0	0.3	0.0	1.1
C	1		3.3	
ASH -11 - A	0		0.0	
B	3	1.0	10.0	3.3
C	0		0.0	
ASH -12 - A	5		16.6	
B	2	3.0	6.6	9.9
C	2		6.6	
ASH -13 - A	2		6.6	
B	15	6.6	50.0	22.2
C	3		10.0	
ASH -14 - A	1		3.3	
B	2	1.0	6.6	3.3
C	0		0.0	

Table 21

Nearshore and Offshore Fish Species in Ashtabula Harbor, 1976-1977. (R7)

Species	Nearshore	Offshore
Alewife	X	X
Gizzard shad	X	X
Rainbow smelt	X	X
Burbot	X	X
Longnose gar	X	
Coho salmon	X	X
Northern pike	X	
White sucker	X	X
Black redhorse	X	
Golden redhorse	X	
Northern redhorse	X	
East quillback	X	
Common carp	X	X
Goldfish	X	
Carp x goldfish	X	
Golden shiner	X	
Emerald shiner	X	X
Spottail shiner	X	X
Spotfin shiner	X	
Sand shiner	X	
Longnose dace	X	
Bluntnose minnow	X	
Stonecat	X	X
Channel catfish	X	X
Black bullhead	X	
Yellow bullhead	X	
Brown bullhead	X	
White bass	X	X
Banded killifish	X	X
Trout-perch	X	X
White crappie	X	
Black crappie	X	
Rock bass	X	X
Smallmouth bass	X	X
Largemouth bass	X	
Green sunfish	X	
Bluegill	X	
Pumpkinseed	X	
Sauger		X
Walleye	X	X
Yellow perch	X	X
Logperch	X	
Johnny darter	X	
Freshwater drum	X	X
Mottled sculpin	X	X
Total Number	44	20

*from Sweeney, 1978

Table 22a

Species and Number of Fish Collected in Three Trap Nets at Proposed Disposal Site 19A, Ashtabula Harbor, May, July and August 1984. (R7)

Species	May 16	July 6	August 29
Brown bullhead	258	58	177
White crappie	32		6
Black crappie	29	5	7
Pumpkinseed	49	37	10
Bluegill	44	14	6
Rock bass	4	61	6
Yellow perch	36	20	9
Bowfin	1	1	
Golden shiner		2	
Northern pike	4		
Smallmouth bass	4		
Shorthead redhorse	1		
White perch	1		
Stonecat madtom	1		
White bass	2	1	
Longear sunfish	2		
Carp	2		1
Orangespotted sunfish		1	

U.S. FWS 1984

Table 22b

Ashtabula Harbor Benthos. (3)

Classification	Key*	Number Actual	Number Per Meter^2	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 1A					
DIPTERA					
Chironomus sp.	3	1	22.2	n.m.	-
Procladius sp.	3	1	22.2	n.m.	-
OLIGOCHAETA					
Tubificidae	4	105	2,331.0	1.05	0.53
TOTAL - 3 taxa		107	2,375.4	1.05	0.53
SAMPLE 1B					
DIPTERA					
Procladius sp.	3	2	44.4	n.m.	-
GASTROPODA					
Viviparus sp.	4	1	22.2	0.01	0.01
OLIGOCHAETA					
Tubificidae	4	105	2,331.0	1.05	0.53
PELECYPODA					
Musculium sp.	4	1	22.2	n.m.	-
TOTALS - 4 taxa		109	2,419.8	1.06	0.54
SAMPLE 1C					
DIPTERA				0.02	-
Chironomus sp.	3	3	66.6		
Coelotanypus sp.	3	2	44.4		
Procladius sp.	3,4	3	66.6		
GASTROPODA					
Viviparus sp.	4	1	22.2	0.2	0.05
OLIGOCHAETA					
Tubificidae	4	275	6,105.0	2.2	0.52
PELECYPODA					
Musculium sp.	4	2	44.4	0.05	0.01
TOTALS - 6 taxa		286	6,349.2	2.47	0.58

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter^2	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 1 (COMBINED)					
DIPTERA				0.02	-
Chironomus sp.	3	4	29.6		
Coelotanypus sp.	3	2	14.8		
Procladius sp.	3,4	6	44.5		
GASTROPODA					
Viviparus sp.	4	2	14.8	0.21	0.03
OLIGOCHAETA					
Tubificidae	4	485	3,593.9	4.3	0.52
PELECYPODA					
Musculium sp.	4	3	22.2	0.05	0.01
TOTALS - 6 taxa		502	3,719.8	4.58	0.56

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 2A					
OLIGOCHAETA					
Naididae	4	1	22.2	n.m.	
Tubificidae	4	15	333.0	0.1	0.03
TOTALS - 2 taxa		16	355.2	0.1	0.03
SAMPLE 2B					
DIPTERA				0.01	-
Coelotanypus sp.	3	3	66.6		
Procladius sp.	3,4	6	133.2		
HIRUDINEA					
Helobdella elongata	4	4	88.8	0.06	0.02
OLIGOCHAETA					
Tubificidae	4	40	888.0	0.32	0.10
PELECYPODA					
Musculium sp.	4	3	66.6	0.06	0.02
Pisidium sp.	4	2	44.4	0.01	-
TOTALS - 6 taxa		58	1,287.6	0.46	0.14
SAMPLE 2C					
DIPTERA				0.02	0.01
Chironomus sp.	3	1	22.2		
Procladius sp.	3	6	133.2		
Tanypus sp.	3	1	22.2		
HIRUDINEA					
Helobdella elongata	4	3	66.6	0.08	0.02
OLIGOCHAETA					
Tubificidae	4	47	1,043.4	0.36	0.10
PELECYPODA					
Musculium sp.	4	7	155.4	0.04	0.01
TOTALS - 6 taxa		65	1,443.0	0.48	0.13

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number		Volume (ml)	
		Actual	Per Meter^2	Actual	Per Liter
SAMPLE 2 (COMBINED)					
DIPTERA				0.03	-
Chironomus sp.	3	1	7.4		
Coelotanypus sp.	3	3	22.2		
Procladius sp.	3,4	12	88.9		
Tanypus sp.	3	1	7.4		
HIRUDINEA					
Helobdella elongata	4	7	51.9	0.14	0.01
OLIGOCHAETA					
Naididae	4	1	7.4	n.m.	-
Tubificidae	4	102	755.8	0.78	0.07
PELECYPODA					
Musculium sp.	4	10	74.1	0.1	0.01
Pisidium sp.	4	2	14.8	0.01	-
TOTALS - 9 taxa		139	1,029.9	1.06	0.10

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 3A					
DIPTERA				0.01	-
Coelotanypus sp.	3	1	22.2		
Cryptochironomus sp.	3	1	22.2		
Procladius sp.	3	4	88.8		
HIRUDINEA					
Helobdella elongata	4	6	133.2	0.09	0.02
Mooreobdella microstoma	4	1	22.2	0.1	0.03
OLIGOCHAETA					
Tubificidae	4	150	3,330.0	1.24	0.31
PELECYPODA					
Sphaerium sp.	4	6	133.2	0.04	0.01
TOTALS - 7 taxa		169	3,751.8	1.48	0.37
SAMPLE 3B					
DIPTERA					
Chironomus sp.	3	1	22.2	n.m.	-
Coelotanypus sp.	3	1	22.2	n.m.	-
Procladius sp.	3	1	22.2	n.m.	-
HIRUDINEA					
Helobdella elongata	4	2	44.4	0.01	-
OLIGOCHAETA					
Tubificidae	4	100	2,220.0	0.8	0.32
TOTALS - 5 taxa		105	2,331.0	0.81	0.32
SAMPLE 3C					
DIPTERA					
Procladius sp.	3	1	22.2	n.m.	-
HIRUDINEA					
Helobdella elongata	4	7	155.4	0.05	0.01
OLIGOCHAETA					
Tubificidae	4	120	2,664.0	1.05	0.21
PELECYPODA					
Sphaerium sp.	4	2	44.4	0.02	-
TOTALS - 4 taxa		130	2,886.0	1.12	0.21

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter^2	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 3 (COMBINED)					
DIPTERA				0.02	-
Chironomus sp.	3	1	7.4		
Coelotanypus sp.	3	2	14.8		
Cryptochironomus sp.	3	1	7.4		
Procladius sp.	3	6	44.4		
HIRUDINEA					
Helobdella elongata	4	15	111.0	0.15	0.01
Mooreobdella microstoma	4	1	7.4	0.1	0.01
OLIGOCHAETA					
Tubificidae	4	370	2,738.0	3.09	0.27
PELECYPODA					
Sphaerium sp.	4	8	59.2	0.06	0.01
TOTALS - 8 taxa		404	2,989.6	3.42	0.30

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 4A					
DIPTERA					
Coelotanypus sp.	3	1	22.2	n.m.	
Procladius sp.	3	1	22.2	n.m.	
HIRUDINEA					
Helobdella elongata	4	2	44.4	0.01	-
OLIGOCHAETA					
Tubificidae	4	138	3,063.6	1.15	0.29
PELECYPODA					
Sphaerium sp.	4	10	222.0	0.02	0.01
TOTALS - 5 taxa		152	3,374.4	1.18	0.30
SAMPLE 4B					
DIPTERA					
Procladius sp.	3	4	88.8	n.m.	-
OLIGOCHAETA					
Tubificidae	4	54	1,198.8	0.45	0.26
PELECYPODA					
Sphaerium sp.	4	4	88.8	0.01	0.01
TOTALS - 3 taxa		62	1,376.4	0.46	0.27
SAMPLE 4C					
DIPTERA					
Cryptochironomus sp.	3	1	22.2	n.m.	-
Procladius sp.	3	2	44.4	n.m.	-
OLIGOCHAETA					
Tubificidae	4	97	2,153.4	0.81	0.29
PELECYPODA				0.02	0.01
Musculium sp.	4	1	22.2		
Sphaerium sp.	4	6	133.2		
TOTALS - 5 taxa		107	2,375.4	0.83	0.30

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter^2	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 4 (COMBINED)					
DIPTERA				0.01	-
Coelotanypus sp.	3	1	7.4		
Cryptochironomus sp.	3	1	7.4		
Procladius sp.	3	7	51.8		
HIRUDINEA					
Helobdella elongata	4	2	14.8	0.01	-
OLIGOCHAETA					
Tubificidae	4	289	2,138.6	2.41	0.28
PELECYPODA				0.05	0.01
Musculium sp.	4	1	7.4		
Sphaerium sp.	4	20	148.0		
TOTALS - 7 taxa		321	2,375.4	2.48	0.29

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 5A					
DIPTERA				0.01	-
Chironomus sp.	3	1	22.2		
Procladius sp.	3	3	66.6		
HIRUDINEA					
Helobdella elongata	4	1	22.2	n.m.	-
OLIGOCHAETA					
Tubificidae	4	192	4,262.4	1.6	0.4
PELECYPODA					
Musculium sp.	4	2	44.4	0.05	0.01
TOTALS - 5 taxa		199	4,417.8	1.66	0.41
SAMPLE 5B					
DIPTERA					
Chironomus sp.	3	1	22.2	n.m.	-
Procladius sp.	3	4	88.8	n.m.	-
GASTROPODA					
Viviparus sp.	4	1	22.2	0.2	0.05
OLIGOCHAETA					
Tubificidae	4	186	4,129.2	1.55	0.39
PELECYPODA					
Musculium sp.	4	2	44.4	0.05	0.01
TOTALS - 5 taxa		194	4,306.8	1.8	0.45
SAMPLE 5C					
DIPTERA					
Procladius sp.	3	1	22.2	n.m.	-
Tanypus sp.	3	1	22.2	n.m.	-
HIRUDINEA					
Helobdella elongata	4	1	22.2	n.m.	-
OLIGOCHAETA					
Tubificidae	4	246	5,461.2	2.05	0.51
PELECYPODA					
Sphaerium sp.	4	1	22.2	n.m.	-
TOTALS - 5 taxa		250	5,550.0	2.05	0.51

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 5 (COMBINED)					
DIPTERA				0.02	-
Chironomus sp.	3	2	14.8		
Procladius sp.	3	8	59.2		
Tanypus sp.	3	1	7.4		
GASTROPODA					
Viviparus sp.	4	1	7.4	0.2	0.02
HIRUDINEA					
Helobdella elongata	4	2	14.8	0.01	-
OLIGOCHAETA					
Tubificidae	4	624	4,617.6	5.2	0.43
PELECYPODA					
Musculium sp.	4	4	29.6	0.1	0.01
Sphaerium sp.	4	1	7.4	n.m.	-
TOTALS - 8 taxa		643	4,758.2	5.53	0.46

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Continued)

Classification	Key*	Number Actual	Number Per Meter²	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 6A					
DIPTERA				0.03	0.01
Chironomus sp.	3	3	66.6		
Procladius sp.	3	3	66.6		
GASTROPODA					
Viviparus sp.	1,4	1	22.2	0.2	0.07
HIRUDINEA					
Helobdella elongata	4	2	44.4	0.01	-
OLIGOCHAETA					
Tubificidae	4	96	2,131.2	0.8	0.27
PELECYPODA					
Musculium sp.	4	5	111.0	0.01	-
TOTALS - 6 taxa		110	2,442.0	1.05	0.35
SAMPLE 6B					
DIPTERA				0.03	0.01
Coelotanypus sp.	3	2	44.4		
Procladius sp.	3	10	222.0		
HIRUDINEA					
Helobdella elongata	4	1	22.2	n.m.	-
OLIGOCHAETA					
Tubificidae	4	104	2,308.8	0.87	0.29
PELECYPODA					
Musculium sp.	4	2	44.4	n.m.	-
TOTALS - 5 taxa		119	2,641.8	0.9	0.3
SAMPLE 6C					
DIPTERA					
Chironomus sp.	3	1	22.2	n.m.	-
Procladius sp.	3	1	22.2	n.m.	-
HIRUDINEA					
Helobdella elongata	4	2	44.4	0.01	-
OLIGOCHAETA					
Tubificidae	4	66	1,465.2	0.55	0.18
PELECYPODA					
Sphaerium sp.	4	2	44.4	n.m.	-
TOTALS - 5 taxa		72	1,598.4	0.56	0.18

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

(Continued)

Table 22b (Concluded)

Classification	Key*	Number Actual	Number Per Meter^2	Volume (ml) Actual	Volume (ml) Per Liter
SAMPLE 6 (COMBINED)					
DIPTERA				0.06	0.01
Chironomus sp.	3	4	29.6		
Coelotanypus sp.	3	2	14.8		
Procladius sp.	3	14	103.6		
GASTROPODA					
Viviparus sp.	1,4	1	7.4	0.2	0.02
HIRUDINEA					
Helobdella elongata	4	5	37.0	0.02	-
OLIGOCHAETA					
Tubificidae	4	266	1,968.4	2.22	0.25
PELECYPODA				0.02	-
Musculium sp.	4	7	51.8		
Sphaerium sp.	4	2	14.8		
TOTALS - 8 taxa		301	2,227.4	2.52	0.28

* Taxonomic Keys used for identification of benthos
n.m. Volume not measureable

Table 23

State Endangered, Threatened or Potentially Threatened Animal and Plant Species - Ashtabula River AOC. (R7)

1. Cakile edentula - Inland Sea-rocket, P

2. Cyperus schweinitzii - Schweinitz's Umbrella-sedge, P
   Juncus balticus - Baltic Rush, P
   Najas flexilis - Slender Naiad, P
   Potomogeton richardsonii - Richardson's Pondweed, T
   Potentilla anserina - Silverweed, P
   Potentilla paradoxa - Bushy Cinquefoil, T
   Sporobulus cryptandrus - Sand Dropseed, P
   Vallisneria americana - Eel-Grass, P

3. Walnut Beach City Park

   Ammophila breviligulata - American Beach Grass, P
   Cakile edentula - Inland Sea-rocket, P
   Cyperus schweinitzii - Schweinitz's Umbrella-sedge, P
   Euphorbia polygonifolia - Seaside Spurge, P
   Lathyrus japonicus - Inland Beach-pea, T
   Myriophyllum heterophyllum - Two-leaved Water-milfoil, T
   Potentilla anserina - Silverweed, P
   Sporobolus cryptandrus - Sand Dropseed, P
   Triplasis purpurea - Purple Sand-grass, P

4. Beach-Dune Plant Community

   Ammophila breviligulata - American Beach Grass, P
   Cakile edentula - Inland Sea-rocket, P
   Euphorbia polygonifolia - Seaside Spurge, P
   Lathyrus japonicus - Inland Beach-pea, T
   Triplasis purpurea - Purple Sand-grass, P

5. Lota lota - Burbot, OWE

Status Codes Animals: OWE = State Endangered
Plants: T = State Threatened
P = Potentially Threatened (not a legal designation)

Source: ODNR, Division of Natural Areas and Preserves

Table 24

Summary of Excess Lifetime Cancer Risk from Ingestion of Sediment from Fields Brook, Its Tributaries, and the Ashtabula River. (R5)

Carcinogens	Maximum: Incremental Concentration Above Background ug/kg	Maximum: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean: Incremental Concentration Above Background ug/kg	Mean: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
UNNAMED TRIBUTARY 22						
Inorganics						
Arsenic	88,600	2×10^{-2}	2×10^{-4}	Only one sample, no mean possible.		
Total		2×10^{-2}	2×10^{-4}			
DETREX TRIBUTARY						
Organics						
Volatiles						
1,1,2,2-Tetrachloroethane	5,400	2×10^{-5}	-	605	2×10^{-6}	-
Tetrachloroethene	5,200	4×10^{-6}	-		-	-
Trichloroethene	7,800	1×10^{-6}	-		-	-
Pesticides						
γ-Hexachlorocyclohexane	3,410	8×10^{-5}	-	379	9×10^{-6}	
PCB's	111	8×10^{-6}	-			-
Base/Neutrals						
Hexachlorobenzene	824,400	2×10^{-2}	2×10^{-4}	190,533	5×10^{-3}	2×10^{-5}
Hexachloroethane	45,880	1×10^{-5}	-	11,034	3×10^{-6}	-
Hexachlorobutadiene	389,300	5×10^{-4}	5×10^{-6}	121,008	2×10^{-4}	1×10^{-6}
Inorganics						
Arsenic	97,600	2×10^{-2}	2×10^{-4}	48,000	1×10^{-2}	1×10^{-4}
Total		5×10^{-2}	5×10^{-4}		2×10^{-2}	1×10^{-4}

(Continued)

Table 24 (Continued)

Carcinogens	Maximum Incremental Concentration Above Background ug/kg	Maximum Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean Incremental Concentration Above Background ug/kg	Mean Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
			DS TRIBUTARY			
Organics						
Volatiles						
1,1,2,2-Tetrachloroethane	180,000	6×10^{-4}	6×10^{-6}	19,946	7×10^{-5}	-
Chloroform	3,614	4×10^{-6}	-	942	1×10^{-6}	-
Tetrachloroethene	160,000	1×10^{-4}	1×10^{-6}	27,679	2×10^{-5}	-
Trichloroethene	160,000	3×10^{-5}	-	28,058	5×10^{-6}	-
Vinyl Chloride	31	1×10^{-6}	-		-	-
Pesticides						
Heptachlor	22,741	1×10^{-3}	1×10^{-5}	3,408	2×10^{-4}	2×10^{-6}
Base/Neutrals						
Hexachlorobenzene	810,000	2×10^{-2}	2×10^{-4}	228,285	6×10^{-3}	6×10^{-5}
Hexachloroethane	49,000	1×10^{-5}	-	9,461	2×10^{-6}	-
Hexachlorobutadiene	140,000	2×10^{-4}	2×10^{-6}	36,164	5×10^{-5}	-
Benzo(a)pyrene	5,900	1×10^{-3}	1×10^{-5}	1,478	3×10^{-4}	3×10^{-6}
Inorganic						
Arsenic	8,100	2×10^{-3}	2×10^{-5}		-	-
Total		3×10^{-2}	3×10^{-4}		7×10^{-3}	7×10^{-5}
			ROUTE 11 TRIBUTARY			
Organics						
Pesticides						
PCB's	1,544	1×10^{-4}	1×10^{-6}	525	4×10^{-5}	-
Base/Neutrals						
Hexachlorobenzene	804	2×10^{-5}	-	161	5×10^{-6}	-
Total		1×10^{-4}	1×10^{-6}		4×10^{-5}	

(Continued)

Table 24 (Continued)

Carcinogens	Maximum: Incremental Concentration Above Background ug/kg	Maximum: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean: Incremental Concentration Above Background ug/kg	Mean: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
UNNAMED TRIBUTARY 9						
Organics						
Pesticides						
PCB's	57	4×10^{-6}	-	Only one sample, no mean possible.		
Total		4×10^{-6}	-			
FIELDS BROOK REACH 8						
Inorganics						
Arsenic	4,700	1×10^{-3}	1×10^{-5}	-	-	-
Total		1×10^{-3}	1×10^{-5}	-	-	-
FIELDS BROOK REACH 7						
Organics						
Volatiles						
1,1,2,2-Tetrachloroethane	33,000	1×10^{-4}	1×10^{-6}	33,000	1×10^{-4}	1×10^{-6}
Tetrachloroethene	9,400	8×10^{-6}	-	6,250	5×10^{-6}	-
Trichloroethene	22,000	4×10^{-6}	-	15,550	3×10^{-6}	-
Total		1×10^{-4}	1×10^{-6}		1×10^{-4}	1×10^{-6}
FIELDS BROOK REACH 6						
Organics						
Volatiles						
1,1,2,2-Tetrachloroethane	130,000	4×10^{-4}	4×10^{-6}	34,286	1×10^{-4}	1×10^{-6}
Tetrachloroethene	250,000	2×10^{-4}	2×10^{-6}	71,440	6×10^{-5}	-
Trichloroethene	470,000	9×10^{-5}		130,008	2×10^{-5}	-
Pesticides						
PCB's	518,293	4×10^{-2}	4×10^{-4}	82,048	6×10^{-3}	6×10^{-5}

(Continued)

Table 24 (Continued)

Carcinogens	Maximum Incremental Concentration Above Background ug/kg	Maximum Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean Incremental Concentration Above Background ug/kg	Mean Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
			FIELD BROOKS REACH 6 (Cont'd)			
Base/Neutrals						
Hexachlorobenzene	57,000	2×10^{-3}	1×10^{-5}	21,641	6×10^{-4}	6×10^{-6}
Hexachloroethane	43,000	1×10^{-5}	-	13,043	3×10^{-6}	-
Hexachlorobutadiene	77,000	1×10^{-4}	-	27,843	4×10^{-5}	-
Inorganics						
Arsenic	2,900	7×10^{-4}	7×10^{-6}		-	-
Total		4×10^{-2}	4×10^{-4}		7×10^{-3}	6×10^{-5}
			FIELDS BROOK REACH 5			
Organics						
Volatiles						
1,1,2,2-Tetrachloroethane	380	1×10^{-6}	-	53	-	-
Tetrachloroethene	4,100	4×10^{-6}	-	631	-	-
Vinyl Chloride	210	8×10^{-6}	-	28	1×10^{-6}	-
Pesticides						
PCB's	600,000	4×10^{-2}	3×10^{-4}	81,966	6×10^{-3}	6×10^{-5}
Base/Neutrals						
Hexachlorobenzene	70,180	2×10^{-3}	2×10^{-5}	14,320	4×10^{-4}	6×10^{-6}
Hexachlorobutadiene	205,700	3×10^{-4}	3×10^{-6}	24,514	3×10^{-5}	-
Benzo(a)pyrene	4,500	9×10^{-4}	8×10^{-6}	835	2×10^{-4}	1×10^{-6}
Inorganics						
Arsenic	10,200	3×10^{-3}	2×10^{-5}		-	-
Total		5×10^{-2}	5×10^{-4}		7×10^{-3}	6×10^{-5}

(Continued)

Table 24 (Continued)

Carcinogens	Maximum: Incremental Concentration Above Background ug/kg	Maximum: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean: Incremental Concentration Above Background ug/kg	Mean: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
FIELDS BROOK REACH 4						
Organics						
Pesticides						
PCB's	44,693	3×10^{-3}	3×10^{-5}	13,226	1×10^{-3}	9×10^{-6}
Base/Neutrals						
Hexachlorobenzene	321,000	9×10^{-3}	9×10^{-5}	68,175	2×10^{-3}	2×10^{-5}
Hexachlorobutadiene	49,220	6×10^{-5}	-	10,840	1×10^{-5}	-
Benzo(a)pyrene	2,280	4×10^{-4}	4×10^{-6}	374	7×10^{-5}	-
Total		1×10^{-2}	1×10^{-4}		3×10^{-3}	3×10^{-5}
FIELDS BROOK REACH 3						
Organics						
Pesticides						
PCB's	6,180	5×10^{-4}	4×10^{-6}	3,039	2×10^{-4}	2×10^{-6}
Base/Neutrals						
Hexachlorobenzene	3,900	1×10^{-4}	1×10^{-6}	975	3×10^{-5}	-
Total		6×10^{-4}	5×10^{-6}		2×10^{-4}	2×10^{-6}
FIELDS BROOK REACH 2						
Organics						
Pesticides						
PCB's	3,301	2×10^{-4}	2×10^{-6}	825	6×10^{-5}	-
Base/Neutrals						
Hexachlorobenzene	3,915	1×10^{-4}	1×10^{-6}	1,041	3×10^{-5}	-
Hexachlorobutadiene	2,700	4×10^{-6}	-	675	-	-
Benzo(a)pyrene	500	1×10^{-4}	-	125	2×10^{-5}	-
Total		5×10^{-4}	4×10^{-6}		1×10^{-4}	1×10^{-6}

(Continued)

Table 24 (Concluded)

Carcinogens	Maximum: Incremental Concentration Above Background ug/kg	Maximum: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Maximum: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day	Mean: Incremental Concentration Above Background ug/kg	Mean: Excess Lifetime Cancer Risk Residents 0.017g of sed/kg-day	Mean: Excess Lifetime Cancer Risk Workers 0.00016g of sed/kg-day
			FIELDS BROOK REACH 1			
Organics						
Pesticides						
PCB's	11,451	8×10^{-4}	8×10^{-6}	Only one sample, no mean possible.		
Base/Neutrals						
Hexachlorobenzene	5,880	2×10^{-4}	2×10^{-6}			
Hexachlorobutadiene	1,029	4×10^{-6}	-			
Total		1×10^{-3}	1×10^{-5}			

Note: Means less than 1×10^{-6}, see Appendix B for actual risk value. Inorganic concentrations corrected for background; amount shown is greater than background.

Based on cancer potency factors published on October 1, 1985, in the Draft Superfund Public Health Evaluation Manual.

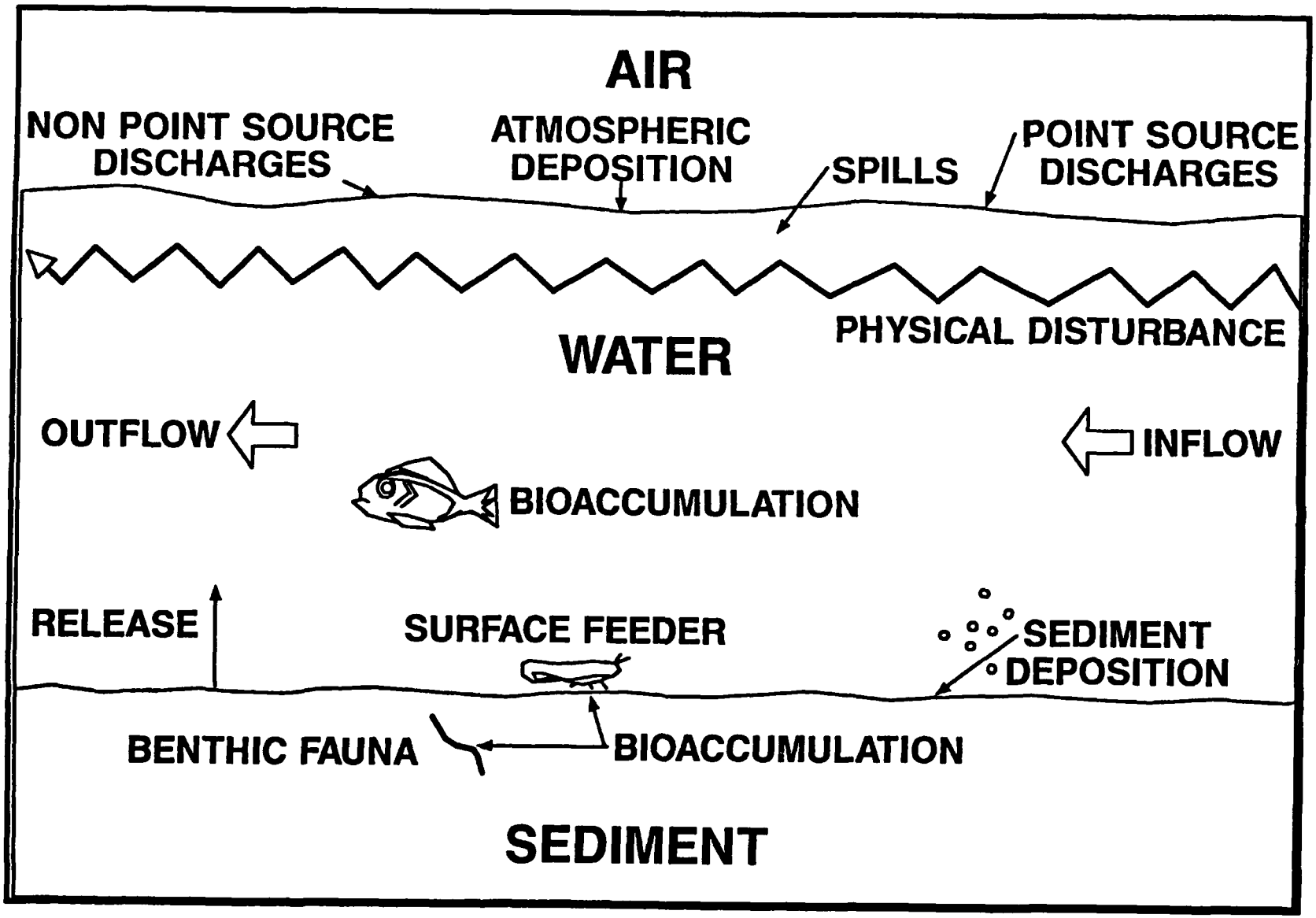

Figure 1. Contaminant migration pathways for evaluation of in-place contaminated sediments

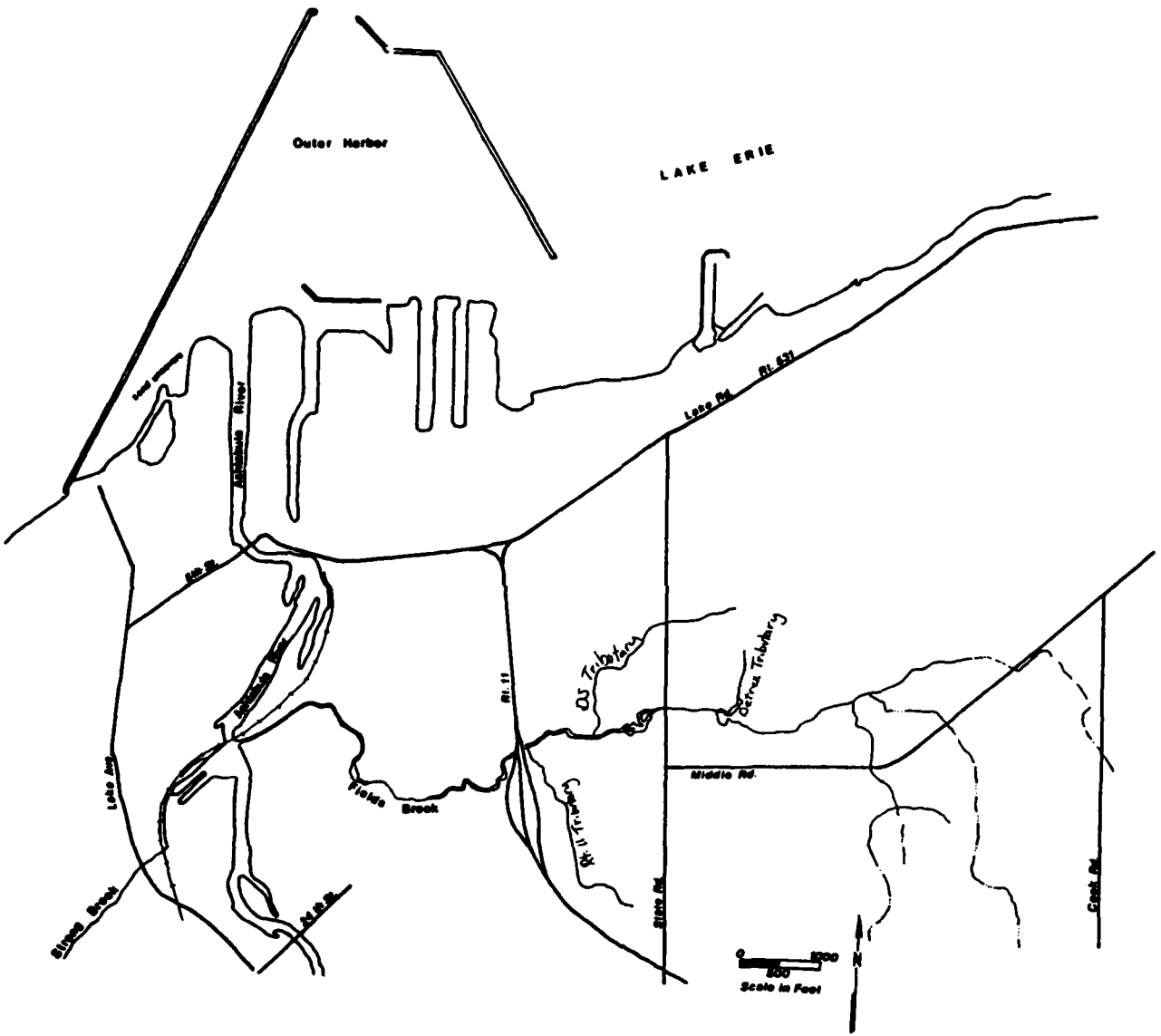

Figure 2. Boundaries of the Ashtabula River Area of Concern (AOC) (R7)

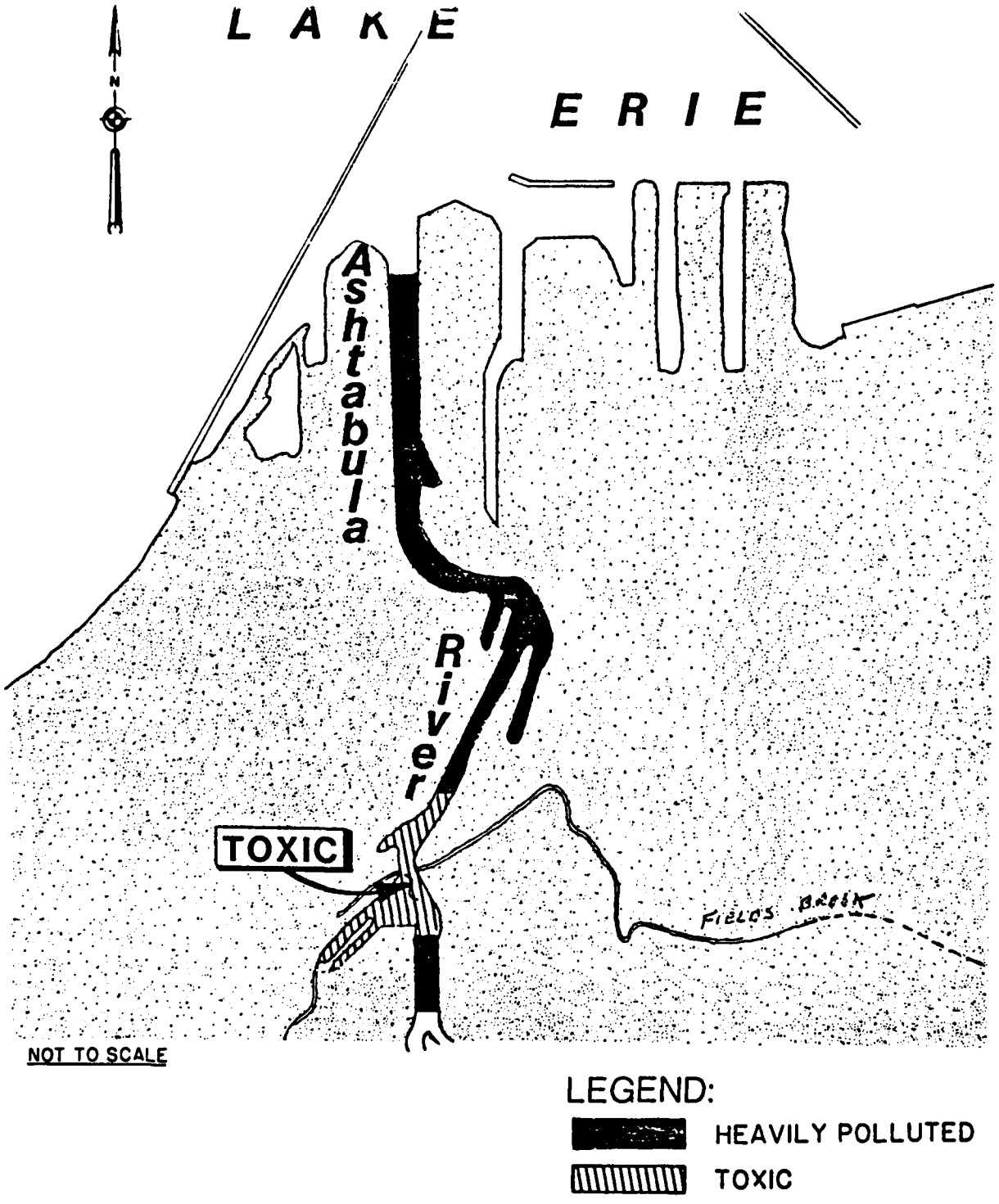

Figure 3. Locations of heavily polluted and toxic sediments, Ashtabula River (R8)

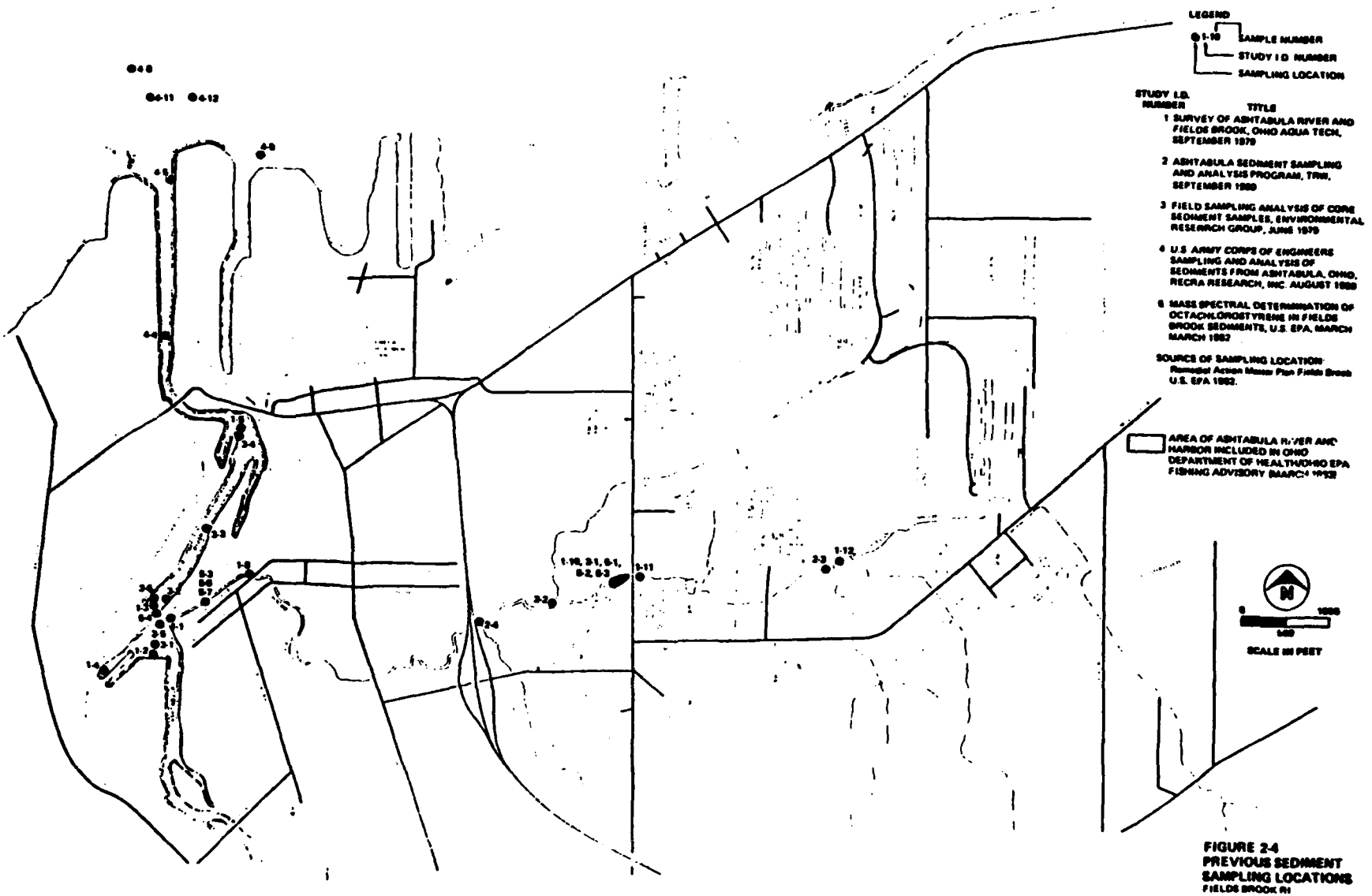

Figure 4. Previous sediment sampling locations (R4)

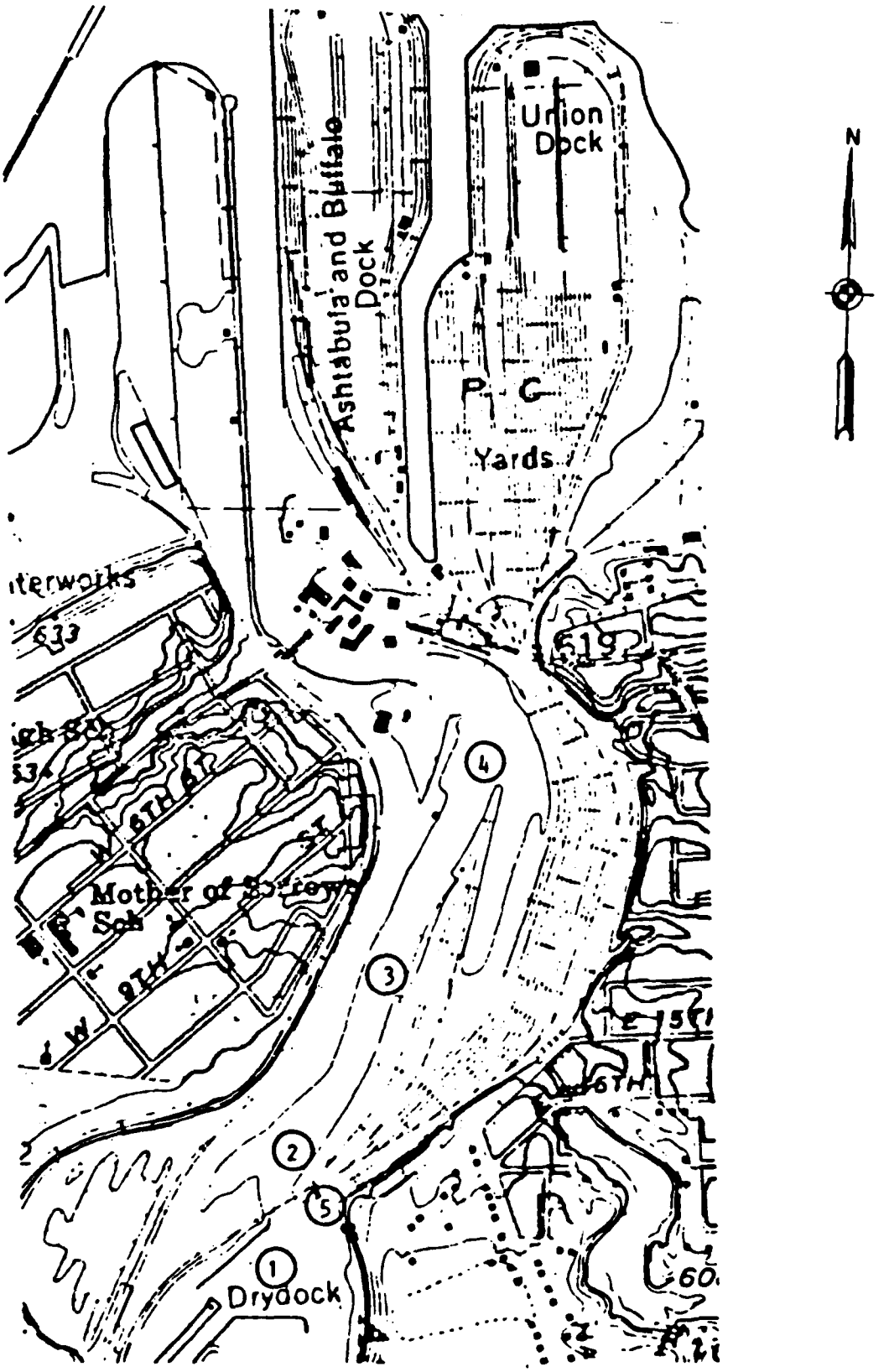

Figure 5. Sampling locations, Ashtabula River, Ashtabula, Ohio (R1)

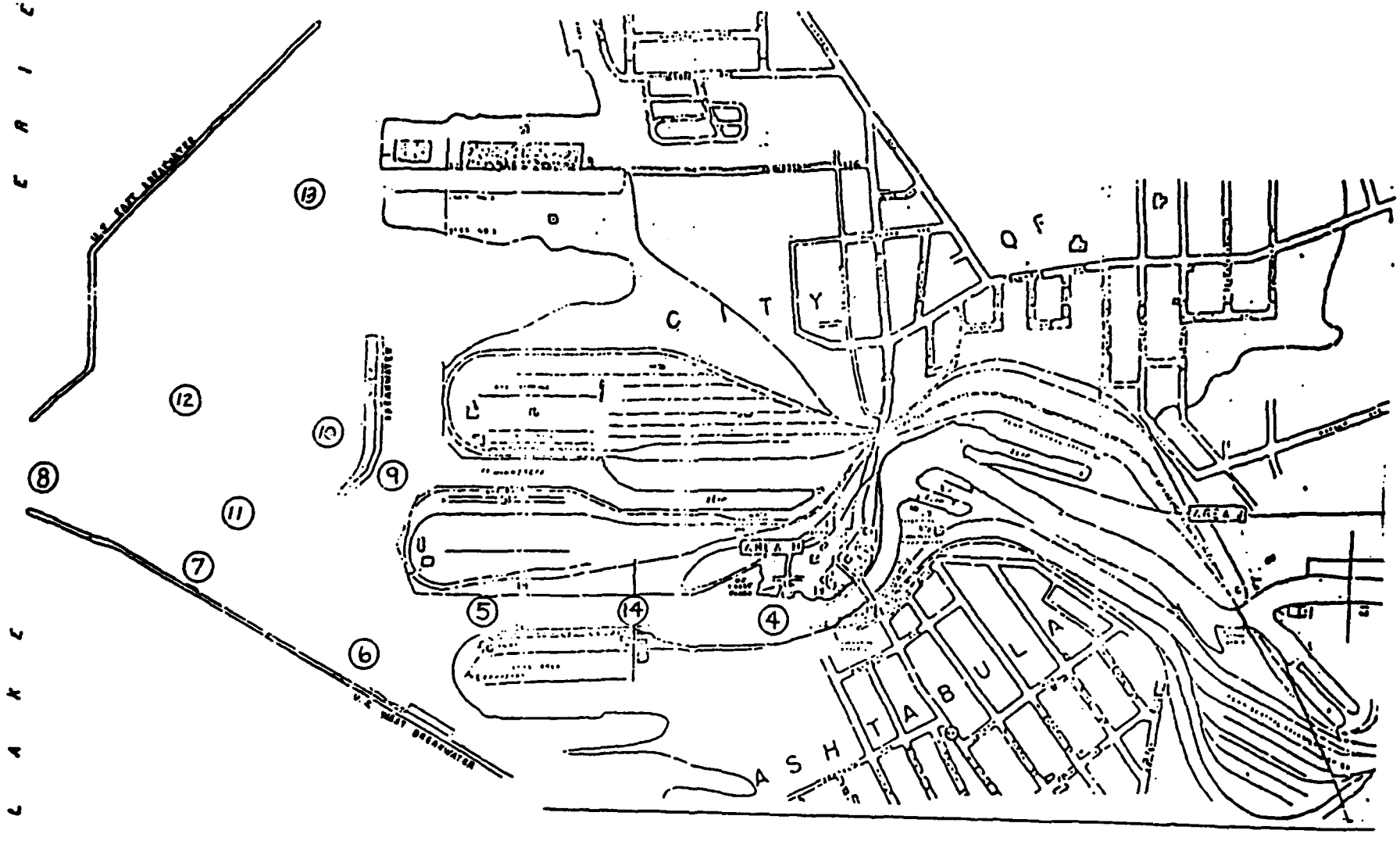

Figure 6. Ashtabula Harbor sampling locations (R10)

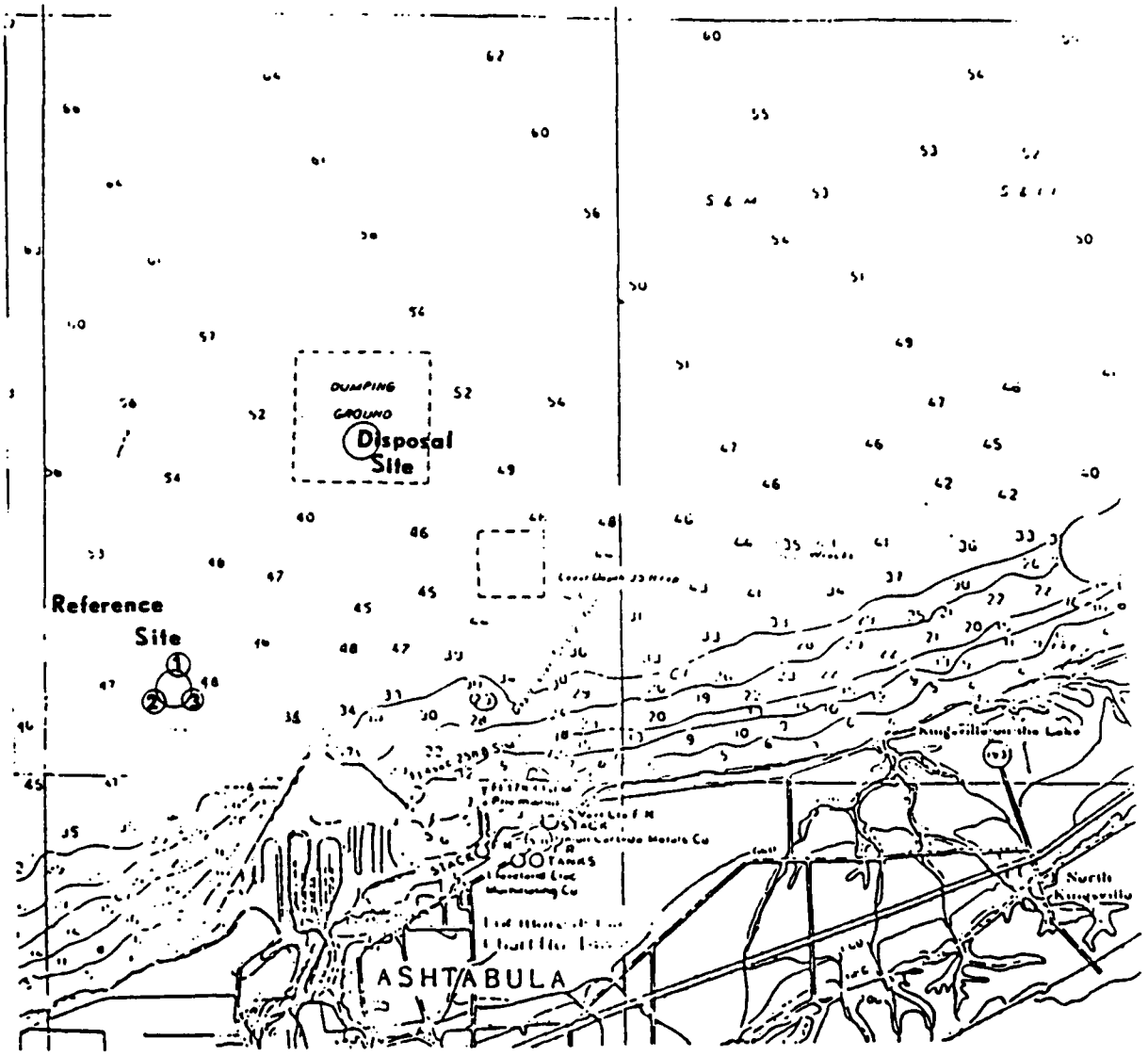

Figure 7. Ashtabula disposal and reference sampling locations (R10)

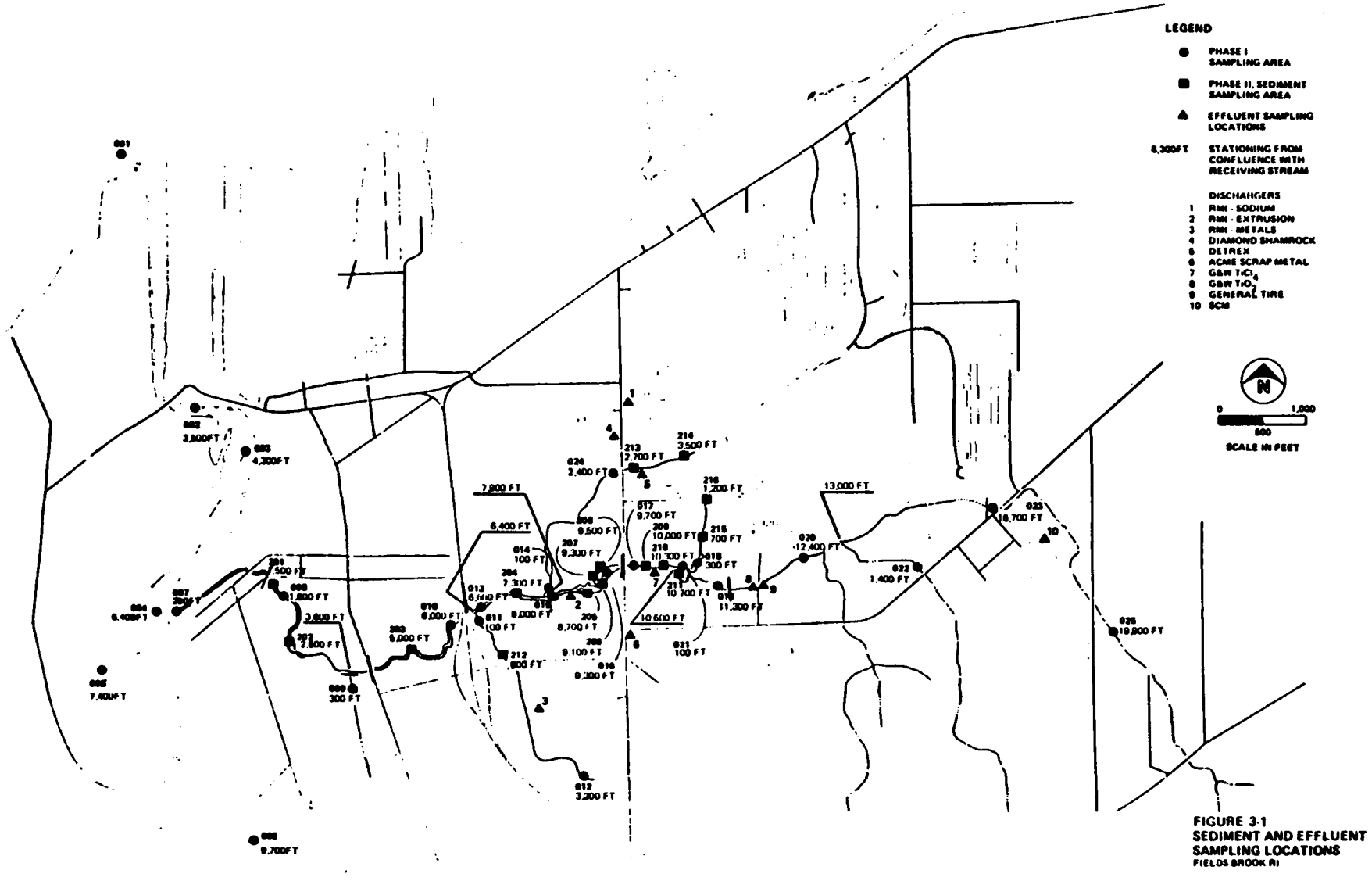

Figure 8a. Sediment and effluent sampling locations (R4)

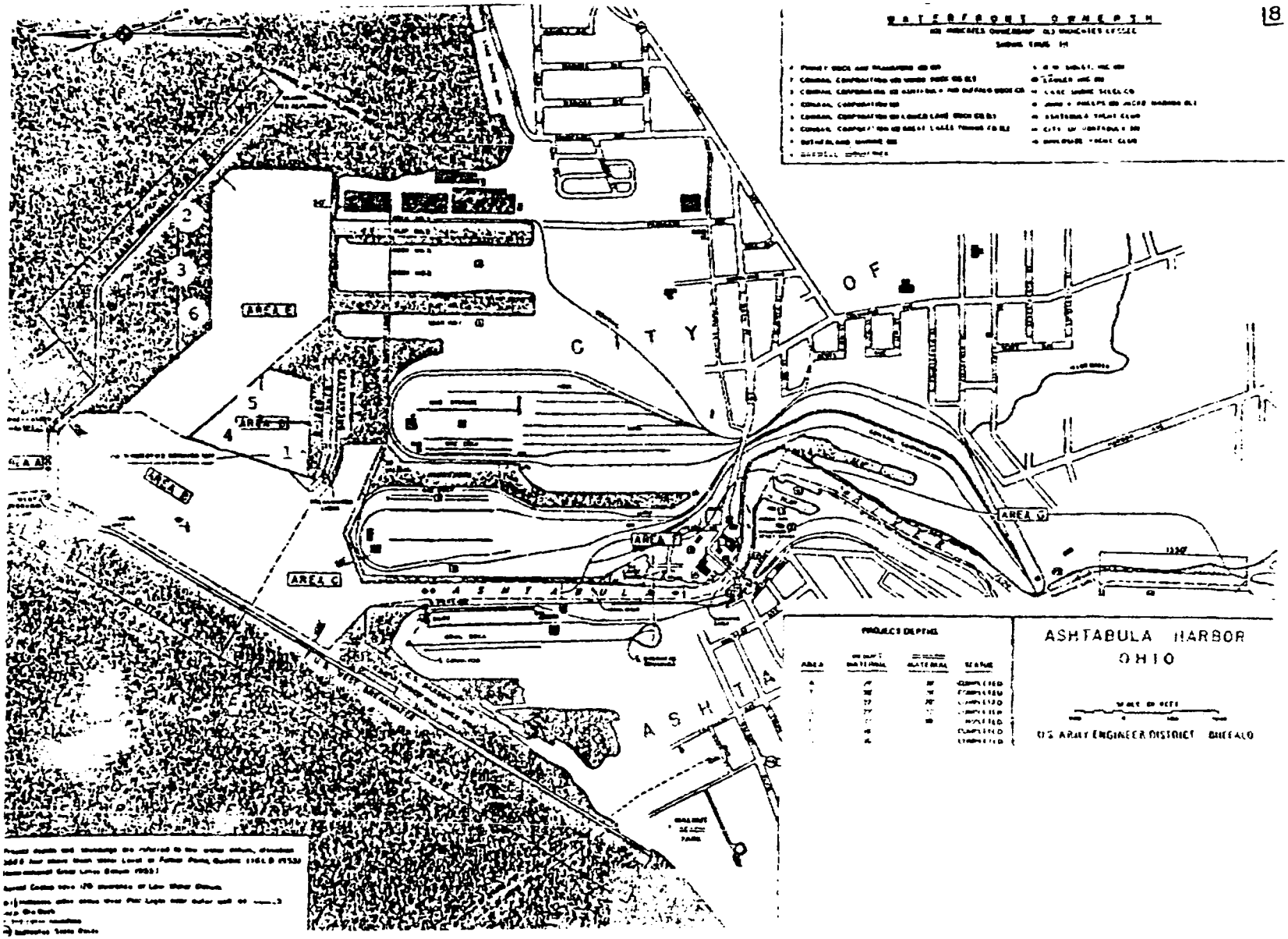

Figure 8b. Locations of sampling sites for sediment and benthos in Ashtabula Harbor, Ohio - August 17-19, 1983 (3)

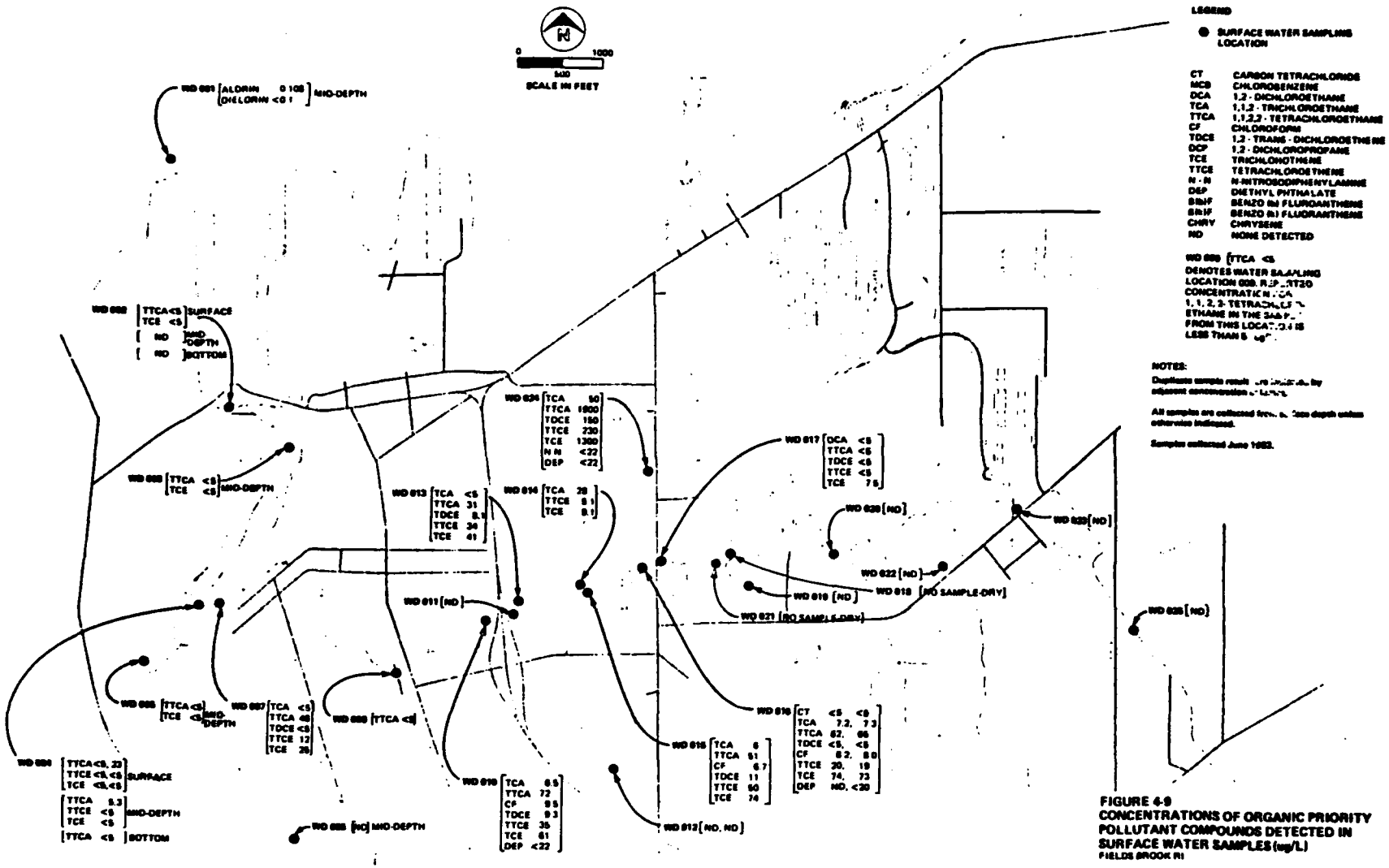

FIGURE 4-9
CONCENTRATIONS OF ORGANIC PRIORITY POLLUTANT COMPOUNDS DETECTED IN SURFACE WATER SAMPLES (ug/L)
FIELDS BROOK RI

Figure 9. Concentrations of organic priority pollutant compounds detected in surface water samples (μg/L) (R4)

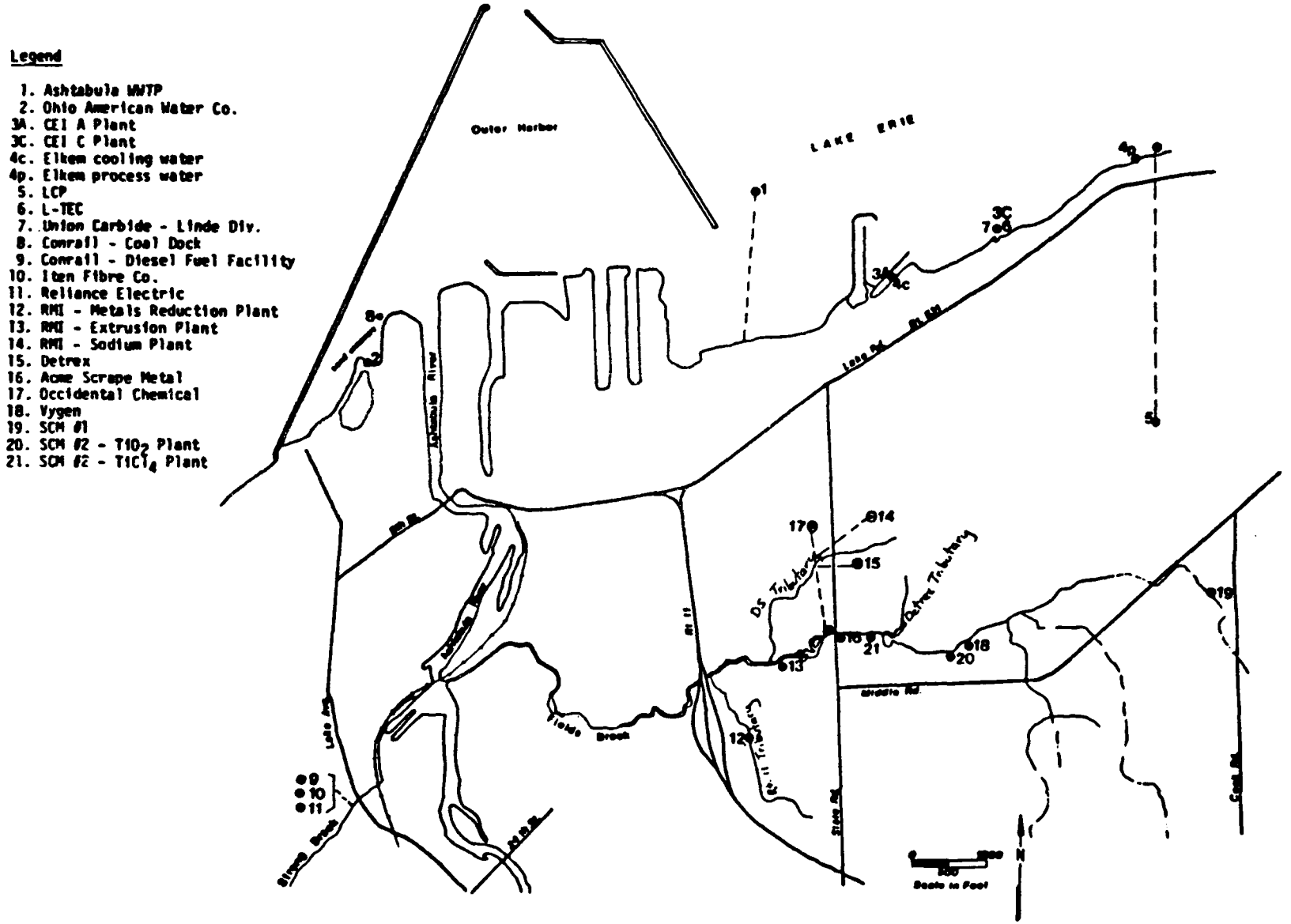

Figure 10. Location of point source dischargers in the Ashtabula River AOC (R4)

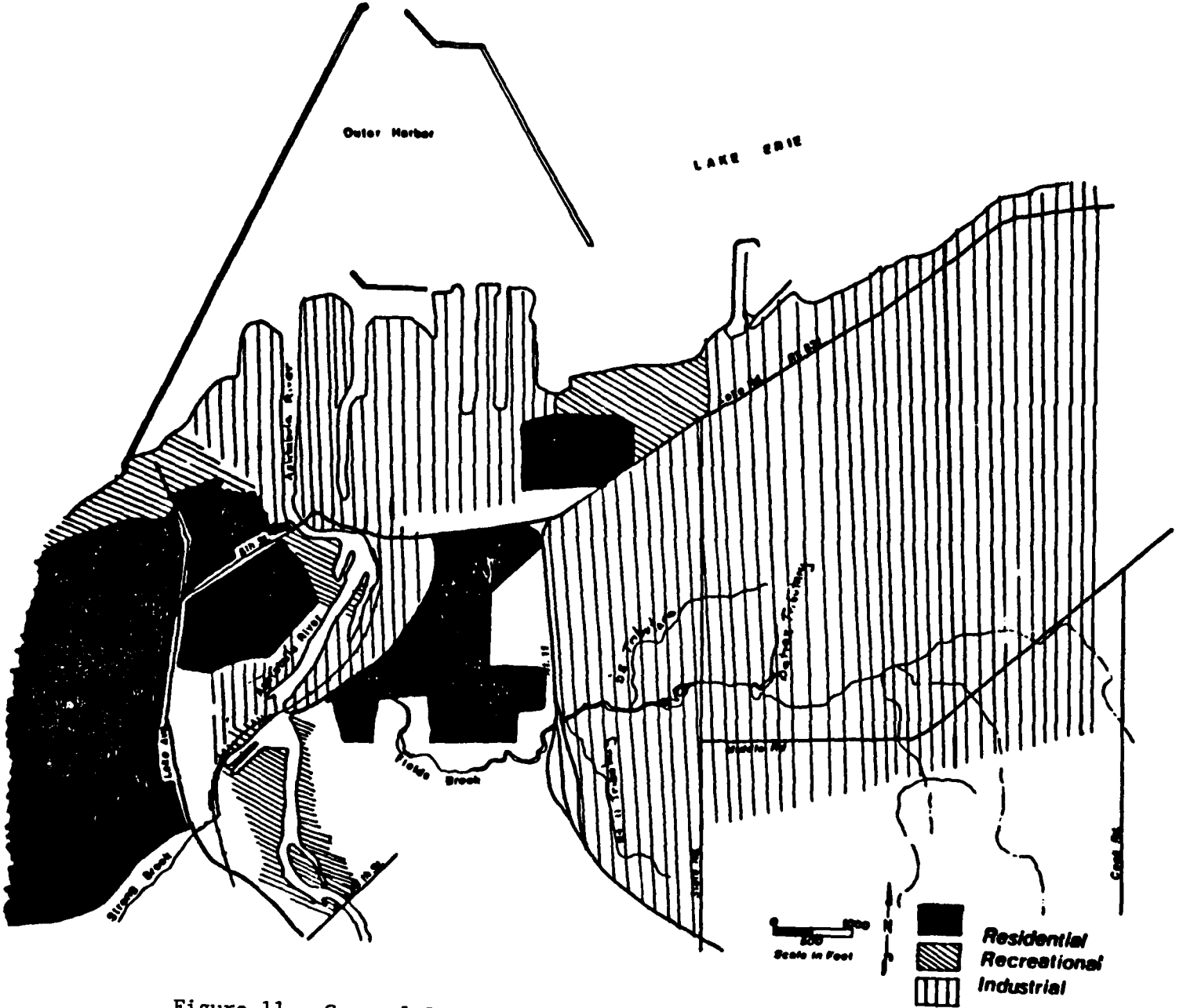

Figure 11. General Land Use in the Ashtabula River AOC (R7)

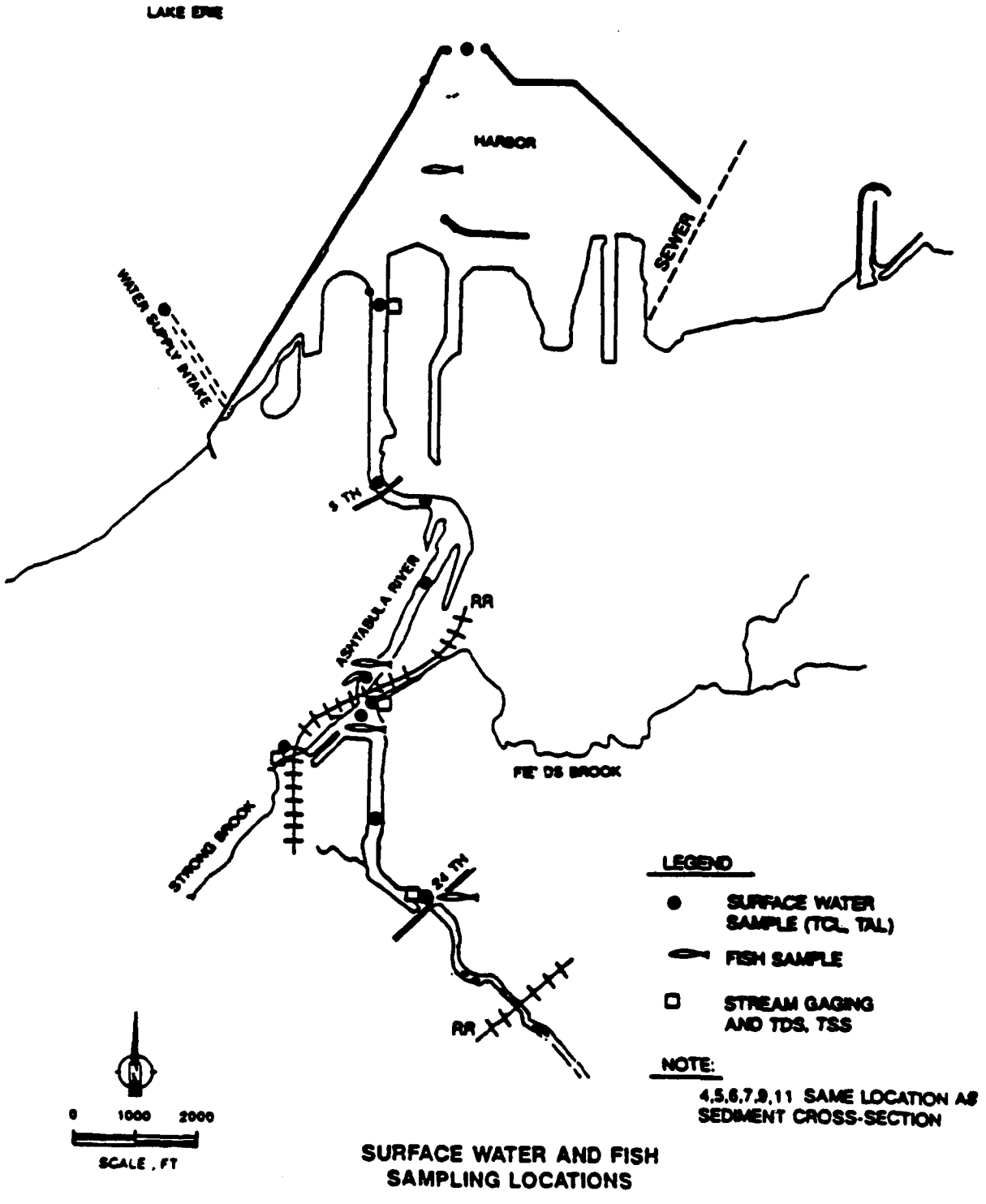

Figure 12a. Ashtabula River location map (4)

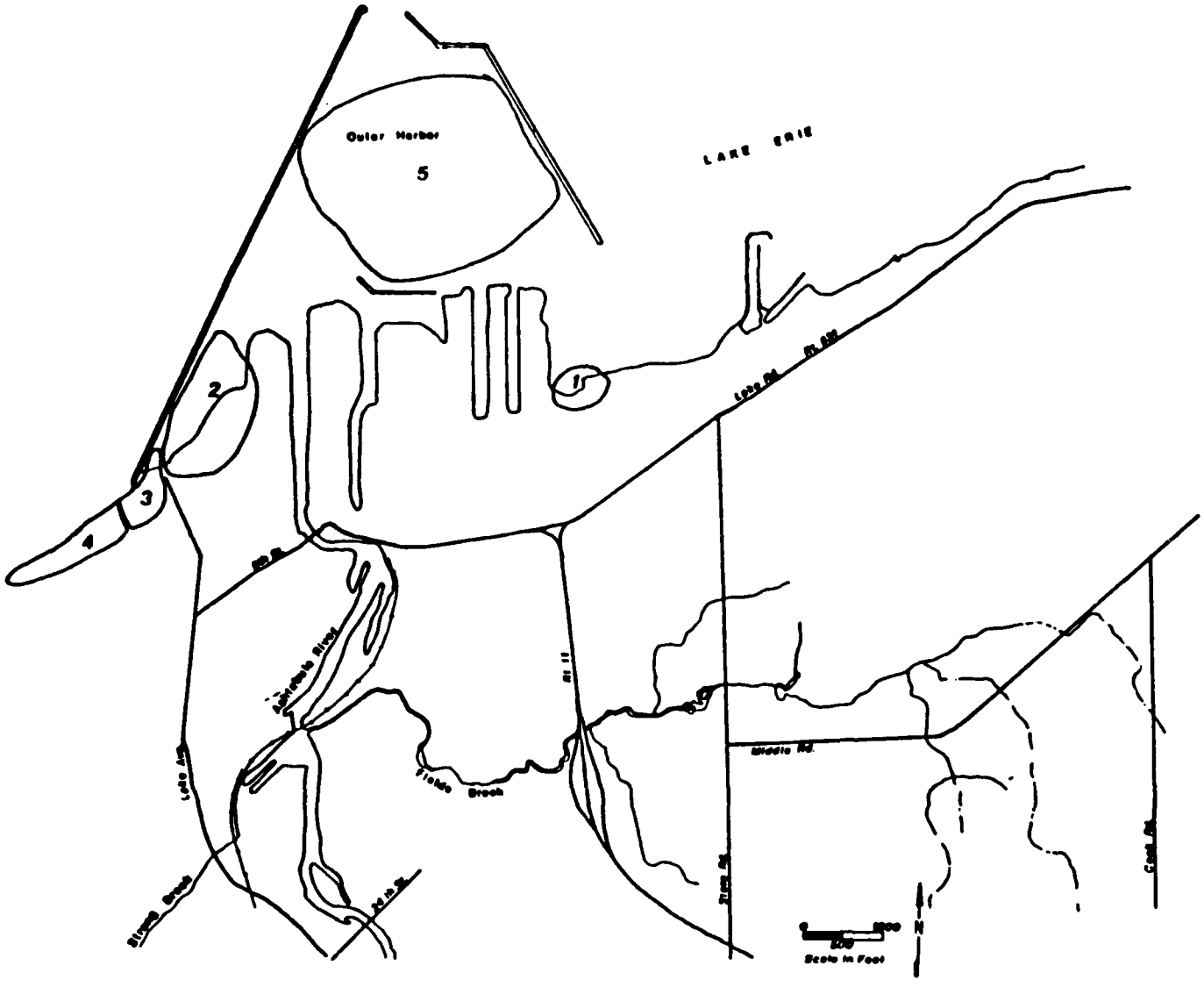

Figure 12b. Site locations of State endangered, threatened or potentially threatened animal and plant species in Ashtabula (Table 23) (R7)

APPENDIX 1: LITERATURE CITED

1. Environmental Research Group, Inc. 1983. Analytical Report No. 4030. Ann Arbor, MI.

2. Environmental Research Group, Inc. 1984. Analytical Report No. 53. Ann Arbor, MI.

3. Kandler, G. C., Jr. 1983. Benthic Macroinvertebrate Sampling Ashtabula Harbor, Ohio. Contract No. DACW35-83-M-0599. Swanson Environmental, Inc.

4. USEPA Great Lakes National Program Office. 1990. Assessment and Remediation of Contaminated Sediments (ARCS) Work Plan. Great Lakes National Program Office, Chicago, IL.