Five-Year Review Report

Second Five-Year Review Report

for

Fields Brook Site

Ashtabula, Ohio

June 2009

PREPARED BY:

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
BGS	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cm/sec	Centimeters per second
COC	Contaminants of concern
CRG	Confidence Removal Goal
CUG	Cleanup Goal
DCE	Dichloroethylene
DNAPL	Dense Non-Aqueous Phase Liquid
DRE	Destruction Removal Efficiency
DS Tributary	Detrex Tributary
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
ESMI	Environmental Soil Management Companies
EU	Exposure Unit
FBAG	Fields Brook Action Group
FFS	Focused Feasibility Study
FRAC	Fracture tank
FS	Feasibility Study
FSCA	Facility Stormwater Collection Area
ft	Feet
g/kg	Gram per kilogram
HCB	Hexachlorobenzene
HCBD	Hexachlorobutadiene
mg/kg	Milligram per kilogram
mg/l	Milligram per liter
MIC	Millennium Corporation
MSL	Mean Sea Level
MW	Monitoring well
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ODH / BRP	Ohio Department of Health / Bureau of Radiation Protection
Ohio EPA	Ohio Environmental Protection Agency
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSC	On-Scene Coordinator
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAHs	Polycyclic aromatic yydrocarbons
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethylene

PCE	Tetrachloroethylene
ppb	Parts per billion
pCi/g	Pico-curies per gram
pH	Measure of acidity
PID	Photoionization detector
ppm	Parts per million
PRP	Potentially responsible party
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RMI	Reactive Metals Incorporated
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
sq ft	Square Feet
SVOC	Semi-volatile organic compound
TCE	Trichloroethylene
TDS	Total dissolved solids
$TiCl_4$	Titanium tetrachloride
TSCA	Toxic Substances Control Act
TSS	Total suspended solids
TEF	Toxic Equivalency Factor
UAO	Unilateral Administrative Order
UECA	Uniform Environmental Covenants Act
ug/l	Microgram per liter
USACE	U.S. Army Corps of Engineers
UU/UE	Unlimited use/unrestricted exposure
VOCs	Volatile organic compounds
WTP	Water treatment plant

Executive Summary (Site-Wide)

The Fields Brook site, located approximately 55 miles east of Cleveland, is in the city and county of Ashtabula, Ohio. It is a six square-mile watershed of a brook where, from 1940 to the present, at least 19 separate facilities operated. Activities range from metals-fabrication to chemicals production. Fields Brook flows into the Ashtabula River, which flows into Lake Erie approximately 1-1/2 miles downstream of the site. Sediments and surface water of Fields Brook, and soils on the Fields Brook floodplain/wetlands area, were contaminated with a wide variety of contaminants including polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), heavy metals, phthalates and low-level radionuclides. Approximately 23,000 people live within one mile of the site, in the city of Ashtabula.

Upper reaches of the brook (areas designated as Exposure Units 4 through 8 on Fig.1 and 2) flow through areas which are currently heavily industrialized. Future use in these areas is also expected to be industrial. Although access to the brook through these areas is not completely restricted, public use generally is not found due to the industrial nature of the area and the availability of other nearby recreational areas. In these areas, the remedy included cleanup to meet industrial use scenarios. The remedies also addressed ecological risks.

Lower reaches of the brook (areas designated as Exposure Units 1 through 3 on Figure 1 and 2) flow between residential neighborhoods prior to discharge to the Ashtabula River adjacent to a rail yard. The currently-residential neighborhoods are expected to remain residential use in the future and the rail yard is expected to remain in industrial use. Through EU 1 through 3, sediment and floodplain soils were cleaned up to address residential-use scenarios to protect individuals who may accidentally ingest or come into direct contact with contaminated sediment or soil from Fields Brook. Although not required by the Record of Decision, the rail yard cleanup also met a residential cleanup level. The remedy for both residential and industrial use areas also addressed ecological risk.

A State of Ohio Sport Fish Consumption Advisory has been in place for the section of the Ashtabula River which includes the discharge point for Fields Brook since 1983 (Fig. 3A). In 1998 and again in 2004, the advisory was revised to address updated information for PCBs and mercury for a variety of species. Fish consumption advisory signs are in place, posted by the Ohio Department of Health. In addition, a State-wide advisory is in place related to mercury, and in the case of Steelhead Trout, for PCBs (Fig. 3B). Fish move freely between the Ashtabula River and Fields Brook when water levels in the brook are sufficiently high. Fishing occurs both in the Ashtabula River and near the mouth of Fields Brook, where the brook is somewhat wider and deeper than farther upstream. Although Fields Brook was a significant pathway for PCB contaminant movement to the river and thus cleanup was important for future fish consumption from the mouth of the brook and in the Ashtabula River, fishing along upstream reaches of the brook is not currently considered a significant risk pathway due to its small size and lack of access. Therefore, the State of Ohio and EPA consider the Ashtabula River advisory and the State-wide advisory to be protective of fishing impacts from contamination in Fields Brook.

Six industrial source areas were identified that could potentially recontaminate Brook sediment and floodplain soils (Fig. 4). The remedies in these areas were designed to protect Fields Brook from recontamination and did not remediate the facilities involved. At these source areas, institutional controls were included in the remedies to the extent that they were necessary for protection of Fields Brook. The industrial source area facilities are subject to other environmental regulations such as the Resource Conservation and Recovery Act (RCRA) Corrective Action provisions that may require additional cleanup or institutional controls in the future. Long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

The remedies for the Fields Brooks Superfund Site in Ashtabula County, Ohio included the removal of contaminated sediment and floodplain soil from Fields Brook. In addition, remedial actions were implemented at six (6) separate source control operable units to prevent these properties from contributing additional contamination to the brook. Cleanup work at the Fields Brook site occurred as indicated below:

Fields Brook Sediment and Floodplain/Wetland Soils - Construction of an on-site landfill was completed in the summer of 2000 (shown on Fig. 15 as "Consolidated Landfill Area"). Excavation of Fields Brook soil and floodplain/wetland sediment and low-level radioactive and DNAPL-contaminated soil and sediment was completed in December 2002. Thermal treatment was performed onsite for soils and sediment impacted by dense non-aqueous phase liquids (DNAPL), but not regulated under the Toxic Substances Control Act (TSCA). Restoration activities were completed in Spring 2003. Institutional control requirements remain to be implemented at the landfill and in the floodplain.

Millennium Inorganic Chemicals TiCl4 Facility - Excavation of approximately 60,000 cubic yards of PCB- and radium-contaminated soil and mining residuals was completed in the fall of 1999. Excavated material was disposed of in a 2nd landfill -- the existing Millennium on-site landfill, shown on Fig. 17 as "Millenium Inorganic Chemicals Inc Industrial Waste Landfill". Institutional control requirements may be needed and are not yet implemented.

RMI Metals – Excavation and disposal of PCB-contaminated soils to industrial use standards was completed in the summer of 2001. The Record of Decision also included a contingent remedy for on-site containment of soils, but this was not done. No institutional controls were required because no material was left on-site which had the potential to cause an exceedance of Fields Brook cleanup levels.

Acme Scrap Iron and Metals / South Sewers - The excavation and disposal of PCB-contaminated soil and the cleaning of the south sewers was completed in the Fall of 2000. Institutional controls may be needed and are not yet implemented.

Detrex Chemicals- Construction of a slurry wall was completed in 2000. Construction of DNAPL extraction wells began in 2001. The first phase of the DNPAL extraction system was constructed in 2002. To date, over 11,000 gallons of DNAPL have been removed from the

property. Work is on-going at the facility. Institutional control requirements remain to be implemented.

North Sewers - The grouting and replacement of the PCB-contaminated North Sewers was completed in Fall of 2000. Institutional controls were placed in 2004.

Conrail - Physical construction at the Conrail source control OU was completed in December of 1998. Although the Record of Decision allowed on-site containment of arsenic-contaminated soil, which would have required an institutional control to manage for the long term, in the final approved remedial action all arsenic-contaminated soil was excavated to residential cleanup standards and shipped for disposal off-site. Therefore, no institutional controls were required.

Ashtabula River - Fields Brook flows into the Ashtabula River. Contaminated sediments in the Ashtabula River have been addressed under the Great Lakes Legacy Act program.

Operations Maintenance and Monitoring - The Fields Brook PRPs are conducting O&M monitoring at the Fields Brook landfill and in the brook.

Completion of remedial actions (based on the approval date for the report summarizing the completion of the remedial action) were achieved as follows:

Operable Unit		**Completion of Remedial Action Date (based upon approval date of final report)**
Operable Unit 1 -	Sediment	9/30/2003
Operable Unit 2 -	*Historically known as the Source Control Operable Unit, OU2 was further broken down into OUs 5 - 10 to allow for facility-specific design and enforcement activities. No construction completion date or status is therefore noted for this OU.*	
Operable Unit 3 -	*OU3 was historically the Ashtabula River and Harbor, which is currently being addressed outside of the Superfund program by the Ashtabula River Partnership under the Great Lakes Legacy Act. No construction completion date or status is therefore noted for this OU.*	
Operable Unit 4 -	Floodplain/Wetlands	9/30/2003
Operable Unit 5 -	Detrex Corporation	System is in operation and functional. System is being optimized to increase removal of dense non-aqueous phase liquid. System is being evaluated to determine if remedy in place is protective.
Operable Unit 6 -	Millennium $TiCl_4$ Plant	6/28/2000

Operable Unit 7 -	North Sewers	5/14/2001
Operable Unit 8 -	Acme Scrap Iron and Metal / South Sewers	3/17/2003
Operable Unit 9 -	Conrail Bridge Yard	4/17/2000
Operable Unit 10 -	RMI Metals Property	9/10/2002

This five-year review focuses on the data collected, decisions made, and work completed since June 2004, although the full history of the site is also summarized. The review addresses the sediment and floodplain/wetland operable units (OU1 and OU4) and the Detrex, Millennium, North Sewer, and Acme Scrap Iron source control OUs. No reviews were required for the Conrail and RMI Metals source control OUs because EPA had determined that the excavations conducted were sufficient to protect Fields Brook from recontamination without containment of any residual low-level contamination and without the need for any Institutional Controls.

Since the first five-year review, routine monitoring of brook sediment and floodplain soil has identified additional contamination. Follow-up investigations have found two types of dense non-aqueous phase liquid (DNAPL) in the brook. A chlorinated solvent DNAPL attributed to historical Detrex operations had previously been addressed during the original brook cleanup. Additional pockets of this material were seen during brook monitoring and during follow-up excavation work. In addition, work at the site has uncovered a DNAPL not previously seen at the site. This DNAPL is Therminol, a heat transfer fluid historically used at the Millennium $TiCl_4$ facility. Therminol is Arochlor 1248 (a PCB) in an oil carrier.

Because of the discovery of additional contamination within the floodplain since the first five-year review, response actions continue at the Site. The PRP group Fields Brook Action Group (FBAG) has rerouted the brook and performed limited excavation work to address contamination seen during routine monitoring. A review of the Detrex source control measures is underway to ensure that there is not a continuing source of chlorinated solvent DNAPL to the brook. Upon discovery of the Therminol DNAPL, a Unilateral Administrative Order was issued to Millennium requiring the company to address the Therminol DNAPL and associated PCB contamination in sediment and floodplain soils. The FBAG has prepared a Focused Feasibility Study (Focused FS) to evaluate containment measures for Exposure Unit 8 of the brook because of EPA concern that not all DNAPL can be identified and addressed. EPA has approved the Focused FS and is in the process of issuing an ESD to address the new contamination. The additional work will be implemented via an existing Consent Decree.

Based upon monthly inspection reports, monitoring data and a site inspection, the on-site TSCA regulated landfill appears to be performing adequately (Attachment 6). In addition, data from Millennium's captive landfill, considered a TSCA-equivalent landfill for disposal of material from Millennium's remedial source control cleanup and the more recent removal action, show that the landfill is also performing adequately.

Sediment & Floodplain (OU 1 & 4) Protectiveness

The remedial actions implemented for Fields Brook sediment (OU1) and floodplain and wetland areas (OU4) is protective of human health and the environment in the short term. However, EPA can not make a determination of the long-term protectiveness of the remedial action for the portions of OU1 and OU4 known as Exposure Units 4, 5, 6, and 8. Additional actions are necessary to address contamination within Fields Brook and the DS Tributary and to ensure that recontamination of the brook does not again occur. In addition, the implementation of ICs is necessary. Long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Although there are presently a few selected exceedances of health-based cleanup standards for PCBs and chlorinated solvents in industrial use areas of soils and sediment, it is not believed that there currently are complete pathways of human exposure likely to cause unacceptable risk. Many of the exceedances are not located at the surface; all are located in industrial-use areas; and they are not an acute hazard. As such, EPA has made the determination that human exposures currently remain under control. However, additional work is necessary to assure that human exposure remain under control for the long term.

Detrex Corporation Source AREA (OU 5) Protectiveness

The remedy implemented for the Detrex Corp (Operable Unit 5) is protective of human health and the environment in the short-term pursuant to the remedial action objective of preventing recontamination of Fields Brook from organic chemical contamination in site soils, groundwater and DNAPL.

The long-term protectiveness of the cleanup cannot be assured at this time as it relies on the continued operation of the remedial action components and an optimization of DNAPL removal from the site. Although complete removal of DNAPL is not possible, DNAPL is considered a principal threat at the Detrex operable unit and its presence at the site presents a risk to Fields Brook absent the optimization of operation and maintenance of the engineering controls. For this reason, additional work is necessary to address operational difficulties with the existing extraction wells, to expand the DNAPL extraction system to achieve broader DNAPL removal, and to finalize and implement O&M requirements. In addition, ICs must be in place to assure long-term protectiveness. Long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Millenium $TiCl_4$ Plant Source Area (OU6) Protectiveness

The remedy as implemented is protective of human health and the environment in the short term pursuant to the remedial action objective of preventing recontamination of Fields Brook in excess of the PCB and radium cleanup goals. The implementation of ICs may be necessary to ensure long-term protectiveness and will be assessed by EPA. If IC's are necessary, long-term

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

North Sewers Source Area (OU 7) Protectiveness

The remedy implemented for the North Sewers Source Control operable unit is protective of human health and the environment pursuant to the remedial action objective of preventing recontamination of Fields Brook. Institutional controls which have been put in place to control excavation into the North Sewer and disturbance of the grouted material appear to be effective; however, a long-term stewardship plan shall be completed to ensure long-term protection.

Acme Scrap Iron and Metals and South Sewers Source Area (Operable Unit 8) Protectiveness

The remedy implemented for the Acme Scrap and South Sewers operable unit is protective in the short-term of human health and the environment in the short term pursuant to the remedial action objective of preventing recontamination of Fields Brook in excess of the PCB cleanup goal. The implementation of ICs may be necessary to ensure long-term protectiveness. If IC's are necessary, long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Fields Brook Superfund Site		
EPA ID *(from WasteLAN)*: OHD980614572		
Region: 5	**State: OH**	**City/County: Ashtabula, Ashtabula County**

SITE STATUS	
NPL status: ☒ Final □ Deleted □ Other (specify)	
Remediation status (choose all that apply): □ Under Construction □ Operating □ Complete	
Multiple OUs?* ☒YES □NO	**Remedial action completion dates:**
	Sediment OU 09/30/2003
	Floodplain / Wetland OU 09/30/2003
	Detrex Corporation OU Not complete yet
	Millennium $TiCl_4$ Plant OU 06/28/2000
	North Sewers OU 05/14/2001
	Acme Scrap Iron and Metal / South Sewers OU 03/17/2003
	Conrail Bridge Yard OU 04/17/2000
	RMI Metals OU 09/10/2002
Has site been put into reuse? X YES □ NO (Some source area OUs are active industrial facilities)	

REVIEW STATUS	
Lead agency: ☒ EPA □ State □ Tribe □ Other Federal Agency _____	
Author name: Terese Van Donsel & Leah Evison	
Author title: Remedial Project Managers	**Author affiliation: EPA Region 5**

Review period:** 03 /13/2004 to 06/05/2009
Date(s) of site inspection: 02/25/2009
Type of review: ☒ Post-SARA
Review number: □ 1 (first) ☒ 2 (second) □ 3 (third) □ Other (specify):
Triggering action: ☒ First Five-Year Review
Triggering action date *(from WasteLAN)*: 06/07/2004
Due date *(five years after triggering action date)*: 06/07/2009

* ["OU" refers to operable unit.]

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

Recommendations and Follow-up Actions (OU 1 & 4)

Recommendations/Follow-up Actions for Sediment & Floodplain (OU 1 & OU 4)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement ESD to address chlorinated DNAPL and PCB DNAPL present in EU8	FBAG	EPA	Implementation as directed under the CD (estimated completion of field work by 9/30/2010)	N	Y
Investigate and remediate chlorinated DNAPL pockets in EU6	FBAG and/or Detrex	EPA	8/31/10	N	Y
Investigate and remediate chlorinated DNAPL pockets in the DS Tributary (EU5)	Detrex	EPA	5/31/10	N	Y
Investigate and remediate elevated PCB detections in EU6 and EU4	FBAG and/or Millennium	EPA	8/31/10	N	Y

Recommendations/Follow-up Actions for Sediment & Floodplain (OU 1 & OU 4)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement institutional controls in floodplain to address or restricted use after add'l field work completed and a develop a plan to monitor ICs to ensure long-term stewardship	EUs 4, 5,6, and 8-property owner	EPA	IC Work Plan shall be submitted by 12/15/2010	N	Y
Implement institutional controls at landfill property to restrict access, protect remedial controls, and restrict groundwater use, and develop a plan to monitor ICs to ensure long-term stewardship	OU1/4 – Landfill-FBAG	EPA	IC Work Plan shall be submitted by 12/15/2009	N	Y
Update Operation, Maintenance, and Monitoring Plan after add'l field work completed	OU1/4 - FBAG	EPA	12/15/2010	N	Y

Recommendations and Follow-up Actions (Detrex Corp Source Area – OU 5)

Recommendations/Follow-up Actions for Detrex Corp (OU 5)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Complete optimization of DNAPL extraction system	Detrex	EPA	10/30/2010	N	Y
Complete investigation of potential migration pathways near North Sewer and former CEI line	Detrex	EPA	12/30/2009	N	Y
Complete investigation of potential chlorinated DNAPL migration north and east of primary DNAPL area	Detrex	EPA	12/30/2009	N	Y

Recommendations/Follow-up Actions for Detrex Corp (OU 5)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement institutional controls in source area to protect remedial action components and restrict well construction and water use, and develop a plan to monitor ICs to ensure long-term stewardship	Detrex	EPA	IC Work Plan shall be submitted by 12/30/2010 (following optimization of DNAPL extraction system)	N	Y

Recommendations and Follow-up Actions (Millenium $TiCl_4$ Plant Source Area, OU6)

Recommendation/Follow-up Action for Millenium TiCl4 Plant Source Area (OU 6)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Assess the need to implement institutional controls at their property to restrict access and protect remedial controls. If required by EPA, implement ICs and develop a plan to monitor ICs to ensure long-term stewardship.	EPA Millenium	EPA	12/15/2009 If required by EPA, IC Work Plan shall be submitted by 6/30/2010	N	Y

Recommendations and Follow-up Actions (North Sewers Source Area, OU7)

Recommendation/Follow-up Action for North Sewers Source Area (OU 7)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement a plan to ensure long-term stewardship	North Sewer property owners	EPA	Plan shall be submitted by 3/31/2010	Y	Y

Recommendation and Follow-up Action (Acme Scrap Source Area OU 8)

Recommendation/Follow-up Action for Acme Scrap (OU 8)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Assess the need to install institutional controls to restrict use of property, and protect remedial controls. If required by EPA, implement ICs and develop a plan to monitor ICs to ensure long-term stewardship.	EPA Acme Scrap property owner	EPA	12/15/2010 If required by EPA, IC Work Plan shall be submitted by 6/30/2010	N	Y

Fields Brook Superfund Site
Ashtabula, Ohio
Second Five-Year Review Report

I. Introduction

The purpose of a five-year review is to determine whether the remedy implemented at a site is continuing to be protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in five-year review reports. Five-year review reports identify any issues and concerns found during the review, if any, and make recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

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

The NCP at 40 CFR Section 300.430(f)(4)(ii) states:

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

The United States Environmental Protection Agency (EPA), Region 5, has conducted the second five-year review of the remedial actions implemented at the Fields Brook Site in Ashtabula, Ohio. This report documents the results of the review, which covers information gathered and actions performed since June 2004, although the full history of the site is also summarized. The Ohio Environmental Protection Agency (Ohio EPA) provided support in the development of this five-year review by participating in the site inspection.

This is the second five-year review for the Fields Brook Site. The remedial action at the Millennium $TiCl_4$ plant triggered the schedule for the statutory reviews, because the Millennium remedial action began on June 9, 1999. Although the Conrail operable unit cleanup was completed prior to the Millennium cleanup, the Millennium cleanup had a containment component since waste was sent to the Millennium on-site captive landfill.

Since the Fields Brook Site is a complicated site with many Operable Units (OUs), this report has been segmented by operable unit to facilitate the explanation of work performed in each area of the

site and the discussion of any issues associated with residual contamination or operation, maintenance and monitoring (OM&M) procedures.

The original completion of remedial action dates for the various operable units were achieved, as follows:

Operable Unit		**Completion of Remedial Action Date (based upon approval date of final report)**
Operable Unit 1 -	Sediment	9/30/2003
Operable Unit 2 -	*Historically known as the Source Control Operable Unit, OU2 was further broken down into OUs 5 - 10 to allow for facility-specific design and enforcement activities. No construction completion date or status is therefore noted for this OU.*	
Operable Unit 3 -	*OU3 was historically the Ashtabula River and Harbor, which is currently being addressed outside of the Superfund program by the Ashtabula River Partnership. No construction completion date or status is therefore noted for this OU.*	
Operable Unit 4 -	Floodplain/Wetlands	9/30/2003
Operable Unit 5 -	Detrex Corporation	* System is in operation and functional. System must be expanded to increase removal of dense non-aqueous phase liquid. System is being evaluated to determine if remedy in place is protective.
Operable Unit 6 -	Millennium $TiCl_4$ Plant	6/28/2000
Operable Unit 7 -	North Sewers	5/14/2001
Operable Unit 8 -	Acme Scrap Iron and Metal / South Sewers	3/17/2003
Operable Unit 9 -	Conrail Bridge Yard	4/17/2000
Operable Unit 10 -	RMI Metals Property	9/10/2002

For purposes of this five-year review, historical issues related to OU1 and OU4 will be discussed separately to reflect the separate investigative and administrative paths of each operable unit. However, since sediment and floodplain remediation was performed in parallel and excavated materials is co-mingled in the on-site landfill, discussions related to the brook cleanup and any future work associated with OU1 and OU4 will be discussed together.

This five-year review focuses on information gathered and work completed since June 2004, although the full history of the site is also summarized. The review addresses the sediment and floodplain/wetland operable units (OU1 and OU4) and the Detrex, Millennium, North Sewer, and Acme Scrap Iron source control OUs. This second five-year review does not address the Conrail and RMI Metals source control operable units because EPA had determined that the excavations conducted were sufficient to protect Fields Brook without containment of residual low-level contamination or the need for ICs.

Since the first five-year review, routine monitoring of brook sediment and floodplain soil identified additional contamination in sediment and floodplain soils that poses a threat to human health and the environment. Follow-up investigations have found that the contamination is related to two types of dense non-aqueous phase liquid (DNAPL) in the brook. A chlorinated solvent DNAPL attributed to Detrex operations had previously been addressed during the original brook cleanup. Additional pockets of this material were seen during brook monitoring and during follow-up excavation work. In addition, work at the site has uncovered a DNAPL not previously seen at the site. The DNAPL is Therminol, a heat transfer fluid historically used at the Millennium $TiCl_4$ facility. Therminol is Arochlor 1248 in an oil carrier.

Because of the discovery of additional contamination within the floodplain since the first five-year review, response actions continue at the Site. The FBAG has rerouted the brook and performed limited excavation work to address contamination seen during routine monitoring. A review of the Detrex source control measures is underway to ensure that there is not a continuing source of chlorinated solvent DNAPL to the brook. Upon discovery of the Therminol DNAPL, EPA issued a Unilateral Administrative Order to Millennium, requiring the company to address the Therminol DNAPL and associated PCB contamination in sediment and floodplain soils. The FBAG has prepared a Focused Feasibility Study (Focused FS) to evaluate containment measures for Exposure Unit 8 of the brook. Containment is considered an appropriate option to consider because of EPA, Ohio EPA and PRP concern that not all DNAPL can be identified and addressed.

Based upon monthly inspection reports, monitoring data and a site inspection, the on-site TSCA landfill appears to be performing adequately (Attachment 6). In addition, data from Millennium's captive landfill, considered a TSCA-equivalent landfill for disposal of material from Millennium's remedial source control cleanup and the more recent removal action, shows that the landfill is also performing adequately.

This five-year review finds that the sediment and floodplain cleanup to date may not be protective in the long-term for EUs 5, 6 and 8 of OUs 1 and 4. Additional measures to ensure long-term protectiveness in EU8 will be addressed through an upcoming remedy modification. For EU 5 and 6, investigations are continuing into the source and extent of contamination. Additional measures are likely to be needed to address exceedances of health-based standards in these areas.

The scope of the source control remedies was limited to actions necessary to protect Fields Brook from recontamination above the cleanup goals (CUGs). The remedies selected for the source control cleanups were not developed to adderss potential human health or ecological risks within each source control area that are unrelated to the Brook. However, some of the source area cleanups (such as at Conrail and the Millennium $TiCl_4$ Plant) incorporated additional measures and health-based cleanup levels to minimize operations and maintenance (O&M) and long-term liability. Details concerning the five-year reviews of the source control operable units can be

found in the source control sections of this document. A five-year review was not conducted for the Conrail and RMI Metals OUs. Both Conrail and RMI Metals removed sufficient material from their respective properties to ensure the protection of Fields Brook, and eliminated the need for any follow-up action, O&M activities, or institutional controls.

II. Site Chronology – Sediment & Floodplains (OU 1 & OU 4)

Event	Date
Site is finalized on the National Priorities List (NPL)	September 8, 1983
Sediment RI Report Completed	March 1995
Sediment FS Completed	July 1986
Record of Decision for the Fields Brook Sediment Operable Unit	September 30, 1986
Source Control RI Completed	May 1997
Source Control FS Completed	June 1997
Record of Decision for the Floodplain / Wetland Operable Unit	June 30, 1997
Explanation of Significant Differences – Sediment Operable Unit	August 15, 1997
Record of Decision for Source Control Operable Unit	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the RD/RA for the Sediment and Floodplain / Wetland Operable Units (OU1 / OU4)	December 17, 1997
EPA issues Unilateral Administrative Orders for the performance of RD/RA at the Source Control Operable Unit. OU2 broken into OUs 5 though 10.	December 1997
Site-Wide Explanation of Significant Differences Modifying the Decisions for the Sediment, Floodplain/Wetland and Source Control Operable Units (addition of radionuclide cleanup requirements)	April 8, 1999
Consent Decree lodged for Performance of Remedial Design and Remedial Action for OU1 / OU4	May 14, 1999
Consent Decree entered for Performance of Remedial Design and Remedial Action for OU1 / OU4	July 7, 1999
PRP Contractor Mobilization at the Site	April 28, 2000
Start Landfill Excavation	May 25, 2000
EPA approves landfill design / Start of landfill construction	July 2000
Start Liner Installation	July 20, 2000
EPA approves Remedial Design / Commencement of Remedial Action	August 9, 2000
Complete Landfill	September 6, 2000
Begin Excavation in OU1 / OU4	September 22, 2000
Encounter DNAPL / Commence Shutdown	October 16, 2000
DNAPL Investigation	Oct. 2000 – Mar. 2001

Event	Date
Re-commence excavation activities in OU1 / OU4	May 7, 2001
Explanation of Significant Differences to address the presence of DNAPL-impacted soil and sediment.	August 17, 2001
Begin Thermal Treatment with Soil Pure, Inc.	October 19, 2001
Soil Pure Left Site	November 2001
Thermal treatment resumed with ESMI of New York – commence trial runs to prepare for performance demonstration	June 17, 2002
Thermal treatment shutdown pending approval of performance demonstration plans and scheduling of trial burn	Aug. 2, 2002 – Sept. 29, 2002
Performance Demonstration Performed	October 8 – 10, 2002
Site Mitigation - Placement of Plantings	Oct. 2002 – Mar. 2003
Complete Sediment and Soil Excavation	December 17, 2002
Thermal treatment completed	December 20, 2002
Demobilization	Dec. 2002 – Feb. 2003
Conditional Approval of Final Construction Report	September 30, 2003
EPA Approval of Quality Assurance Project Plan for OM&M	March 19, 2004
EPA Approval of OM&M Work Plan	May 4, 2004
First Five Year Review Completed	June 7, 2004
PCBs & Chlorinated Solvent DNAPL found in brook during OM&M sampling	May 14, 2005
PRPs Mobilize to Excavate Soil & Sediment Pockets with PCB and Chlorinated Solvent DNAPL	August 20, 2007
PRPs discover oily DNAPL – Determined to be Therminol (Arochlor 1248)	August 29, 2007
EPA issued Unilateral Administrative Order to Millennium to address potential for release of PCB contaminants	October 18, 2007
Millennium installs interceptor trench and commences soil/sediment excavation	Winter 2006/2007
Fields Brook Action Group submits proposal for relocating and isolating Fields Brook as part of a Focused Feasibility Study	February 2, 2009

Background

Physical Characteristics

The Fields Brook Site (Site) is located in northeast Ohio, in Ashtabula County, approximately 55 miles east of Cleveland, Ohio (Figures 1 through 3). Fields Brook drains a six square-mile watershed.

The eastern portion of the watershed drains Ashtabula Township and the western portion drains the eastern portion of the city of Ashtabula. The main channel is 3.9 miles in length and begins at Cook Road, just south of the Penn Central Railroad tracks. From this point, Fields Brook flows northwest to Middle Road, then west to its confluence with the Ashtabula River. From Cook Road downstream to State Route 11, Fields Brook flows through an industrialized area. Downstream of State Route 11 to near its confluence with the Ashtabula River, Fields Brook flows through undeveloped and residential areas in the City of Ashtabula. Fields Brook discharges to the Ashtabula River approximately 8,000 feet upstream from Lake Erie.

Land and Resource Use

The industrial zone of Ashtabula is concentrated around Fields Brook and is comprised of several chemical industries and waste disposal sites. Manufacturing has occurred since the early 1940's in this area. Activities ranging from metal-fabrication to production of complex chemical products occurred on approximately 18 separate industrial properties, and the decades of industrial activity along Fields Brook and its tributaries resulted in the release of chemical contamination to the Fields Brook watershed, particularly the sediments of Fields Brook, the floodplain soils and sediments, and the soils surrounding the industries.

History of Contamination

In the last 60 years, the industrial area of Fields Brook has been the location of manufacturing activities ranging from metal-fabrication to chemical production. Brook sediments and floodplain soils were contaminated with polychlorinated biphenyls (PCBs), radionuclides, chlorinated benzene compounds, chlorinated solvents, hexachlorobutadiene, polyaromatic hydrocarbons (PAHs), arsenic, and other hazardous substances.

Initial Response

The Fields Brook Site was placed on the National Priorities List (NPL) for hazardous waste sites on September 8, 1983. The site consists of Fields Brook, its tributaries, and any surrounding areas that contribute, potentially may contribute, or have contributed to the contamination of the brook and its tributaries. The site is a multi-source site and involves multiple media, including soil, sediment, groundwater and surface water.

Early in the remedial investigation process, the EPA divided the Fields Brook site into four areas of concern, three of which have been designated as "operable units" (OUs) associated with the Fields Brook Superfund site. The Sediment OU (OU#1) involves the cleanup of contaminated sediment in Fields Brook and its tributaries. The Source Control OU (OU#2) involves the location and cleanup of sources of contamination to Fields Brook to prevent recontamination of the brook and adjacent floodplains/wetlands area. These OU#2 areas ultimately became operable units 5 through 10). The Ashtabula River Area of Concern (OU#3) includes contaminated areas of the Ashtabula River and harbor. The cleanup of the Ashtabula River and harbor has been addressed outside of the Superfund process using funding through the Great Lakes Legacy Act. The

Floodplain/Wetland OU (OU#4) encompasses contaminated soils and floodplain sediments located within the 100-year floodplain area surrounding Fields Brook and outside of the channel and sideslope areas of Fields Brook.

Between April 1983 and July 1986, the EPA performed a Remedial Investigation/Feasibility Study (RI/FS) for the Sediment Operable Unit. EPA completed the RI Report in March 1985 and the FS report in July 1986. The RI included a baseline human health risk assessment that demonstrated human health risks from the brook sediment. The FS Report described several alternatives for remedial action of the Sediment Operable Unit. In 1986, EPA issued a ROD for the Sediment Operable Unit.

The 1985 RI also addressed health risks from exposure to soils in the floodplain area adjacent to Fields Brook. In 1993, the PRPs initiated a voluntary assessment of the nature and extent of contamination in the Floodplain/Wetland Area of Fields Brook. The PRPs' investigation of the Floodplain/Wetland Operable Unit was conducted under the oversight of EPA, Ohio EPA and the USACE and was completed by the spring of 1995. After completion of the site investigation, the PRPs prepared a FS to evaluate cleanup alternatives. The FS report was finalized in October 1996. In July 1997, EPA issued the ROD for the Floodplain/Wetland Operable Unit.

Because it was recognized that the cleanup of the Fields Brook sediment should not be performed unless the source(s) of contamination are addressed prior to the cleanup, the EPA required the PRPs to investigate the industrial area of the Fields Brook watershed. From 1992 to 1995, the PRPs evaluated 94 properties in the Fields Brook watershed to determine whether the properties could cause future recontamination once the Brook cleanup is underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the brook from flowing groundwater. As a result of the Source Control evaluation, the EPA identified six industrial areas as possible sources of recontamination to Fields Brook. Detailed information about the types and extent of contamination at the source areas can be found in the Source Control RI Report, which was approved by EPA in May of 1997. In conjunction with the preparation of the Source Control RI report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June 1997, with the Source Control ROD issued on September 29, 1997. To improve continuity of discussions, the five-year reviews for the six source control operable units of Fields Brook are presented in separate sections of this document. Please see the Table of Contents for the location of the source control reviews.

III. Remedial Actions

Remedy Selection

A. Sediment Operable Unit

The response action selected in the 1986 Sediment ROD involved excavation and containment of contaminated sediments within an on-Site landfill, and on-Site thermal treatment of the significantly contaminated or mobile sediments. Specifically, the 1986 ROD included the following components:

1. Excavation of organically contaminated sediment with a greater than $1x10^{-6}$ excess lifetime cancer risk level, and inorganically contaminated sediment to health based levels or background levels, whichever was higher (based on residential use scenarios). The ROD estimated that approximately 52,000 cubic yards (cy) would be excavated;

2. Construction of an on-Site RCRA/TSCA landfill with separate cells for solidified sediments, solidified sediments containing arsenic, and a temporary storage cell for sediment to be thermally treated;

3. On-Site thermal treatment of both excavated sediments which are above 50 ppm PCB's, and sediments with high potential for mobility which have a soil/water partition coefficient (koc) of below 2400. Treated material would be disposed via landfilling in either: a) the on-Site landfill if analysis of the ash from thermal treatment indicates it requires management as a hazardous waste; or b) in the on-Site landfill or in an off-Site solid waste landfill if analysis of the ash from thermal treatment indicates it does not require management as a hazardous waste. The ROD estimated 16,000 cubic yards of sediment would be thermally treated;

4. Solidification of the remaining quantity of excavated sediment, and disposal via landfilling in the on-Site landfill. The ROD estimated sediment volume before solidification was 24,000 cubic yards;

5. Treatment of wastewaters generated during construction activities in an on-Site treatment system, with discharge to the Ashtabula Publicly Owned Treatment Works or directly to Fields Brook;

6. Completion of various pre-design studies;

7. Operation and maintenance of the remedy;

8. Completion of a Remedial Investigation/Feasibility Study to address any ongoing sources of contamination to Fields Brook; and

9. Completion of an investigation to address the nature and extent of contamination in the Ashtabula River.

As a result of discussions with and information provided by the PRPs and information from pre-design studies, an Explanation of Significant Differences was issued in August of 1997 to refine the work to be performed as part of the Fields Brook sediment cleanup. The following significant changes were made to the remedial action:

1. Elimination of solidification requirements for excavated sediments landfilled on-Site;

2. Thermal treatment of the excavated sediments would be conducted at an off-Site facility instead of at an on-Site facility;

3. Refinement of the cleanup goals/standards for the sediment to be excavated (identification of specific cleanup goals, based on the desired risk endpoints established in the original ROD);

4. Reduction of the excavated sediment estimated total volume from 52,000 cubic yards to 14,000 cubic yards, including a reduction of the estimated thermal treatment sediment volume from 16,000 cubic yards to 3,000 cubic yards; and

5. Elimination of the chemical waste landfill requirement of Section 761.75(b)(3) which specifies a fifty-foot distance between the bottom liner and the historical high water table.

When the remedial design for the cleanup of the Fields Brook sediment and the floodplain/wetland soils was approximately 90% complete stage, the EPA received information regarding possible radionuclide contamination in the Ashtabula River and the Fields Brook watershed. EPA evaluated the available data and the PRPs, under EPA and Ohio Department of Health Bureau of Radiation Protection oversight, conducted follow-up sampling and determined that radium should be added as a contaminant of concern for the cleanup of the Millennium facility and for the Fields Brook sediment and the floodplain/wetland soils. In addition, because of the presence of radium, specific components of the remedial action were modified to address soils and sediment that contain radium. The 1999 Site-Wide ESD made the following modifications in the cleanup requirements for brook sediment and floodplain soils:

1. Thermal treatment (incineration and/or low-temperature thermal desorption) was not appropriate for sediment that contains levels of radium (and other radionuclides) above background. For sediment with background levels of radionuclides, off-site thermal treatment would proceed as planned. For sediment with levels of radionuclides above background, the sediment would be chemically stabilized prior to disposal in the on-site landfill.

2. The design of the on-site landfill built to contain site soils and sediment from SOU and FWOU was upgraded.

   Monitoring wells around the landfill are to be routinely sampled, and the samples will be analyzed for radionuclides. Air monitoring is to be performed at the landfill to ensure that levels of radon gas emanating from the landfill do not present any risk to human health.

3. Additional soil and sediment would be excavated from the site to meet the radium cleanup level of 5 pCi/g above background, for combined levels of radium-226 and radium-228 for residential areas and 10 pCi/g above background for combined levels of radium-226 and radium-228 in industrial areas of the site.

4. Consistent with the decommissioning project at the RMI Extrusion property (adjacent to Fields Brook), EPA utilized a 30 pCi/g cleanup level for uranium (U-238) in floodplain soils and brook sediment.

In the summer of 2000, the Fields Brook landfill was constructed and cleanup of the Sediment and Floodplain /Wetland Operable Units began. In the fall of 2000, during excavation of brook sediments, pockets of chlorinated DNAPL were found below brook sediments and floodplain soils.

An ESD was issued in August of 2001 to address the newly-identified volume of material. Because the volume of highly-contaminated material at the site had significantly increased with the DNAPL discovery, it now made financial sense to reverse the earlier ESD that had moved the thermal treatment off-site. Therefore, the ESD made the following modification to the Sediment OU cleanup requirements:

1. On-site thermal treatment of DNAPL-impacted soils;

2. Supplemental field sampling and pre-treatment monitoring to ensure that soils to be thermally treated do not contain elevated levels of radionuclides; and

3. Off-site thermal treatment of liquid DNAPL.

B. Floodplain/Wetland Operable Unit (OU#4)

The major components of the 1997 selected remedy for the Floodplain/Wetland OU included:

1. Excavation or cover of contaminated soils and sediments in the FWA that exceed cleanup action levels; backfill of all excavation and cover areas with hydric-compatible soil;

2. Removal of all trees in excavation areas, and removal of all trees below 12" diameter at basal height in cover areas, with vegetation in response areas considered contaminated, and with live vegetation above ground surface considered clean if it can be decontaminated;

3. Revegetation of all backfill and cover areas, and revegetation of all areas disturbed during construction, using erosion mats and native vegetation;

4. Construction of a temporary access road to allow access to and along the floodplain from the roadways during construction, made of crushed stone and 1/4-inch thick geonet liner, and to be removed after construction and disposed of either in the on-site landfill or if clean in other on-site or off-site areas;

5. Consolidation of excavated soils and sediments, construction debris, and roadways constructed to implement the remedy if determined to be contaminated, within an on-site fenced-in containment cell (landfill) to be built on one of the industrial properties located within the Fields Brook watershed;

6. Construction of a minimum of three downgradient wells and one upgradient well to monitor the long-term effectiveness of the landfill;

7. Long-term operation and maintenance and post closure care of the remedial action to help ensure its effectiveness;

8. Long-term monitoring including sampling of Floodplain/Wetland surface soils and sediments, and backfill and cover areas, and monitoring of wetland conditions at specific locations and for parameters defined in the Record of Decision Summary, to verify the effectiveness of the remedial action;

9. Placement of institutional controls on deeds and title for properties where: contamination will remain in the Floodplain/Wetland; the landfill will be constructed; or hazardous substances, pollutants or contaminants will remain above levels that allow for unlimited use and unrestricted exposure. For the landfill, the deed restrictions must prevent residential, industrial or other development on the landfill. For all other properties, the deed restrictions must provide notice to any subsequent purchaser or prospective developer of the presence of hazardous substances and of the requirement to conduct all development activities in such a manner as to not release contamination towards Fields Brook; and

10. Implementation of access restrictions, including enclosing the entire landfill area with a fence and posted warning signs.

During the Remedial Design process, it was determined by all parties that the 6" soil cover was impractical since inspection and long-term maintenance would be difficult. Therefore, the PRPs voluntarily agreed to excavate all soils in the residential area of the Floodplain/Wetland OU that contained 6 ppm or greater total PCBs thereby eliminating the need for institutional controls in these areas.

During the preparation of the Remedial Design for the Floodplain/Wetland area, the issue of radionuclides arose. The Floodplain/Wetland RD required modifications due to the discovery of radionuclides. As discussed in Section IV(A) above, the 1999 Site-Wide ESD added cleanup criteria for radionuclides (specifically, radium and uranium). In addition, the discovery of DNAPL below the brook and floodplain in the fall of 2000 impacted remedial work on the Floodplain/Wetland OU. The August 2001 ESD allowed the on-site thermal treatment of DNAPL-impacted soil and sediment.

Since the issuance of the Unilateral Administrative Order for RD/RA for OU#1 and OU#4 (and the subsequent negotiation of a Consent Decree between EPA and the site PRPs), the sediment and floodplain/wetland operable units have been addressed together for design and construction. This made sense because the cleanup of the streambed and adjacent floodplain would be performed as a single project. The Consent Decree was lodged on May 14, 1999 and entered on July 7, 1999. Upon entry of the Consent Decree, the Unilateral Administrative Order for OUs 1 and 4 was vacated.

The design work that began in 1998 built on earlier conceptual design work for the brook sediment. Design reviews were conducted by EPA and the USACE. The 100% Remedial Design for OU#1 and OU#4 was approved on August 9, 2000.

Cleanup Standards

The remedial design for the Sediment and Floodplain/Wetland Operable Units was based on an area-wide averaging approach. Thus, the brook was divided in sections that were termed "exposure units". Using the assumption that no person would be repeatedly exposed to the exact same area for a long period of time, the remedial design allowed an averaging approach over areas. For the Sediment Operable Unit, the 1986 ROD and 1997 ESD together served as the basis for the selection of Cleanup Goals (also known as "CUGs") for contaminants of concern. Based on the cleanup goals, Confidence Removal Goals (CRGs) were calculated to guide the necessary excavation in each exposure area of the brook. By excavating to the CRGs, the resulting average

concentration of residual contamination should be equal to the CUGs. The remedial design utilized a significant volume of existing data on brook contamination to develop cut lines based on the CRGs.

The CUG for PCBs in sediment was set at 1.3 ppm for residential areas of the brook and 3.1 ppm for industrial areas of the brook. For hexachlorobenzene, the sediment CUG was set at 6.38 ppm for residential areas of the brook and 15 ppm for industrial areas. Sediment CRGs varied within the brook, depending on contaminant distributions. Upon issuance of the 1999 site-wide ESD that addressed radionuclide contamination, a sediment cleanup standard of 10 pCi/g total radium (ra-226 + ra-228) above background was established for industrial areas of the brook. For residential areas, sediment would need to meet a standard of 5 pCi/g of total radium above background. A uranium standard of 30 pCi/g was established for sediment within the brook (both residential and industrial areas) to be consistent with the U.S. Department of Energy cleanup of the RMI Extrusion facility.

For the Floodplain/Wetland Operable Unit, two indicator parameters were initially established to guide the cleanup, PCBs and hexachlorobenzene. Similar to the Sediment OU, the remedy for the Floodplain/Wetland OU was an area-wide averaging approach was designed to result in a protective cleanup. The CUG for PCBs was set at 1 ppm, on average, for residential areas of the Fields Brook floodplain and 6 to 8 ppm, on average, in industrial areas of the floodplain. As part of the remedial design, supplemental chemical sampling was performed in the floodplain. The remedial design then developed grid-based excavation cut lines based on PCB and hexachlorobenzene contamination. In industrial areas of the brook, areas with total PCB concentrations at or above 50 ppm and/or a hexachlorobenzene concentration of 200 ppm were to be excavated. In residential areas, grids with 6 ppm total PCBs and/or 80 ppm hexachlorobenzene were to be excavated. As with the Sediment OU, the identification and ultimate excavation of additional soils due to radionuclide contamination is thought to have further reduced residual chemical contamination to even lower levels. For industrial areas of the floodplain, a cleanup standard of 10 pCi/g total radium (ra-226 + ra-228) above background was established. For residential areas, soils were required to meet a standard of 5 pCi/g of total radium above background.

Remedy Implementation

Remedial action work began in the field on May 25, 2000 with the construction of the on-site "TSCA-equivalent" landfill. This "Fields Brook landfill" was built for the disposal of all excavated Fields Brook sediment and floodplain soils that did not require thermal treatment. In addition, the on-site landfill was to be made available to the PRPs for disposal associated with the remediation of the Source Control Operable Units. Landfill construction was completed on September 6, 2000.

Excavation began in the brook on September 22, 2000. Excavation of contaminated soil and sediment continued until October 16, 2000 when chlorinated solvent DNAPL was discovered under brook sediment and floodplain soils in the upper industrial reaches of the brook. Additional field investigations were performed to determine the extent of the problem and estimate the volume of additional material that would require thermal treatment. On May 7, 2001, excavation work recommenced in other areas of the brook while work within the DNAPL-impacted areas

remained on hold. The EPA ultimately issued the August 17, 2001 ESD to address the volume of DNAPL-impacted material and allow on-site thermal treatment of the material.

The FBAG proposed an on-site thermal treatment system that utilized low temperature thermal desorption for contaminant destruction. A trial burn was conducted at the site in October of 2002. By the time the results of the trial burn were available, virtually all of the contaminated material had been treated at the site. The results of the trial burn found that the unit had met all emissions requirements but failed to obtain the "four nines" (99.99%) Destruction Removal Efficiency (DRE) required under Subpart O for hexachloroethane. The trial burn recorded a DRE of 99.67% for hexachloroethane. The system completed the small amount of remaining material at a reduced feed rate, which increased treatment time and maximized the DRE. The operation of the EMSI thermal desorption unit ceased on December 20, 2002.

The excavation of Fields Brook sediment and floodplain soils continued until December 16, 2002. Upon placement of the final materials in the landfill, the landfill was closed. Contractor demobilization was complete by February 2003.

At completion, 53,094 cubic yards of contaminated sediment and floodplain soil were excavated from Fields Brook. Of this, 1,435 cubic yards of contaminated sediment and floodplain soil were sent off-site for thermal treatment (before the discovery of the DNAPL-impacted area and the issuance of the ESD allowing on-site treatment). Approximately 20,420 cubic yards of contaminated soil and sediment were thermally treated on-site. Treated soils were utilized for backfill on-site. Approximately 30,514 cubic yards of excavated sediment and floodplain soil were sent to the on-site landfill, which ultimately housed not only material from the brook, but from many of the source control cleanups as well.

Site restoration in the brook and floodplain was performed in late 2002 and completed in March 2003. In addition to the normal seeding and planting of impacted areas, the PRPs worked with the EPA and the Ohio EPA to determine what additional activities would be necessary to allow the stream and floodplain system to return to a natural state. Restoration activities included the addition of willow snags in the brook, the placement of logs horizontally on the ground to provide habitat, and the vertical placement of logs to provide perches for raptors. Vegetation and wildlife have begun to return to the area. Unfortunately, some of the logs that were placed at the site ended up being utilized by residents as firewood.

System Operation/Operation and Maintenance

The Operation, Maintenance and Monitoring Plan (OM&M) for the Sediment and Floodplain/Wetland Operable Units was approved on May 4, 2004. The OM&M Plan addresses post-remediation sampling within the brook, in terms of both scope and the duration. Since approval of the OM&M Plan, sediment and floodplain/wetland soils have been sampled and analyzed to monitor the status of the brook. Samples have been taken from backfill areas within the floodplain and streambed (where excavation has occurred and clean fill materials have been placed) to ensure that residual levels of contamination have not contaminated what should be clean areas. In addition, samples have been taken from areas that were not excavated to ensure that health-based levels are not exceeded and to track residual contaminant levels.

In addition to the sampling within the brook, the OM&M Plan includes long-term activities associated with the upkeep of the Fields Brook on-site landfill. The OM&M Plan includes the sampling regime for the groundwater monitoring wells around the landfill, the inspection and routine maintenance associated with the landfill cover, and the collection and disposal procedures for leachate. A recent OM&M report is found in Attachment 1.

The air-monitoring requirement to check for emissions of radon at the landfill has been eliminated and is not required as part of OM&M because EPA determined that radon was not a concern in the open air surrounding the landfill. See Attachment 1 for the latest O&M report.

Institutional Controls

Institutional controls (ICs) are required to ensure the protectiveness of the remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. ICs are required to assure the long-term protectiveness for any areas that do not allow for unlimited use or unrestricted exposure (UU/UE), and are required also to maintain the integrity of the remedy. ICs are required at OU1 and OU4 because the remedy has not yet achieved full protectiveness necessary for UU/UE. As noted below, a proprietary control is preferred, such as an environmental covenant under the Ohio version of the Uniform Environmental Covenants Act (UECA), Ohio Revised Code Sections 5301.80-5301.92.

Currently OU1 and OU4 are subject to the institutional controls listed in the table below.

Map of Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions	**IC Objective**	**Title of IC Instrument Implemented**
Landfill Cap*	Prohibit interference with landfill cap; restrict use of area; prohibit residential use .	No ICs are currently in place. Deed restrictions need to be implemented (the use of the UECA covenant will be explored). A Work Plan will be submitted for EPA approval to implement the ICs, and to develop a plan to ensure long-term stewardship.
Brook and Floodplain*	Prohibit excavation in the soil and sediment in the industrial EUs	No ICs are currently in place. Deed restrictions need to be implemented (the use of the UECA covenant will be explored). A Work Plan will be submitted for EPA approval to implement the ICs, and to develop a plan to ensure long-term stewardship.

* Maps which depict the current conditions of the site and areas which require restrictions will be

developed as part of the implementation of institutional controls or IC Plan.

As noted, ICs were originally required for the residential EUs. However, since the remedy was enhanced in these areas, these areas now have unlimited use and unrestricted exposure. Thus, no ICs are needed for these areas.

Current Status of Access and Use Restrictions (Institutional Controls)

Landfill
The landfill is fenced and access to the landfill is restricted. However, the ICs are not yet in place on the landfill area to permanently restrict access and development in this area. Operation and maintenance of the landfill cover system includes inspection of the landfill surface, vegetation conditions, and surface water drainage features. Inspections of the landfill cover are performed quarterly.

Industrial EUs of OU1 / OU4
ICs are not currently in place for the industrial areas of the brook. Access to the brook and floodplain in these areas is partially somewhat restricted as access thru the currently operating plants, Detrex and Millennium, is restricted to plant personnel. Within the industrial portion of the brook, access need not be fully restricted as long as ICs are put in place to ensure that the property use remains industrial in use and proprietary controls detail where contamination may be present at depth. With proper remedy implementation (including resolution of recent recontamination issues), no contamination should be available at depths that would be encountered and cause an unacceptable risk under routine trespass or facility worker scenarios. The current property owners for these areas are working on executing a restrictive covenant for these areas.

Though not all ICs are in place (see table above), based on inspections and interviews, EPA is not aware of any uses of the Site which are inconsistent with the objectives that will be served by the institutional controls.

IC Follow up Actions Needed: ICs must be implemented so that the remedy functions as intended. EPA will request that the PRPs develop an IC work plan for EPA approval. The work plan will consist of IC evaluation activities and a draft IC Action Plan to implement the ICs and long-term stewardship procedures. The IC evaluation activities will include a map which depicts the current conditions of the Site and areas which do not allow for UU/UE, title work to ensure no prior encumbrances exist on the Site which are inconsistent with the ICs to be implemented and the draft environmental covenant under UECA which will "run with the land" and be enforceable against future land owners. Accordingly, EPA will review the Work Plan and provide direction to the PRPs on how to revise their IC Workplan.

Long Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for long-term stewardship is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs as well as remedy components. The O&M plan shall be updated to include procedures to ensure long-term stewardship such as regular inspection of the engineering controls and access controls at the Site and review of the ICs for the Site. The plan should also include a

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

V. Progress Since the Last Five-Year Review

The first (2004) five-year review for OU1/ OU4 found that the remedy was protective of human health. Excavations had been performed to achieve health-based cleanup levels in brook sediment and floodplain soils.

Land uses were found to be consistent with the assumptions made when determining what areas would be assumed residential and what would be assumed industrial. OM&M sampling was set to begin. It was anticipated that the OM&M data would allow EPA to evaluate the recovery of the brook and more fully judge the protectiveness of the cleanup.

Based upon monthly inspection reports and a site inspection, the on-site landfill appeared to be performing adequately. As of the date of the first five-year review, chemical monitoring had not yet commenced.

EPA provided notice to the public that it was conducting a second five-year review of the Fields Brook cleanups. EPA ran an ad in the local paper, the Ashtabula Star Beacon, on December 5, 2008.

Contamination Found During OM&M Sampling

In the fall of 2005, the FBAG reported the results of its required monitoring in the brook. One sediment grid was found to contain PCBs above the allowable residual level. To address this area, the FBAG mobilized to excavate the area in question. During that excavation, a pocket of DNAPL was found in fill material that had been placed at the site during the original cleanup. A follow-up investigation found more pockets of DNAPL, with additional DNAPL material found in EUs 6 and 8 and the DS tributary. The Fields Brook PRPs and EPA held a meeting on February 8, 2006 to discuss these results. The FBAG believed that the source of the DNAPL was an on-going migration of DNAPL from the Detrex facility. Detrex believed that the contamination was residual DNAPL from the prior cleanup that had been missed.

During the winter of 2006/2007, Detrex installed an interceptor trench (in three segments) north of the floodplain to ensure that the potential for southward movement of DNAPL would be cut off (Fig. 5). Detrex did not agree that there was transport in this manner, but installed the trench as a precautionary measure. To resolve the matter, the FBAG agreed to address the identified contamination, without conceding its position. The FBAG submitted a work plan to perform the requested work. On August 2, 2007, EPA's approved a work plan for the FBAG to excavate the pockets of soil and sediment contaminated with PCBs and chlorinated solvent DNAPL. The FBAG mobilized to the Site on August 20, 2007.

Emergency Response

During excavation work on August 29, 2007, the field crew encountered an oily DNAPL in an excavation, near the Millennium $TiCl_4$ plant. This DNAPL was different than the Detrex chlorinated solvent DNAPL, since it did not have high VOC concentrations and the characteristic

Detrex DNAPL odor. During the week of September 4, additional free product was encountered in excavations and results from the earlier sampling began to arrive. The laboratory results indicated areas of very high PCB contamination in sediment and floodplain soil.

Late on September 6th, the laboratory notified the FBAG that the oil was Therminol (Aroclor 1248 in an oil carrier). FBAG representatives and EPA's field oversight representative expressed concern that storms were approaching. The FBAG sandbagged and tied down tarping over excavation areas. Over the weekend, Ashtabula was hit with heavy storms and high winds. The Fields Brook floodplain received a large volume of water, and additional protective measures were necessary to protect the brook. The FBAG excavated a secondary channel for Fields Brook, dug a surface water intercept channel between the excavation areas and Millennium, pumped water out of the excavation area, and constructed a soil berm when it was determined that there was too much water to handle in real time.

On September 10th and 11th, the FBAG continued to recover from the flooding and continued other work outside of the Therminol-impacted areas. Because of Ohio EPA and EPA concerns regarding the stability of the berms and the volume of bermed contact water, EPA Region 5 issued a verbal order to Millennium to bring in the storage necessary to address the bermed contact water. Millennium mobilized approximately 40 frac tanks to the Site to hold the pumped water. In addition, the OSCs directed the installation of collection sumps in the Therminol DNAPL excavations and closed these areas off from short-term surface water intrusion. On October 18, 2007, EPA issued a Unilateral Administrative Order (UAO) to Millennium. The UAO requires Millennium to:

1) Perform an investigation to determine all sources of PCBs migrating to Fields Brook from the Millennium plant. Prevent discharges of PCB oil from identified seeps and other sources that are identified during investigation at the Millennium property. Contain and remove all PCB liquids, contaminated soil and sediment and conduct proper disposal.

2) Remove, and treat as appropriate, all PCB contaminated liquid. Also remove any PCB contaminated soil, to a level of 50 ppm, within the plant area.

3) Conduct an investigation of the extent of PCB contamination in EU8 and EU6 of the Fields Brook Site.

4) Test and treat as needed any stormwater or groundwater in the ponded area, excavation trench or any other area that stormwater or groundwater from the Site collects. Water should be treated to a level of 0.1 ug/L total PCBs before discharge.

5) If discovered, remove, to a level not to exceed 50 ppm, all PCB-contaminated soil in the floodplain, to achieve an overall average of no greater than 8 ppm total PCBs. The floodplain/wetland cleanup level has been established to be consistent with past remedial requirements at the Site. Remove all PCB contaminated liquid, excluding water, in and below the floodplain.

6) If discovered, remove, to a level of 3.1 ppm total PCBs, all contaminated sediment in Fields Brook and in exposed or easily-erodable areas of the floodplain. The sediment

cleanup level has been established to be consistent with past remedial requirements at the Site. Remove all PCB-contaminated free products in and below Fields Brook sediments.

7) Implement a Site Health and Safety plan; and

8) Develop and implement a Site security plan.

Millennium continued the work initiated with the verbal order to control the site and agreed to comply with the terms of the removal UAO. Millennium commenced installation of an interceptor trench along its north fence line to ensure that any subsurface NAPL that could be present on the Millennium property could not migrate to the floodplain. Millennium also commenced the sampling and excavation of contaminated soils and sediment within the floodplain.

The excavation work found small areas of PCB contamination difficult to find within cracks in the clay and at depths beyond what had previously been investigated. Excavation also uncovered areas of chlorinated DNAPL contamination, sometimes overlapping with the Therminol contamination. Excavation work continued until September 2008, when Millennium stopped its excavation work believing it had addressed the emergency removal and entered into discussion with EPA regarding additional work that may be needed in EU8. See Figures 6A through 6C for information regarding the extent of the Millennium removal work.

In parallel with the work in the floodplain, Millennium collected soil borings from the perimeter of its facility and within the facility in areas of historic PCB contamination. These facility samples did not identify any Therminol DNAPL.

The FBAG and Millennium collected soil and sediment samples from Fields Brook to assess the extent of recontamination. Downstream sampling in Fields Brook has so far shown that residential areas of the brook have not been impacted at levels that would cause a health concern. In addition to the contamination within EU8, EU6 shows areas of elevated PCB contamination, in addition to areas impacted by chlorinated DNAPL and its constituents. The DS Tributary (EU5) also has been found to contain additional pockets of chlorinated DNAPL, but no PCB contamination

In order to complete the assessment of the PCB DNAPL, EPA analyzed samples of heavily impacted soil for dioxins and durans. The results showed the presence of dioxins and furans, but at levels below EPA action levels. The toxic equivalency factors (TEFs) were well below 1 part per billion (ppb). Considering the fact that the samples analyzed were heavily contaminated subsurface samples showing visible PCB DNAPL impact, it is unlikely that the PCB DNAPL would be causing any dioxin/furan exceedances within brook sediment or floodplain soils.

The FBAG submitted a Focused Feasibility Study for EU 8 to EPA. The Focused Feasibility Study provides options for continuing the excavation of contaminated material from the floodplain and isolating the brook from contamination in the area. EPA retains its enforcements options with regard to both the removal UAO and the RD/RA Consent Decree with the FBAG. EPA anticipates that it will propose a remedy modification in June 2009 to resolve the contamination issues within EU8.

Maps showing current conditions for EUs 5 and 6 are shown in Fig. 6D and 6E.

Resolving Issues Associated with Chlorinated DNAPL Contamination

Since the 2005 discovery of chlorinated solvent contamination within EUs 5 (DS Tributary), 6 and 8, the source of the contamination has been a subject of dispute. The FBAG maintains that the presence of chlorinated DNAPL within EU8 indicates that the Detrex source control remedy is not protecting the brook. Detrex maintains that the presence of chlorinated DNAPL is an indication that the original chlorinated DNAPL cleanup did not sufficiently remove material, and that material is now migrating within the floodplain into the more permeable backfilled areas that were placed during the original stream cleanup. Detrex also maintains that recent excavations, which are frequently deeper than previous work, are uncovering material that had not previously been known to exist.

The presence of DNAPL in EU6 has led EPA to require Detrex to conduct additional investigations. Because of concern about potential movement of material toward EU6 from the North Sewer or from the western portion of the Detrex property, Detrex dug multiple test trenches perpendicular to the North Sewer and placed investigational borings alongside (both to the east and to the west) and within State Rd. Work was conducted with EPA oversight. The trenches gave no indication that DNAPL was traveling to the south toward EU6 from the DS Tributary or from under State Rd. Contamination seemed to be localized in the southern end of the old North Sewer, in a section of the floodplain that was not completely addressed during the original cleanup.

After EPA observed DNAPL in the brook at the base of the North Sewer, the FBAG installed a sump in the area, with Detrex responsible for the removal of contaminated water from the location. In late 2009, Ashtabula County began the State Rd. bridge replacement project. FBAG, Millennium, and Detrex were tasked with providing the necessary environmental support whenever the County's contractor encountered contamination. The FBAG has recently claimed that excavations in the area of the North Sewer have provided evidence that contaminated water (including DNAPL) is entering the area from under State Rd. EPA is evaluating the information and will require Detrex to conduct additional investigations to ensure that potential pathways of DNAPL movement are identified and resolved.

EPA and FBAG concern about the potential movement of DNAPL to EU8 led Detrex to place borings and investigational trenches in the southern portion of its property. Detrex also installed the three interceptor trenches previously discussed to cut off any potential pathway to the south. EPA is evaluating the data from the water collected from the three trenches. The two most westerly trenches have very low levels of chlorinated contamination. However, the most eastern trench contains higher levels of VOCs. The source of these VOCs may be residual soil and/or DNAPL contamination at depth. In either case, the interceptor trench is serving to cut off the entry of chlorinated contamination (DNAPL or dissolved phase) into the brook.

Chlorinated DNAPL contamination within the DS Tributary is significant just to the west of State Road. This area had not previously been excavated by the FBAG.

While past sampling had found exceedances of CUGs, CRGs had not been exceeded, meaning that it would be protective for the area to remain in place under the averaging approach used to determine areas of excavation. No reports of chlorinated DNAPL were reported from this area prior to the original stream cleanup. Recent visual inspections of the area now show pockets of chlorinated DNAPL present near the surface of the stream at this location. EPA is requiring Detrex to perform additional investigations in this area to determine if there is a DNAPL pathway

not previously identified or if the DNAPL is residual material from under the road that has migrated to the west. EPA has also tasked Detrex to investigate and remediate the extent of chlorinated DNAPL within the DS Tributary. EPA is working with Detrex to resolve comments on its work plan for the DS Tributary. Investigation and supplemental remedial action work is anticipated for spring and summer of 2009.

Additional discussion of the Detrex source control remedial action and supplemental investigations can be found in the Detrex section of this five-year review.

Resolving Issues Associated with Therminol (PCB)Contamination

Millennium is currently monitoring the interceptor trench that separates Fields Brook from the area of its facility where Therminol had historically been used. To date, DNAPL has not been seen in the water collected in the trench. There are PCB detections in the water, but Millennium maintains that the source of this contamination is PCBs that are sorbed onto fine soil particles. Millennium has also placed soil borings around its property and within areas of historical PCB contamination. No indication of Therminol DNAPL has been seen. EPA will continue to evaluate the Therminol detections within EU8 and the PCB contaminant levels in the Millennium trench. EPA may require additional sampling at the Millennium facility if new information suggests that Therminol may be present and may pose a threat to Fields Brook.

VI. Five-Year Review Process

Administrative Components

Potentially interested parties, including the Ohio EPA and the PRPs for the Sediment and Floodplain/Wetland operable units, were consulted during the preparation of the five-year review. The members of the review team included:

Terese Van Donsel, RPM, EPA
Leah Evison, RPM, EPA
Peter Felitti, Associate Regional Counsel, EPA
Regan (Sig) Williams, Ohio EPA

Community Notification and Involvement
Notification was given to the Ohio EPA that the five-year review was being prepared. EPA placed an ad in the Ashtabula Star Beacon on December 12, 2008. A copy of the Ashtabula Star Beacon ad is provided in Fig. 7. No community interviews were conducted as part of the five-year review.

Document Review/Data Review
The following documents were reviewed to assess the protectiveness of the Fields Brook cleanup:

- Record of Decision for the Sediment Operable Unit, September 30, 1986;
- Explanation of Significant Differences for the Sediment Operable Unit, August 15, 1997;
- Record of Decision for the Floodplain/Wetland Operable Unit, June 30, 1997;

- Site-Wide Explanation of Significant Differences, April 8, 1999;
- Explanation of Significant Differences to address DNAPL-Impacted Soils and Sediment, August 17, 2001;
- Final Remedial Action Work Plan, August 2000;
- First Five Year Review dated June, 2004
- Unilateral Administrative Order issued to Millennium, October 18, 2007
- Correspondence and sampling data from Millennium, Detrex, and the FBAG;
- Photo and videos related to DNAPL releases; and
- Focused Feasibility Study dated February 2, 2009

Site Inspection

A site inspection of the Fields Brook site, including the brook channel and floodplain, was conducted on February 25, 2009 by Terese Van Donsel and Leah Evison. The site inspection did not include a detailed inspection of the Fields Brook landfill. Landfill issues were reviewed by evaluation of groundwater data and quarterly maintenance notes. Issues raised during the inspection include FBAG concerns regarding potential Detrex source control failure and the status of EPA's review of the Focused FS to address the potential for future recontamination in EU8.

VII. Technical Assessment

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

Yes, for OUs 1 and 4 in EUs 1, 2, 3, and 7. No, for OUs 1 and 4 in EUs 4, 5, 6, and 8.

The repeated reemergence of chlorinated DNAPL within EUs 5, 6, and 8 raises questions about the sufficiency of the original brook cleanup and Detrex source control measures. In addition, the discovery of the Millennium Therminol DNAPL within EU8 causes increased concern that there exists a potential for the recontamination of upstream, industrial portions of the brook and the distribution of these contaminants to downstream areas.

Millennium has excavated a large volume of soil and sediment from EU8. Additional areas of known and potential PCB contamination remain within the floodplain of EU8, although much of it is at a depth below the base of the stream channel. Within EU6, monitoring data indicate that response measures put in place by the FBAG during the discovery of the Therminol and 2007 flooding of the EU8 area did, to a large measure, protect downstream areas. There are areas of PCB CRG exceedances within EU6 and EU4, but the problem is not widespread.

Chlorinated DNAPL contamination has emerged as a potential problem in EUs 5 (DS Tributary), 6 and 8. Additional excavation, removal or isolation measures are likely necessary to protect the

brook. The alternatives presented in the Focused FS for EU8 should serve to protect the brook for chlorinated DNAPL in EU8. However, as noted previously, additional investigation and excavation work are likely required for EU 5. For EU6, an assessment will be necessary to determine what measures are sufficient which may include the removal of the isolated contaminant pockets.

At the on-site Fields Brook landfill, where soils and sediment from OU1, OU4 and some of the source control OUs were disposed, monthly inspections and groundwater monitoring have not identified any issues that call into question the performance of the landfill. Based on inspection reports, the landfill cover is in excellent condition, the property is fully fenced with locked gates, and procedures are in place to document entry and exit into the site. Chemical monitoring has not identified any exceedances of action levels for primary contaminants of concern when compared to baseline conditions. Elevated radionuclides associated with well RMI-4D (to the southeast of the landfill) appear to be associated with the historical placement of material in a nearby old RMI disposal area and do not appear to be associated with the Fields Brook landfill.

While IC's have not been implanted for these OUs, there is currently no use that is inconsistent with the selected ICs. ICs must be implemented in all industrial EUs so that the remedy is functioning as intended by the decisions documents.

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

Yes, the exposure assumptions for the residential and industrial areas of the brook are still valid. Land use along the brook is still consistent with the assumptions used to determine where residential and industrial cleanups would be performed. Future assessment of additional contamination within EUs 6 and 8 and the DS tributary will need to include confirmation that the Confidence Removal Goals (CRGs) for PCBs and hexachlorobenzene are still being met.

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

Yes. The re-emergence of the chlorinated DNAPL within EUs 5, 6 and 8 and Millennium's recent difficulty in finding Therminol DNAPL pockets within EU8 have highlighted the problem of trying to address contamination that can't be found. The scattered nature of the remaining DNAPL distribution has led EPA to consider containment and isolation of the brook in areas of potential recontamination.

Technical Assessment Summary

Additional remedial actions are necessary to ensure the protection of the brook. The presence of chlorinated DNAPL and Therminol DNAPL within the industrial areas of Fields Brook pose a threat to the residential portions of the brook and, ultimately, to the Ashtabula River. Supplemental work will be necessary to remove contamination within the floodplain and isolate the brook from material that cannot realistically be found and removed.

Cleanup levels for the brook and floodplain were based on a risk assessment that considered possible short and long-term exposures in the residential and industrial areas of the brook. From

the cleanup levels, CRGs were developed that statistically determined the necessary amount of excavation required to achieve cleanup levels within a particular exposure area. Since the excavation cut lines were based on the CRGs, the cleanup that was performed in OU1/OU4 resulted in a remedy that was protective of human health and the environment. With the resolution of the DNAPL issues throughout the industrial areas of the brook, the CRGs will need to be reevaluated for all appropriate contaminants to ensure that they are still valid.

VIII. Issues

Chlorinated DNAPL and PCB DNAPL present in EU8

The difficulty in finding mobile DNAPL present within the EU8 floodplain has led EPA to consider options beyond excavation. The potential for high-level contamination entering EU8 puts downstream areas potentially at risk. Chlorinated DNAPL had previously been excavated during the original brook cleanup, yet the problem has re-emerged. Therminol DNAPL has recently been found within EU8. The extent of this material is difficult to assess, as is the potential for its movement within the floodplain.

Chlorinated DNAPL in EU6

The discovery of PCB and chlorinated VOC contamination within EU6 from the 2005 monitoring and 2007 field work is under review by EPA. Parties dispute the source of this contamination, and an investigation is needed to determine the source as well as the action needed to address the contamination and prevent future recontamination of the brook and floodplains.

Chlorinated DNAPL in DS Tributary (EU5)

The discovery of chlorinated VOC contamination within EU5 is under review by EPA. The parties dispute the source of this contamination. Additional investigation is needed to determine the source of the contamination and to identify the actions necessary to address the contamination and prevent future recontamination of the brook and floodplains.

Elevated PCB Detections in EU6 and EU4

Monitoring conducted by the FBAG and Millennium has found several areas of elevated PCB contamination within EU6 and EU4. To date, no PCB DNAPL has been found in EU4 or EU 6.

Implementation of Institutional Controls in Floodplain to address potential DNAPL presence and/or restricted use

The 2001 ESD to address DNAPL-Impacted Soils and Sediment required that deed restrictions be put in place along the floodplain to document the location, depth and type of residual contamination. For EU8, additional restrictions may be identified and required as part of the anticipated remedy revision in 2009. For EU6, DS Tributary (including EU5 and EU7), and EU4, the PRP that is the owner of the property will be required to prepare an Institutional Control (IC) Study and propose measures necessary to restrict access to areas with the potential for exposure to DNAPL or contamination above health-based levels.

No ICS are needed for the residential EUs as these areas have unlimited use and unrestricted exposure.

Implementation of Institutional Controls at Fields Brook On-Site Landfill

Access to the landfill area is restricted, and the landfill property is owned by the company tasked with performing O&M. However, permanent ICs have not yet been placed on the landfill property to limit access, protect the integrity of landfill structures, and restrict groundwater use.

Reassessment of OM&M Requirements

Additional remedial actions are planned for EU8. Additional investigation and potential actions may also be required for EU6 and the DS Tributary. The OM&M Plan will be revised to compliment the revised remedy for EU8 and data needs for the industrial area of the brook.

IX. Recommendations and Follow-up Actions (OU 1 & 4)

Recommendations/Follow-up Actions for Sediment & Floodplain (OU 1 & OU 4)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement ESD to address chlorinated DNAPL and PCB DNAPL present in EU8	FBAG	EPA	Implementation as directed under the CD (estimated completion of field work by 9/30/2010)	N	Y
Investigate and remediate chlorinated DNAPL pockets in EU6	FBAG and/or Detrex	EPA	8/31/10	N	Y
Investigate and remediate chlorinated DNAPL pockets in the DS Tributary (EU5)	Detrex	EPA	5/31/10	N	Y
Investigate and remediate elevated PCB detections in EU6 and EU4	FBAG and/or Millennium	EPA	8/31/10	N	Y
Implement institutional controls in floodplain to address or restricted use after add'l field work completed and a develop a plan to monitor ICs to ensure long-term stewardship	EUs 4, 5,6, and 8-property owner	EPA	IC Work Plan shall be submitted by 12/15/2010	N	Y
Implement institutional controls at landfill property to restrict access, protect remedial controls, and restrict groundwater use, and develop a plan to monitor ICs to ensure long-term stewardship	OU1/4 – Landfill-FGAG	EPA	IC Work Plan shall be submitted by 12/15/2009	N	Y
Update Operation, Maintenance, and Monitoring Plan after add'l field work completed	OU1/4 - FBAG	EPA	12/15/2010	N	Y

X. Protectiveness Statement

The remedial actions implemented for Fields Brook sediment (OU1) and floodplain and wetland areas (OU4) is protective of human health and the environment in the short term. However, EPA can not make a determination of the long-term protectiveness of the remedial action for the portions of OU1 and OU4 known as Exposure Units 4, 5, 6, and 8. Additional actions are necessary to address contamination within Fields Brook and the DS Tributary and to ensure that recontamination of the brook does not again occur. In addition, the implementation of ICs is necessary. Long-term protectiveness of the remedy will require compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Although there are presently selected exceedances of health-based cleanup standards for PCBs and chlorinated solvents in soils and sediment, it is not believed that there currently are complete pathways of human exposure. As such, EPA has made the determination that human exposures currently remain under control.

As noted in the introduction to this review, detailed five-year review assessments for the Fields Brook source control operable units are presented in separate sections of this document. Protectiveness statements for all OUs are also found in the Executive Summary.

XI. Next Review

The next five-year review for Fields Brook Superfund Site is required by June 2014, five years from the date of this review. However, EPA may elect to perform the review prior to this time if monitoring data raises questions or concerns about the protectiveness or long-term performance of the remedy.

Five-Year Review Report Section
Detrex Corporation Source Area (Operable Unit 5)

Executive Summary

The purpose of this five-year review appendix is to determine if the remedy selected to address the contamination at the Detrex Corporation Operable Unit of the Fields Brook Superfund Site is protective of human health and the environment. The remedy included the construction of a partial slurry well, excavation and disposal of sediments within a retention basin and drainage ditch, installation of a soil cover over an area of low-level soil contamination, construction of a groundwater intercept trench; installation of DNAPL extraction wells; and institutional controls (ICs).

The assessment of this five-year review found that a portion of the remedy is not functioning as intended. The DNAPL recovery system has experienced continued operational difficulties and the scope of the extraction system is insufficient. In addition, ICs are not yet in place. However, EPA has evaluated the remedial action elements currently in place and determined that Fields Brook is protected in the short-term. The long-term protectiveness of the cleanup cannot be assessed at this time as it relies on the continued operation of the remedial action components and a maximization of DNAPL removal from the site. Although complete removal of DNAPL is not possible, DNAPL is considered a principal threat at the Detrex operable unit and its presence at the site may present a risk to Fields Brook. For this reason, additional work is necessary to address operational difficulties with the existing extraction wells by to expanding the DNAPL extraction system to achieve broader DNAPL removal. In addition, the continued assessment of the contamination seen in the DS Tributary, just west of State Road, may ultimately lead to a reassessment of the short-term protectiveness of the remedy. If investigations indicate that the DNAPL in the DS Tributary is due to a failure of the existing DNAPL control measures, additional work will be required to correct the situation.

As with all source control remedial actions, the scope of the required cleanup was limited to actions necessary to protect Fields Brook from recontamination. No assessment was made as to the sufficiency of the remedial action in terms of addressing human health and ecological risks within the Detrex property. The immediate threats to Fields Brook from contamination at the Detrex Corporation operable unit have been addressed and the remedy currently appears to be protective of human health and the environment, in terms of contaminant contributions to Fields Brook.

I. Introduction

The purpose of the five-year review is to determine whether the remedy implemented at a site is protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in Five-Year Review reports. Five-Year Review reports identify any issues and concerns found during the review, if any, and make recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

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

The NCP at 40 CFR Section 300.430(f)(4)(ii) states:

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

The United States Environmental Protection Agency (EPA), Region 5, conducted a five-year review of the remedial actions implemented at the Fields Brook Site in Ashtabula, Ohio. This report section documents the results of the review for the Detrex Corporation Source Control Operable Unit (Detrex). The Ohio Environmental Protection Agency (Ohio EPA) provided support in the development of this five-year review.

The purpose of the cleanup at the Detrex operable unit was to address contaminated surface soils, sediment and DNAPL that had the potential to move into Fields Brook. The remedial action at Detrex was initiated in August 2000 and became operational and functional in October 2002, with the start of operation of the DNAPL extraction system. This is the second five-year review for the Detrex Operable Unit of the Fields Brook Site. The first five-year review found that the remedy was not functioning as designed, but was protective in the short term.

II. Site Chronology – Detrex (OU 5)

Event	Date
Detrex facility constructed	1947
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed six individual source control areas, including Detrex Corporation.	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the Detrex Corporation RD/RA..	December 1997
EPA approval of Phase I (slurry wall & earth work) RD	May 22, 2000
EPA approval of Phase I RA Work Plan	August 30, 2000
Earth work, including construction of slurry wall	August 2000 - July 2001
EPA approval of Phase II (DNAPL Recovery) RD	October 4, 2001
EPA approval of Phase II RA Work Plan	December 6, 2001
Construction of DNAPL extraction system	Summer 2002
DNAPL extraction commenced	October 2002
EPA completes First Five-Year Review	June 7, 2004
PCBs & Chlorinated Solvent DNAPL found in brook during OM&M sampling	May 14, 2005
Detrex investigates southern portion of property for evidence of DNAPL movement towards Fields Brook	August 2005

Event	Date
Detrex installs interceptor trenches north of Fields Brook	Winter 2006/2007
EPA observes DNAPL at North Sewer outfall	December 5, 2006
Detrex completes borings and test trenches along North Sewer to investigate possible migration of DNAPL	December 2006
Excavation of North Sewer outfall area and installation of sump	
Detrex installs additional extraction wells (with alternative design)	September 2007 – February 2008
Additional chlorinated solvent DNAPL pockets found in brook during Millennium removal action	October 2007 – October 2008
Detrex submits revised draft work plans for investigation of DS Tributary and expansion of DNAPL extraction system	June 2008
State Road bridge reconstruction and identification of additional chlorinated DNAPL at North Sewer outfall location	December 2008 – February 2009
Detrex conducts additional investigation with soil borings along western edge of facility and in State Road north of the bridge	January 2009

III. Background

Physical Characteristics

The Detrex Corporation is located in the northwestern portion of the Fields Brook watershed adjacent to the north bank of the main channel of Fields Brook. The facility encompasses 58 acres. Structures on the property include a process building, office building, and numerous aboveground storage tanks that are either within diked areas, paved areas, or on ground surfaces. The northern one-third of the property is used as an active manufacturing area and the southern two-thirds is largely undeveloped.

The area is located in the Lake Plain physiographic province of Ashtabula County. The elevation of the Lake Plain ranges from 620 ft mean sea level (MSL) to 660 ft msl. In general, the subsurface geology of the Fields Brook watershed near Detrex consists of three geologic formations. In descending order, these formations are: glacial-lacustrine, glacial till, and shale bedrock.

Land and Resource Use

As noted above, Detrex is an operating facility. It is a chemical manufacturing company, currently producing zinc dialkyldithiophosphates and high pure 37% hydrochloric acid.

Past operations at this plant included the chlorination of acetylene to produce trichloroethene and tetrachloroethene.

According to information from the Ohio Department of Natural Resources, the groundwater production potential of the area within the watershed is considered very limited and not capable of yielding water at rates greater than 3 gallons per minute. No drinking water wells are located within the industrialized portion of the watershed. The water supply for the industries and residences in the area is from Lake Erie.

History of Contamination

The primary chemicals of interest at Detrex from past operations include tricholoroethene, 1,1,2,2-tetrachloroethane, hexachlorobutadiene (HCBD), hexachlorobenzene (HCB) and tetrachloroethene.

Results from sampling conducted during the Source Control RI indicated that surface soil exceedances for Fields Brook contaminants of concern were identified in several areas of the Detrex facility. These areas include: the stormwater collection ditch on the northern property line, several abandoned retention ponds, construction debris piles, sediment in the stormwater settling collection basin, and a catalyst pile. In addition, the recontamination assessment identified a Dense Non-Aqueous Phase Liquid (DNAPL) in the groundwater on the Detrex facility. The assessment determined that the following areas should be addressed to reduce possible sources of future contamination to Fields Brook:

1. Seven Closed Lagoons

The closed lagoons are located in the northeastern portion of the Detrex facility. Subsurface soil samples collected from the area surrounding the lagoons were found to contain several volatile and semi-volatile organic compounds at concentrations exceeding occupational cleanup goals (CUGs). In addition, DNAPL was identified in the shallow groundwater bearing formation both in the closed lagoon area and at off-site locations on RMI Sodium, the adjacent property. A sample of DNAPL was collected from one of the on-site monitoring wells in order to characterize this material. Four volatile organic compounds were identified (1,1,2,2-tetrachloroethane, 1,2-dichloroethene, tetrachloroethene, and trichloroethene). Three semi-volatile organic compounds were identified (hexachlorobenzene, hexachlorobutadiene, and hexachloroethane).

2. Sources Within the Surface Water Treatment System

The surface drainage system in the northern industrialized portion of the Detrex facility was modified to collect and treat surface water. Of the area within the bounds of the surface water treatment system, approximately 60,000 sq.ft of surface area had soil with CUG exceedances. The ponded area in the lagoon area covers approximately 4,000 sq.ft. In addition, approximately 1,500 sq.ft. along the drainage ditch had surface soil CUG exceedances. The area that is located within the bounds of the surface drainage system is underlain by the subsurface DNAPL plume

3. Sources Outside the Surface Water Collection System

In the Source Control RI Report, the catalyst piles were not considered a potential source of sediment recontamination. A surface soil sample located downslope of the floodplain detected a concentration of 40 ppm PCBs. Subsequent sampling of the catalyst material found the presence of PCBs greater than occupational CUGs for the Fields Brook sediment. Additional sampling of the three catalyst piles indicated PCB concentrations ranged from 2 to 5 ppm. These catalyst piles were located on the southern portion of the Detrex property, in close proximity to Fields Brook.

Initial Response

In late 1986, the EPA began negotiating with a number of Potentially Responsible Parties (PRPs) to conduct the source control RI/FS activities. In 1989, the PRPs were issued a Unilateral Order to complete a Remedial Investigation to identify the sources and potential sources of contamination to the brook, and develop and evaluate cleanup alternatives for the sources of contamination. From 1992 to 1995, the PRPs evaluated 94 areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup was underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the brook from flowing groundwater.

As a result of this evaluation, the PRPs identified five industrial properties as sources of contamination or potential contamination to Fields Brook. The industrial properties include Detrex, Millennium Plant II TiCl4 (formerly SCM), Acme Scrap Iron and Metal, RMI Metals, and Conrail. In addition, several sewer systems located to the north and south of Fields Brook were also found to be potential sources of contamination. Detailed information about the types and extent of contamination at the source areas, including Detrex, can be found in the Source Control RI reports. The final Phase 1 Source Control RI was approved in May of 1997.

In conjunction with the preparation of the Source Control Remedial Investigation Report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June, 1997.

Basis for Taking Action

Evaluations of organic chemical contamination in Detrex's soils and groundwater and the presence of DNAPL below Detrex led EPA to believe that Detrex was a potential source of recontamination to the brook. Remedial actions for the Detrex Corporation operable unit were selected in the September 29, 1997 Source Control ROD.

IV. Remedial Actions

As documented in the Record of Decision, the goal of the source area remedial actions at the Fields Brook site was to prevent recontamination of Fields Brook sediment above cleanup goals. Where institutional controls were required, those controls were intended to limit the future use of areas so as to ensure that contamination does not migrate to the Brook.

Remedy Selection

The selected remedy for the Detrex source area required the containment and treatment of groundwater contamination by the construction of a partial slurry wall and vacuum-enhanced extraction wells. The selected remedy would also reduce the potential for migration of contaminated surface soil to reach the DS Tributary and Fields Brook by containment of surface soil contamination, ditch cleaning, catalyst pile removal and retention pond sediment removal. See Fig. 8 for a map showing features relevant to the site remediation.

More specifically, the selected remedy for the Detrex Corporation Source Control Operable Unit consisted of the following:

a) Clear Debris and Vegetation, Remove Physical Hazards

In order to implement the remedial action, debris and vegetation were to be cleared in response and work areas. Physical hazards that could threaten workers were also to be addressed prior to the remedial action.

b) Construction of Partial Slurry Wall

A partial slurry wall was to be constructed to restrict the flow of groundwater contamination from the Detrex property. The slurry wall component was to extend beyond the downgradient portion of the on-site and off-site DNAPL and dissolved phase plume, and be located outside of the DNAPL area of impact. In addition, the slurry wall was to extend as necessary to ensure that the DNAPL and contaminated groundwater flowing towards Fields Brook or the DS Tributary, particularly along the northern and western directions from the Detrex facility, would be contained or captured.

The slurry wall was to be constructed of a soil-bentonite slurry or other clay mineral slurry. The permeability of the slurry wall was to be designed to be approximately 1×10^{-6} cm/sec. Due to the high percentage of naturally occurring clay soil material in the proposed slurry wall area, the ROD noted that it may be possible to reuse a portion of the excavation spoils by incorporating them into the slurry wall. The remaining excavation spoils were to be temporarily stockpiled on-site and characterized to evaluate on-site and off-site disposal options.

c) Vacuum-Enhanced Extraction Wells

Vacuum-enhanced extraction wells were to be installed near the leading edge of the DNAPL plume near the slurry wall and within the plume to lower groundwater and collect DNAPL in source areas. Based on pilot test results, approximately 36 extraction wells were anticipated.

Fluids collected from the vacuum-enhanced extraction wells were to be routed to a knockout tank to separate the vapor phase from the liquid phase.
The vapor phase was to be treated with granular activated carbon to remove organic contaminant vapors before being released into the atmosphere.

The liquid phase from the knockout tank was to be conveyed to a DNAPL/water separator where DNAPL will be separated from water. The separated DNAPL was to be collected and transported to an off-site facility for treatment or recycling. The separated water was to be conveyed to the existing activated carbon treatment system at the Detrex facility.

d) Surface Water and Erosion Control / Soil Cover

Low-lying areas within the existing surface water collection system area on the Detrex facility and areas with surface soil occupational CUG exceedances were to be filled and regraded. In addition, these areas were to be covered with a 12-inch thick soil cover, an erosion control blanket, and a vegetative or crushed stone layer surface. Clean clay soil would be used for backfill. Regrading and vegetative cover would prevent ponding of surface water in former source areas and reduce infiltration of surface water into the ground. Sediments lying within retention basin DET7 and in the drainage ditch on the northern boundary that collects surface water were to be excavated and analyzed to evaluate disposal options. Following cleaning, the ditch was to be filled with gravel or cement.

e) Catalyst Pile Excavation and Disposal

The catalyst pile material was to be excavated, evaluated, characterized and disposed of. Approximately 100 cubic yards of catalyst material contained in the three small piles and underlying soil was to be removed from the catalyst pile area. Upon completion of the removal of visible catalyst and excavation to the six-inch depth, confirmation samples would be collected from the base of the excavation, prior to backfilling. Clean soil would be replaced in the excavation and the area would be regraded and revegetated.

f) Off-site Surface Water Control In The DS Tributary

In order to reduce the potential for subsurface water seepage to enter the DS Tributary in the northeast portion of the site, a 30-inch diameter culvert was to be installed in the DS Tributary to contain surface water flow and keep groundwater from entering the stream flow. This culvert was to connect to the existing culvert beneath State Road and extend

along the northern side of the railroad spur, approximately 600 feet upstream. This configuration was meant to entirely contain the surface water in the DS Tributary north of the Detrex facility, seal off potential groundwater seepage and prevent soil erosion. All joints were to be sealed to eliminate seepage. Sediment beneath the culvert was to be excavated to a depth of approximately 2.0 feet. The sediment excavated beneath the culvert would be analyzed to evaluate disposal options.

g) Chemical Monitoring and O&M

O&M activities for the vacuum-enhanced extraction well system were to include routine inspections of blowers, electrical equipment, belts, fuses, and pertinent operating parameters. O&M requirements for the slurry wall and regraded areas were to consist of inspections, with regrading and revegetating, as necessary. Routine sampling of selected extraction wells was to be required to monitor the effectiveness of the system. At a minimum, annual groundwater monitoring was to be conducted at points of compliance, with samples to be analyzed for DNAPL, VOC and SVOC parameters. In addition, water level data is to be gathered on a semi-annual basis from all monitoring wells and piezometers installed inside and outside of the slurry wall to evaluate groundwater gradients within the remedial response area.

Storm water treatment system O&M activities, such as carbon replacement, were to remain the same as are currently used at the facility; however, the frequency of replacement was expected to increase depending on the concentration of contaminants in the water pumped out of the extraction wells. O&M activities were to also include separator maintenance, handling and disposal of DNAPL, and inspection and periodic sediment removal from the settling pond at DET7.

The outfall from the existing stormwater treatment system was to be monitored for existing NPDES monitoring requirements and DNAPL constituents not included as part of the current monitoring program.

The source control ROD requires that institutional controls (ICs) be implemented for any area where hazardous substances, pollutants or contaminants will remain above levels that could recontaminate the brook above cleanup levels. More specifically, ICs were to be implemented to protect the cover system, drainage controls, slurry walls, and extraction and monitoring wells that were put in place to provent recontamination of the brook. Such ICs would include proprietary controls, such as an environmental covenant under the Ohio version of the Uniform Environmental Covenants Act (UECA), Ohio Revised Code Sections 5301.80-5301.92.

h) Points of Compliance

In conjunction with completion of the remedial action and performance of required O&M, sheet flow erosion and runoff from the Detrex facility must meet the occupational Cleanup Goals (CUGs) established for the Floodplain/Wetland and Sediment Operable Units. The points of compliance for surface runoff were the property boundary and the DS Tributary.

Groundwater contamination must also meet the occupational CUGs to prevent recontamination of the Brook. At a minimum, the points of compliance for the contaminants present in groundwater will be the edge of the slurry wall or, for areas without the slurry wall, the property boundary and the DS tributary. Contaminant levels at the Detrex outfall must meet residential CUGs to ensure that the 48" combined sewer can meet residential CUGs when it discharges to Fields Brook.

In addition to providing direction concerning points of compliance for monitoring, the Source Control ROD also provided considerations for the evaluation of the performance of a DNAPL extraction system. The ROD references EPA guidance that recommends that long-term remediation objectives of DNAPL remedies should be to remove free-phase, residual and vapor phase DNAPL "to the extent practicable". The ROD also notes that the DNAPL is a principal threat, selects a remedy requiring a combination of containment and active removal of DNAPL and states that "Complete removal of DNAPL in low permeability clay soils is not possible with currently available technology and treatment to asymptotic levels is expected". While recognizing the difficulties of DNAPL removal, the Source Control ROD emphasized DNAPL removal as an important element in the selected remedial action for the Detrex operable unit.

Remedy Implementation

Because the design of the DNAPL extraction system would take longer than the design of the slurry wall, the designs were submitted separately so that remedial action work at the site could proceed as soon as possible. The remedial design for the slurry wall, groundwater culverts and soil work was approved in May of 2000. Debris and physical hazards were removed from the work area. Construction of the slurry wall, installation of groundwater collection trenches and the excavation of accumulated sediment from drainage ditches began in August of 2000 and were completed in mid-2001. The slurry wall controls the movement of groundwater and provides for a system of drains that collect groundwater and run it through Detrex's existing water treatment plant. Site contaminants of concern are addressed in the facility's existing NPDES permit. In addition to the construction of the slurry wall and groundwater culverts, the catalyst piles were removed from the property and small areas of surface soil contamination were regraded and covered to prevent recontamination to the brook.

EPA and Detrex agreed that the DNAPL extraction system could be phased in to allow the system to be expanded based on field performance data and so that the design could be modified to address any problem experienced in the first phase of extraction wells. On October 4, 2001, EPA approved the remedial design for the phase 1 of the DNAPL extraction system. Detrex constructed the system in the summer of 2002. Upon start up in October 2002, Detrex encountered some severe operational difficulties (such as product crystallization and plugging of wells) and eventually had to move to a less automated approach to running the system since they found the extraction system requires close operator attention to maintain.

System Operations and Maintenance

Detrex is currently operating under an O&M Plan that includes the inspection and upkeep of the extraction system and the sampling of monitoring wells. Sampling of the Detrex outfall, which assesses the performance of the on-site water treatment system, is addressed by monitoring

required under Detrex's NPDES permit. Millennium provides copies of its monthly operating reports (MORs) to EPA.

Institutional Controls

Institutional controls (ICs) are sometimes required by EPA to ensure the protectiveness of a remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. For source areas at the Fields Brook Site, ICs are required to assure long-term protectiveness for any areas that have the potential to recontaminate the brook above cleanup levels or otherwise are required to maintain the integrity of the remedy. The industrial source area facilities are subject to other environmental regulations such as the Resource Conservation and Recovery Act (RCRA) Corrective Action provisions that may require additional cleanup or institutional controls in the future.

The ICs required at Detrex are limited to those restrictions necessary to maintain the integrity of the engineered controls that are in place to prevent recontamination of the brook. Currently, signs are posted and access controls (not themselves considered institutional controls) are in place in the form of fencing and site security to limit access to critical areas of the facility, where remedial structures are primarily located. Areas to the south to the main production are posted with signs to discourage trespassers. Detrex is in the process of placing restrictions on its deed to protect remedial structures and restrict installation of groundwater wells. In order to implement an acceptable IC, Detrex will be asked to obtain a title commitment for the property along with maps to indicate the existence of any utility easements that might impact the remedial structures at the facility. Detrex will be asked to submit a UECA covenant for EPA review.

Currently the Detrex OU is subject to the institutional controls listed in the table below.

Map of Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions	**IC Objective**	**Title of IC Instrument Implemented**
Detrex Property*	Prohibit interference; restrict use of area; prohibit residential use .	No ICs are currently in place. Deed restrictions need to be implemented (the use of an UECA covenant will be explored). A Work Plan will be submitted for EPA approval to implement the ICs, and to develop a plan to ensure long-term stewardship.

* Maps which depict the current conditions of the site and areas which require restrictions will be developed as part of the implementation of institutional controls or IC Plan.

IC Follow up Actions Needed: ICs must be implemented so that the remedy functions as intended. EPA will assess the status of the current IC work plan and ensure that it consists of IC evaluation activities and a draft IC Action Plan to implement the ICs and long-term stewardship procedures. The IC evaluation activities will include a map which depicts the current conditions of the Site and areas which require controls, title work to ensure no prior encumbrances exist on the Site which are inconsistent with the ICs to be implemented and the draft deed restrictions to be implemented. Accordingly, EPA will review the Work Plan and provide direction to the PRPs on how to revise their IC Workplan, if necessary.

Long Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for long-term stewardship is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain, monitor and enforce the ICs as well as remedy components. The O&M plan shall be updated to include procedures to ensure long-term stewardship such as regular inspection of the engineering controls and access controls at the Site and review of the ICs for the Site. The plan should also include a requirement for an annual certification to EPA that ICs are in place and effective. Finally, development of a communications plan and use of the State's one call system shall be explored.

V. Progress Since the Last Five-Year Review

The first five-year review noted the continued operational difficulties with the DNAPL extraction wells. However, the review found that the assessment was protective in the short term, with long-term protectiveness dependant upon expansion of the DNAPL recovery system. At the time of the first five-year review, Detrex was working with EPA Region 5 staff and technical support from EPA's Ada, Oklahoma office to identify an alternate well design to improve DNAPL extraction efficiency.

Installation of Additional Extraction Wells

From September 2007 to February 2008, Detrex installed two additional DNAPL extraction wells within the primary DNAPL area at the facility. The wells were installed with a roto-sonic drill to minimize disturbance in the formation. The wells were placed into service in February of 2008. Performance of these more-recently installed extraction wells has not been as expected, nd the wells are not currently extracting DNAPL.

Status of DNAPL Extraction System

Of the twelve original and two supplemental recovery wells installed, not all are currently in operation. Maintenance of the wells remains difficult and DNAPL recovery is complicated by many factors:

1. DNAPL is not thought to be present in a continuous layer, but is present in pockets and stringers within the formation;

2. Use of excessive extraction pressure can strip the VOC off of the DNAPL, leaving a higher percentage of semi-volatile components that can (absent the VOCs) crystallize and inhibit extraction; and
3. Fines frequently enter the screen and clog up the pumps.

As of March 2009, approximately 16,000 gallons of DNAPL have been collected and sent off-site for recycling or disposal. Extracted water with dissolved phase contamination is treated through Detrex's on-site water treatments system and discharged to Fields Brook, under its NPDES permit. See Attachment 2 for the latest Detrex monthly status report showing DNAPL extraction volumes.

Expansion of the DNAPL Extraction System

In June of 2008, Detrex submitted a draft revised O&M Plan that expands Detrex's existing O&M plan in order to formalize procedures for upkeep and monitoring of the interceptor trenches. The draft revised plan also proposes two additional approaches for the removal of DNAPL from the Detrex property. Detrex is proposing to utilize a collection trench within the primary DNAPL area in an effort to improve its efficiency of DNAPL removal. While health and safety issues will be critical during the installation of the collection trench, it is hoped that the larger collection area will facilitate DNAPL flow into the extraction system. To supplement the collection trench, Detrex is proposing the installation of small diameter wells without dedicated pumps. The low-investment wells would be periodically pumped to remove DNAPL. Should a well stop functioning as designed, a replacement well could be inexpensively installed. EPA expects that Detrex will move forward with the expansion of the DNAPL extraction system in spring/summer of 2009.

Contamination Found During Fields Brook OM&M / Millennium Removal Action

In the fall of 2005, the Fields Brook PRPs, known as the Fields Brook Action Group (FBAG) reported the results of the required monitoring in the brook. One sediment grid in EU8 was found to contain PCBs above the allowable residual level. To address this area, the FBAG mobilized to excavate the area in question. During that excavation, a pocket of DNAPL was found in fill material that had been placed at the site during the original cleanup. A follow-up investigation found more pockets of DNAPL in EUs 6 and 8 and in the DS tributary. It is not know if the source of the DNAPL is an on-going migration of DNAPL from the Detrex facility, or residual DNAPL from the prior cleanup that had been missed.

In order to assess whether DNAPL is moving south from the DNAPL accumulation area to the brook, Detrex has undertaken three separate subsurface investigations on the southern portion of the Detrex property during the time period of August 2005 through January 2009. Geoprobe sampling, test pit sampling and installation of monitoring wells in this area of the Detrex property has not observed the presence of DNAPL within the lacustrine subsurface soils or along the interface with the underling glacial till. The following is a summary of the investigative work performed by Detrex since 2005.

August 2005 - Description of Work
• 16 test pits (8 ft long, 3 ft wide, 7-20 ft deep).

• Elevated PID readings in 5 test pits located long former discharge channel (>10 ppmv).
• 18 geoprobe locations (12-16 ft deep).
• Elevated PID headspace readings in one geoprobe sample located below storm water pond dike in Fields Brook floodplain.
• DNAPL was not observed at any location.

August 2006 - Description of Work
• 15 soil borings (18 – 24 ft deep) located north of Fields Brook along proposed groundwater interceptor trench alignment.
• 8 monitoring wells (screened across lacustrine – glacial till contact – approximately 12-18 ft bgs).
• No volatile organic compounds (VOCs) detected in groundwater sample.
• One soil sample out of 15 samples detected VOCs at a concentration of 86 ug/kg.
• No semi-volatile organic (SVOCs) compounds detected in soil samples.
• DNAPL was not observed at any location.

January 2009 - Description of Work
• 7 soil borings (30-40 ft deep) located along western portion of property (east of State Road) north of Fields Brook.
• 8 monitoring wells (4 screened across lacustrine – glacial contact, 4 screened at top of shale bedrock).
• DNAPL was not observed at any location.

Since 2005, Detrex Corporation has drilled and sampled 40 soil borings, 16 test pits and 16 monitoring wells to evaluate potential migration of DNAPL from the source area south towards Fields Brook EU-6 and EU-8. DNAPL has not been observed in any sampling location in the upland areas of the Detrex property in proximity to either EU-6 or EU-8 of Fields Brook.

There is no dispute that the ultimate source of the chlorinated DNAPL was Detrex. During the winter of 2006/2007, as a precautionary measure, Detrex installed an interceptor trench (in three segments) north of the floodplain to ensure that the potential for southward movement of DNAPL would be cut off.

Resolving Issues Associated with Chlorinated DNAPL Contamination in Fields Brook EUs 6 and 8

Since the 2005 discovery of chlorinated solvent contamination within EUs 6 and 8 and the DS Tributary, the source of the contamination has been a subject of dispute. EPA is evaluating the data from the water collected from Detrex's three interceptor trenches. The two most westerly trenches have very low levels of chlorinated contamination. However, the most eastern trench

contains higher levels of VOCs. Whether the contamination is from DNAPL moving from the Detrex DNAPL source area or dissolved-phase residual VOC contamination from impacted soils along the old Detrex Tributary (the pathway of the historical outfall), the interceptor trench is serving to cut off the entry of chlorinated contamination (DNAPL or dissolved phase) into the brook.

In addition to the pockets of DNAPL found by the FBAG during its investigations, the EPA RPM noted chlorinated DNAPL at the North Sewer outfall during a December 2006 site visit. In December of 2006, Detrex dug multiple test trenches perpendicular to the North Sewer and placed investigational borings alongside State Road to evaluate the potential for DNAPL movement along the North Sewer. A FBAG representative was present during the installation of test trenches. The trenches gave no indication that DNAPL was traveling to the south toward EU6 from the DS Tributary or from under State Rd. Contamination seemed to be localized in the southern end of the old North Sewer, in a section of the floodplain that was not completely addressed during the original cleanup. After EPA observed DNAPL in the brook at the base of the North Sewer, the FBAG installed a sump in the area, with Detrex responsible for the removal of contaminated water from the location.

In late 2008, Ashtabula County began the State Road bridge replacement project. FBAG, Millennium, and Detrex were tasked with proving the necessary environmental support whenever the County's contractor encountered contamination.

In January of 2009, Detrex installed additional soil borings along the western edge of the Detrex property in an effort to confirm that there is not a southwesterly flow of DNAPL from its facility. Detrex also placed two soil borings within State Road itself, just north of the bridge area, to ensure that DNAPL isn't crossing under the road, in a path to reach the former North Sewer outfall location. The January 2009 soil borings did not find evidence of significant VOC contamination, except in the far northwest corner of the Detrex facility, where headspace readings showed the presence of VOCs.

EPA is evaluating information that excavations in the area of the North Sewer have provided evidence that contaminated water (including DNAPL) is entering the area from the North Sewer and from an old CEI power conduit. EPA will require Detrex to conduct additional investigations to determine if a pathway of DNAPL movement exists and if so, to address and resolve the pathway.

EPA is evaluating the more recent chlorinated solvent data in comparison with chlorinated solvent data from timeframes prior to the original cleanup and information regarding the extent of Fields Brook excavations. Such a comparison allows EPA to judge the more recent data in concert with historical CUG and Confidence Removal Goal (CRG) exceedances and determine whether current areas of elevated chlorinated solvent contamination are likely from new DNAPL entering the system or likely extensions (vertically or laterally) of contamination previously seen but not addressed.

Resolving Issues Associated with Chlorinated DNAPL Contamination in the DS Tributary

Chlorinated DNAPL contamination within the DS Tributary is significant just to the west of State Road. This area had not previously been excavated by the FBAG. While past sampling had found exceedances of CUGs, CRGs had not been exceeded, meaning that the contamination could

remain in place under the averaging approach used to determine areas of excavation. No reports of chlorinated DNAPL were reported from this area prior to the original stream cleanup. Recent visual inspections of the area now show significant chlorinated DNAPL present near the surface of the stream at this location. EPA is requiring Detrex to perform additional investigations in this area to determine if there is a DNAPL pathway not previously identified or if the DNAPL is residual material from under the road that has migrated to the west. EPA has also tasked Detrex to investigate and remediate the extent of chlorinated DNAPL within the DS Tributary. Investigation and supplemental remedial action work is anticipated for spring and summer of 2009.

VI. Five-Year Review Process

Administrative Components

Potentially interested parties, including the Ohio EPA and the potentially responsible party for the Detrex source control area, were consulted during the preparation of the five-year review. The members of the review team included:

Terese Van Donsel, RPM, EPA
Leah Evison, RPM, EPA
Peter Felitti, Associate Regional Counsel, EPA
Regan (Sig) Williams, Ohio EPA

Community Notification and Involvement

Notification was given to the Ohio EPA that the five-year review was being prepared. EPA placed an ad in the Ashtabula Star Beacon on December 5, 2008. A copy of the Ashtabula Star Beacon ad is provided in the OU1/OU4 section of this review as Fig. 7. No community interviews were conducted as part of the five-year review.

Document Review/Data Review

The following documents were reviewed:

1. Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site, September 29, 1997;

2. FBAG dispute resolution position paper and supporting documents;

3. Detrex dispute resolution position paper and supporting documents;

4. Detrex monthly reports;

5. Detrex cumulative chlorinated solvent data;

6. Water quality data from interceptor trenches; and

7. February 2009 FBAG presentation regarding chlorinated solvent contamination in Fields Brook (M. Sharma, Gradient Corporation);

A site inspection of the Fields Brook Site, including the Detrex Corporation operable unit, was conducted on February 25, 2009.

VII. Technical Assessment

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

No. Although the primary structures outlined by the ROD have been put in place (the groundwater collection trench, partial slurry wall and DNAPL extraction wells), the extraction system has not been expanded to reach a reasonable DNAPL removal rate, considering the volume of DNAPL present below the facility. In addition, ICs are not yet in place.

EPA is continuing its review of the existing remedial components to assess the system's ability to contain DNAPL that is not extracted. Chlorinated DNAPL within Fields Brook and the DS Tribuary could be evidence of source control failure or could be material not addressed during previous cleanups. Either way, the potential that there may also be a continuing source component to the presence of DNAPL remains a concern. The interceptor trenches installed to the north of Fields Brook should serve to cut off any potential DNAPL movement from flowing into EU8 of the brook. Concerns regarding DNAPL movement into the DS Tributary and the EU6 will continue to be investigated by EPA, and any necessary ICs implemented.

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

Yes, there has been no change to the hexachlorobenzene cleanup requirements for Fields Brook. The Remedial Action Objectives for the Detrex Operable Unit are still valid. The goal of the Detrex source cleanup is to ensure that contaminants do not move from the facility to the brook in excess of CUGs.

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

As previously discussed, the continuing discovery of chlorinated DNAPL within EUs 6 and 8 and within the DS Tributary has raised concerns about the sufficiency of the remedial action components currently in place. EPA plans to require Detrex to continue efforts to expand the DNAPL extraction system and conduct additional sampling to ensure that DNAPL is sufficiently contained within its facility.

VIII. Issues

The following issues have been identified which require follow-up actions:

- Increase effectiveness of chlorinated DNAPL extraction system in DNAPL source area

- Complete investigation of potential migration pathways near North Sewer and former CEI line to rule out unaddressed chlorinated DNAPL migration from source area

- Complete investigation of potential chlorinated DNAPL migration north and east of primary DNAPL area

- Implement institutional controls in source area and develop a plan to ensure long-term stewardship

IX. Recommendations and Follow-up Actions

Follow-up actions for this OU are summarized in the table below.

Recommendations and Follow-up Actions (Detrex Corp Source Area – OU 5)

Recommendations/Follow-up Actions for Detrex Corp (OU 5)	**Party Responsible**	**Oversight Agency**	**Milestone Date**	**Follow-up Action Affects Protectiveness? (Y/N)**	
				Current	**Future**
Complete optimization of DNAPL extraction system	Detrex	EPA	10/30/2010	N	Y
Complete investigation of potential migration pathways near North Sewer and former CEI line	Detrex	EPA	12/30/2009	N	Y
Complete investigation of potential chlorinated DNAPL migration north and east of primary DNAPL area	Detrex	EPA	12/30/2009	N	Y
Implement institutional controls in source area to protect remedial action components and restrict well construction and water use, and develop a plan to monitor ICs to ensure long-term stewardship	Detrex	EPA	IC Work Plan shall be submitted by 12/30/2010 (following optimization of DNAPL extraction system)	N	Y

X. Protectiveness Statement

The remedy implemented for the Detrex Corp (Operable Unit 5) is protective of human health and the environment in the short-term pursuant to the remedial action objective of preventing recontamination of Fields Brook from organic chemical contamination in site soils, groundwater and DNAPL.

The long-term protectiveness of the cleanup cannot be assured at this time as it relies on the continued operation of the remedial action components and an optimization of DNAPL removal from the site. Although complete removal of DNAPL is not possible, DNAPL is considered a principal threat at the Detrex operable unit and its presence at the site presents a risk to Fields Brook absent the optimization of operation and maintenance of the engineering controls. For this reason, additional work is necessary to address operational difficulties with the existing extraction wells, to expand the DNAPL extraction system to achieve broader DNAPL removal, and to finalize and implement O&M requirements. In addition, the implementation of ICs is necessary. Long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

EPA makes this protectiveness statement with the qualifier that it will continue to evaluate the situation at the Site and will be alert to the potential of DNAPL movement into the brook. Should a potential pathway of DNAPL movement be identified, EPA will require Detrex to eliminate the pathway to ensure protection of Fields Brook. The continued assessment of the contamination seen in the DS Tributary (see recommendations for OU1/4) and at the North Sewer outfall in EU6 may lead to a reassessment of the short-term protectiveness of the remedy. If investigations indicate that the DNAPL in the DS Tributary and/or the brook is due to a failure of the existing DNAPL control measures, additional work will be required to correct the situation.

Five-Year Review Report Section
Millenium $TiCl_4$ Plant Source Area (Operable Unit 6)

Executive Summary

The purpose of this five-year review is to determine if the remedy selected to address the contamination at the Millennium $TiCl_4$ Plant Operable Unit of the Fields Brook Superfund Site remains protective. The remedy, which only addressed potential sources of recontamination risk to Fields Brook, included the excavation of PCB and radium-contamination soil and mining residuals. The cleanup was performed from July to October 1999. Excavated soils and mining residuals were sent to Millennium's solid waste industrial landfill located within the Fields Brook watershed. No O&M was required. Millennium's O&M responsibilities for its landfill were and are defined by the permit issued by the Ohio EPA, with the only addition being the expansion of the monitoring parameters to include PCBs and radionuclides. EPA will coordinate with Ohio EPA to ensure that Millenium's RCRA permit incorporates needed restrictions on future land use and protection of the on-site landfill.

The discovery of Therminol within the brook in 2007 led to additional sampling at the Millennium facility and the construction of interceptor trenches between the facility and Fields Brook. The 2007/2008 construction of interceptor trenches along the northern edge of the facility provide protection of the brook should Therminol DNAPL be present in the subsurface. No Therminol has been found within the Millennium facility and the risk from Therminol contamination appears to be limited to the floodplain. Immediate and long-term threats to Fields Brook from contamination at the Millennium $TiCl_4$ plant have been addressed and the remedy remains protective of human health and the environment.

O&M at the Millennium landfill is being performed in conjunction with Millennium's license requirements with the State of Ohio. Leachate and groundwater monitoring results for PCBs and radium have been acceptable.

The assessment of this five-year review found that the remedy implemented for the Millennium $TiCl_4$ plant operable unit is functioning as designed. The scope of the original cleanup was limited to actions necessary to protect Fields Brook from PCB and radium recontamination. No data is available to indicate that the Millennium facility is a current source of PCBs or radionuclides to the brook. No institutional controls are in place; however, EPA will assess the need for institutional controls as a follow-up to this five-year review.

I. Introduction

The purpose of the five-year review is to determine whether the remedy implemented at a site is protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in five-year review reports. Five-year review reports identify any issues and concerns found during the review, if any, and make recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

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

The NCP, 40 CFR Section 300.430(f)(4)(ii) states:

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

The United States Environmental Protection Agency (EPA), Region 5, conducted a five-year review of the remedial actions implemented at the Fields Brook Site in Ashtabula, Ohio. This report section documents the results of the review for the Millennium $TiCl_4$ Plant Source Control Operable Unit. The Ohio Environmental Protection Agency (Ohio EPA) provided support in the development of this five-year review.

This is the second five-year review for the Millennium $TiCl_4$ Plant Operable Unit of the Fields Brook Site. The cleanup of the Millennium $TiCl_4$ Plant was initiated in July of 1999 and completed in October of 1999. EPA issued a letter on June 28, 2000, approving the Completion of Remedial Action Report.

II. Site Chronology – Millenium TiCl4 Plant (OU 6)

Event	Date
$TiCl_4$ Plant constructed by Stauffer Chemical Company and began operations	1956
National Distillers and Chemicals bought and operated $TiCl_4$ Plant	1959
Cabot Titania purchased and began its operation of the $TiCl_4$ Plant	1963
$TiCl_4$ Plant leased to Gulf and Western Industries, Inc.	1972
Gulf and Western purchased the $TiCl_4$ Plant	1975
SCM purchased the $TiCl_4$ Plant	1983
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
SCM changed its name to Millennium Inorganic Chemicals, Inc.	1997
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including the Millennium $TiCl_4$ Plant	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA.	December 1997
Effective date of EPA "stop work" directive issued to Millennium to allow evaluation of project direction pending investigation of radionuclide contamination	June 10, 1998
EPA issued site-wide ESD to address radionuclide contamination at Millennium and in Fields Brook	April 8, 1999
EPA approved the Remedial Design and the Remedial Action Work Plan for the Millennium $TiCl_4$ Plant Operable Unit	July 21, 1999
Commencement of soil and mining residual excavation	July 26, 1999
Completion of excavation	October 15, 1999
EPA approved the Completion of Remedial Action Report	June 28, 2000
EPA approves reduction in PCB and radium monitoring frequency for leachate at the Millennium landfill. Leachate monitoring was reduced	February 4, 2003

Event	Date
from monthly to quarterly.	
Fields Brook PRPs Mobilize to excavate pockets of PCB contamination and DNAPL from Fields Brook	August 20, 2007
Fields Brook PRPs discover oily DNAPL – Determined to be Therminol (Aroclor 1248)	August 29, 2007
EPA issued Unilateral Administrative Order to Millennium to address potential for release of contaminants (response work commenced under verbal order)	October 18, 2007
Millennium installs interceptor trenches on the northern portion of its property as a protective measure to ensure that any DNAPL within the facility can not move to Fields Brook	November – December 2007
Millennium collects soil borings from facility perimeter and from potential DNAPL source areas within its facility	April 2008

III. Background

Physical Characteristics

Millennium Plant II, the $TiCl_4$ (titanium tetrachloride) facility, is located in the south-central portion of the industrialized area near Fields Brook. The structures currently at the site include several process buildings, numerous aboveground storage tanks, a clarifier, and three settling ponds. The western half of the property contains most of the process-related structures, whereas the eastern half remains largely undeveloped and was historically covered by a large pile of mining wastes and filter residue.

Land and Resource Use

The $TiCl_4$ plant was designed, constructed and initially operated by the Stauffer Chemical Company. Construction was completed in 1956. The facility was sold to National Distillers and Chemicals in 1959 and was operated for the next five years by National Distillers (and its affiliates Mallory-Sharon Metals and RMI Titanium). Cabot Titania acquired the plant in 1963 and operated it until 1972, when it was leased to Gulf and Western Industries, Inc. Gulf and Western purchased the plant in 1975. SCM purchased the $TiCl_4$ facility in 1983. The name of the company was changed to Millennium Inorganic Chemicals in 1997. Lyondell Chemical acquired the facility in 2004. The National Titanium Dioxide Company of Saudi Arabia, usually known as Cristal Global, purchased in the facility in 2007.

History of Contamination

At the commencement of operations at the $TiCl_4$ facility, the plant utilized a heat transfer system that used Aroclor-based fluids. This system remained in use until Gulf and Western had pure Aroclor removed from the heat transfer system in 1974 and replaced it with Monsanto PCB-Free Therminol.

Prior to Superfund involvement, there were multiple investigations of contamination at the $TiCl_4$ facility. A Toxic Substances Control Act (TSCA) action in 1983 led to the excavation and disposal of PCB-contaminated sediment from rainwater trenches (660 ppm) and overflow channels (330 ppm). In 1990, SCM identified the presence of PCB contamination (to 41,000 ppm) in plant area soils below the Therminol storage tank. This was reported to the Region V TSCA office. TSCA required the preparation of a work plan and an investigation to determine the extent of soil contamination and identify buried drums. This work was postponed in 1991, to allow coordination with the Fields Brook Source Control RI.

As part of the Source Control RI, the Recontamination Assessment of Millennium identified the Mining Residuals Pile, the Non-Traffic Area and the North Traffic Area as areas that possess the potential to recontaminate Fields Brook. Remedial action was also planned for the Laydown Area; the Plant Process Area; and the Existing Soil Piles, other plant areas that have PCB concentrations greater than the Fields Brook cleanup goal. These three plant areas were determined not to be potential sources of recontamination of Fields Brook. . Descriptions of the six plant areas and analytical results are summarized in the following sections. See Fig. 9 for a facility diagram showing the various areas of historical contamination.

1. Non-Traffic

Site investigations identified PCBs in surface soils (approximately the upper 6 ft) in the west-central portion of the facility, extending north beyond the existing security fence-line. The area extending north beyond the fence-line to the 100-year floodplain is the Non-Traffic Area. PCB concentrations in surface soils in the Non-Traffic Area ranged from 3.1 ppm to 50 ppm. However, a few sampling locations near the old outfall were found to have concentrations of PCBs greater than 50 ppm, and some borings had soils containing greater than 500 ppm.

2. North Traffic Area

Site investigations identified PCBs in surface soils (approximately the upper 6 ft) in the west-central portion of the facility, extending north beyond the existing security fence-line. The area south of the fence-line and north of the Plant Process Area is defined as the North Traffic Area. The surface area in the North Traffic Area was covered with pavement, structures, or gravel. The gravel was placed to prevent further contact with on-site surface soils in this area and to reduce the potential for erosion of the surface soils.
PCB concentrations in surface soils in the North Traffic Area were identified in the range of 3.1 ppm to 50 ppm. However, a few sampling locations near an old outfall had concentrations of PCBs greater than 50 ppm and a small area with PCBs greater than 500 ppm.

3. Laydown Area

The Laydown Area was located immediately south of the concrete pad. The Laydown Area consisted of bare soils and vegetated soils. The average PCB concentration in the Laydown Area was 3.5 ppm, and the maximum concentration was 37.9 ppm (at 1.5 to 3.0

ft depth). The Recontamination Assessment found neither groundwater nor overland erosion to be pathways for recontamination of Fields Brook.

4. Plant Process Area

The Plant Process Area was the active, operating portion of the $TiCl_4$ facility. The Plant Process Area is almost completely covered with either pavement or structures. PCB concentrations in surface soils in the Plant Process Area were identified in the range of 3.1 ppm to 50 ppm. However, a few scattered sampling locations have identified PCB concentrations greater than 50 ppm and a small area was found with PCB concentrations greater than 500 ppm. The primary area with elevated PCB concentrations was associated with the old Therminol system.

5. Soil Piles

The Soil Piles were located on a concrete storage pad in the east central portion of the $TiCl_4$ facility. Standard plant maintenance and upgrades occasionally required the excavation of small amounts of soil. These soils were stockpiled on the concrete pad. Historic sampling results from the excavation locations indicate that some of these soils contained concentrations greater than 50 ppm PCBs. The soil piles were not designated as having the potential to recontaminate Fields Brook.

6. Mining Residuals Pile

The inactive Mining Residuals Pile was located in the eastern portion of the facility between Middle Road and Fields Brook. The pile received "Bevill" exempt mining residuals (e.g., iron hydroxide) from previous plant operations prior to Millennium's operations. As stated in the Bevill exemption, the mining residuals are neither hazardous wastes nor hazardous substances.

Information gathered during the Mining Residuals Pile investigation indicated that the Mining Residuals Pile material was primarily iron hydroxide, with a low moisture content (measured at about 25 to 30 percent, as compared to an approximate field capacity of 50 to 60 percent), and a (disturbed) density ranging between 1.0 and 1.25 tons per cubic yard. Although the mining residuals were not hazardous wastes, sample results revealed that PCBs were present in the Mining Residuals Pile at concentrations ranging from non-detect to 760 ppm.

Initial Response

In 1989, the Fields Brook PRPs were issued a Unilateral Order to complete a Remedial Investigation to identify the sources of contamination, and develop and evaluate cleanup alternatives for the sources of contamination. From 1992 to 1995, the Fields Brook PRPs evaluated 94 areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. Contamination could be caused by discharges from pipes, the

movement of contaminated soil or sediment during rainstorms, and subsurface releases to the brook from flowing groundwater.

As a result of this evaluation, the PRPs identified five industrial properties as sources of contamination to Fields Brook. The industrial properties include Detrex, Millennium Plant II $TiCl_4$ (formerly SCM), Acme Scrap Iron and Metal, RMI Metals, and Conrail. In addition, several sewer systems located to the north and south of Fields Brook were also found to be potential sources of contamination. Detailed information about the types and extent of contamination at the source control operable units, including the Millennium $TiCl_4$ Plant, can be found in the Source Control Remedial Investigation (RI) reports. The final Phase 1 Source Control RI was approved in May of 1997.

In conjunction with the preparation of the Source Control Remedial Investigation report, the PRPs prepared a Source Control Feasibility Study to identify and evaluate cleanup alternatives. The Source Control Feasibility Study was finalized in Juneof 1997. The report described the initial screening of alternatives, the identification of a range of remedial alternatives, and the detailed analysis of the assembled alternatives for each of the five properties and the sewer systems.

Basis for Taking Action

The Source Control Remedial Investigation and Feasibility Study reports form the basis for EPA's cleanup strategy, as selected in the 1997 Source Control ROD. These reports have been included in the information repositories and the Administrative Record. These reports identified five industrial facilities and two sewer systems as sources areas with the potential to recontaminate Fields Brook. A variety of contaminants were identified.

IV. Remedial Actions

As documented in the Record of Decision, the goal of the source area remedial actions at the Fields Brook site was to prevent recontamination of Fields Brook sediment above cleanup goals. Where institutional controls were required, those controls were intended to limit the future use of areas so as to ensure that contamination does not migrate to the Brook.

Remedy Selection

The cleanup of the Millennium $TiCl_4$ plant was developed to address contaminated soils and mining residual piles that were and could potentially be a source of PCBs and radionuclides to the brook. The September 29, 1997 Source Control ROD required the following actions for the Millennium operable unit:

1. excavation of soil with PCB concentrations greater than or equal to 50 ppm. .
2. excavated soils to be disposed at either an on-site or off-site TSCA landfill.
3. following completion of excavation activities, the excavated areas were to be backfilled with clean soil and graded to allow for adequate drainage.
4. remaining surface soils included in the remedial response area were to be contained on-site with a 12-inch soil cover and an erosion control blanket and vegetated to reduce erosion. For traffic and work areas, a geotextile and 6 inches of gravel will be used.

When the Remedial Design for the cleanup of the Fields Brook sediment and the floodplain/wetland soils was approximately 90% complete stage, the EPA received information regarding possible radionuclide contamination in the Ashtabula River and the Fields Brook watershed. EPA issued a "stop work" directive to Millennium (effective June 10, 1998) to halt work on the Remedial Design under the Unilateral Administrative Order pending investigation of radionuclide contamination. EPA evaluated the available data and the site PRP conducted follow-up sampling. The results of the sampling identified unacceptable levels of radium at the Millennium TiCl4 facility and in floodplain/wetland soils near the Millennium facility. EPA determined that radium should be added as a contaminant of concern for the cleanup of the Millennium facility and for the Fields Brook sediment and the floodplain/wetland soils. Because of the presence of radium, specific components of the remedial action were modified to address soils and sediment that contain radium. The April 8, 1999 Site-Wide ESD made changes to the remedy for both Fields Brook and the Millennium TiCl4 property. The ESD required that soil and mining residuals be excavated from the Millennium TiCl4 property to meet an industrial radium cleanup level of 10 pCi/g above background for combined levels of radium-226 and radium-228.

Remedy Implementation

Millennium elected to exceed the requirements of the ROD and proposed the following:

- Excavation of soil and mining residuals containing ≥3.1 ppm total PCBs within the Mining Residual Pile or outside the Facility Stormwater Collection Area (FSCA);
- Excavation of soils containing ≥50 ppm total PCBs inside the FSCA;
- Excavation of soils containing total radium ≥ 12 pCi/g. The 12 pCi/g is based on 10 pCi/g above background, which is estimated at 1 pCi/g Ra-226 background and 1 pCi/g Ra-228 background; and
- Site restoration.

The Remedial Design and the Remedial Action work plan were approved on July 21, 1999.

Instead of waiting for use of the Fields Brook on-site landfill, Millennium had proposed to use its own landfill, which is part of the Millennium complex of facilities within the Fields Brook watershed. EPA evaluated the landfill, consulted with the Ohio EPA and the ODH/BRP, and made the determination that it met the definition of "on-site" and that the construction of the landfill was consistent with the requirements of TSCA. As such, EPA allowed for the disposal of remediation-related material from the Millennium Source Control cleanup.

The physical cleanup at the Millennium $TiCl_4$ property began in July of 1999. Approximately 700,000 cubic yards of PCB and radionuclide-contaminated soil was sent to the Millennium landfill for disposal. Because Millennium was exceeding the ROD-specified cleanup level for PCBs (implementing a 3.1 ppm cleanup instead of a 50 ppm cleanup for areas outside of the

FSCA), Millennium utilized PCB fields screening kits to supplement design estimates of the extent of contamination. This decision was based on the detection limit for the field screening kits and the presence of a clearly visible split between the underlying natural clays in the area and the soil / mining residual fill. PCB field screening results were periodically supplemented with lab verification samples to ensure that the field screening kits were providing results consistent with actual PCB concentrations.

The ROD cleanup requirements for the Millennium $TiCl_4$ plant were based on the risk of recontamination of the brook. The facility was not evaluated for a cleanup based on the current or projected use of the property. Millennium exceeded the ROD-required PCB and radium cleanups and expanded the cleanup to plant areas (within the FSCA) not deemed necessary under the ROD for the protection of Fields Brook.

Field work concluded in October 1999. Remedial Action excavation was officially completed with the approval of the Completion of Remedial Action Report on June 28, 2000. See Figures 10 and 11 for maps showing the extent of excavation.

Institutional Controls

Institutional controls (ICs) are sometimes required by EPA to ensure the protectiveness of a remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. For source areas at the Fields Brook Site, ICs are required to assure long-term protectiveness for any areas that have the potential to recontaminate the brook above cleanup levels or otherwise are required to maintain the integrity of the remedy. The industrial source area facilities are subject to other environmental regulations such as the Resource Conservation and Recovery Act (RCRA) Corrective Action provisions that may require additional cleanup or institutional controls in the future.

ICs are not in place at the Millennium facility; however, EPA will assess the need for ICs at the facility as a follow-up action to this five-year review.

IC Follow up Actions Needed: A review of the need for ICs is needed to determine whether ICs must be implemented so that the remedy functions as intended. EPA will conduct such a review and if required, will ensure that an IC work plan is developed which consists of IC evaluation activities and a draft IC Action Plan to implement the ICs and long-term stewardship procedures. The IC evaluation activities will include a map which depicts the current conditions of the Site and areas which require controls, title work to ensure no prior encumbrances exist on the Site which are inconsistent with the ICs to be implemented and the draft deed restrictions to be implemented. Accordingly, EPA will review the Work Plan and provide direction to the PRPs on how to revise their IC Workplan, if necessary.

Long Term Stewardship: Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for long-term stewardship is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain, monitor and

enforce the ICs as well as remedy components. The O&M plan shall be updated to include procedures to ensure long-term stewardship such as regular inspection of the engineering controls and access controls at the Site and review of the ICs for the Site. The plan should also include a requirement for an annual certification to EPA that ICs are in place and effective. Finally, development of a communications plan and use of the State's one call system shall be explored.

System Operation/Operation and Maintenance

Millennium exceeded the requirements of the ROD and met a cleanup standard of 3.1 ppm total PCBs outside of the Facility Stormwater Collection Area (FSCA). This ensures that erosion off of the property will not cause an exceedance of the PCB cleanup goal (3.1 ppm) in the brook.

For areas inside of the FSCA where there is not a concern that erosion could move PCB contamination to the brook, the 50 ppm total PCB cleanup standard was implemented. This was consistent with the PCB cleanup standard required in industrial areas of the floodplain that are directly adjacent to the brook. The areas within the FSCA where the 50 ppm cleanup standard was used are within the plant area and either paved or covered with a soil cover and gravel. Therefore, the FSCA and the cover provide an additional level of protectiveness. Based on the cleanup performed, EPA determined that no O&M was required at the $TiCl_4$ facility.

The Millennium landfill is still open and in operation. The facility is classified as a solid waste disposal facility and is permitted by the Ohio EPA. Millennium continues to perform their permit-required monitoring and maintenance for Ohio EPA. However, PCBs and radionuclides have been added as parameters to their groundwater and leachate monitoring program, consistent with the August 1999 *Supplemental Monitoring Plan for MRP Disposal.* On February 4, 2003, EPA approved a reduction in the monitoring of PCB and radium in the leachate at the Millennium landfill. Leachate monitoring was reduced from monthly to quarterly.

Copies of PCB and radionuclide monitoring results are provided to EPA. See the attached correspondence containing quarterly radium and PCB analytical results from leachate collected from the Millennium landfill and the results of groundwater monitoring from the landfill perimeter wells.

V. Progress Since the Last Five-Year Review

The first five-year review (2004) found that the remedy as implemented exceeded the requirements of the Source Control ROD and was protective of human health and the environment, in terms of preventing recontamination of Fields Brook. The only follow-up action identified in the first five-year review was the continued monitoring of the Millennium landfill.

However, in the fall of 2005, the Fields Brook PRP group, known as the Fields Brook Action Group (FBAG), reported the results of its required monitoring in the brook. One sediment grid in Exposure Unit (EU) 8 was found to contain PCBs above the allowable residual level. EU8 is located directly north of the Millennium facility. To address this area, the FBAG mobilized to

excavate the area in question. During that excavation, a pocket of DNAPL was found in fill material that had been placed at the site during the original cleanup. A follow-up investigation found more pockets of DNAPL in EUs 6 and 8 and in the DS tributary. The FBAG mobilized to the Site on August 20, 2007 to excavate the pockets of soil and sediment contamination

During excavation work on August 29, 2007, the field crew encountered an oily DNAPL in an excavation, near the Millennium $TiCl_4$ plant. On August 30th, the field crews tried to identify the extent of oil in the brook and in the floodplain alongside the Millennium property boundary. This DNAPL was different than the Detrex chlorinated solvent DNAPL, since it did not have high VOC concentrations and the characteristic Detrex DNAPL odor. According to the FBAG project coordinator, a representative from Millennium took a look at the oil and stated that it wasn't Therminol, the heat transfer fluid historically used at Millennium, because Therminol was black. The oil found in Fields Brook was dark, but had a reddish brown tinge to it. During the week of September 4, additional free product was encountered in excavations and results from the earlier sampling began to arrive. The laboratory results indicated areas of very high PCB contamination in sediment and floodplain soil.

Late on September 6th, the laboratory notified the FBAG that the oil was Therminol (Aroclor 1248 in an oil carrier). FBAG representatives and EPA's field oversight representative expressed concern that storms were approaching. The FBAG sandbagged and tied down tarping over excavation areas in the floodplain. Over the weekend, Ashtabula was hit with heavy storms and high winds. The Fields Brook floodplain received a large volume of water, and additional protective measures were necessary to protect the brook. The FBAG excavated a secondary channel for Fields Brook, dug a surface water intercept channel between the excavation areas and Millennium, pumped water out of the excavation area, and constructed a soil berm when it was determined that there was too much water to handle in real time.

On September 10th and 11th, the FBAG continued to recover from the flooding and continued other work outside of the Therminol-impacted areas. Because of Ohio EPA and EPA concerns regarding the stability of the berms and the volume of bermed contact water, EPA Region 5 issued a verbal order to Millennium to bring in the storage necessary to address the bermed contact water. Millennium mobilized approximately 40 frac tanks to the Site to hold the pumped water. In addition, collection sumps were installed in the Therminol DNAPL excavations and closed these areas off from short-term surface water intrusion. On October 18, 2007, EPA issued a Unilateral Administrative Order (UAO) to Millennium. The UAO requires Millennium to:

1) Perform an investigation to determine all sources of PCBs migrating to Fields Brook from the Millennium plant.
   Prevent discharges of PCB oil from identified seeps and other sources that are identified during investigation at the Millennium property. Contain and remove all PCB liquids, contaminated soil and sediment and conduct proper disposal.

2) Remove, and treat as appropriate, all PCB contaminated liquid. Also remove any PCB contaminated soil, to a level of 50 ppm, within the plant area.

3) Conduct an investigation of the extent of PCB contamination in EU8 and EU6 of the Fields Brook Site.

4) Test and treat as needed any stormwater or groundwater in the ponded area, excavation trench or any other area that stormwater or groundwater from the Site collects. Water should be treated to a level of 0.1 ug/L total PCBs before discharge.

5) If discovered, remove, to a level not to exceed 50 ppm, all PCB-contaminated soil in the floodplain, to achieve an overall average of no greater than 8 ppm total PCBs. The floodplain/wetland cleanup level has been established to be consistent with past remedial requirements at the Site. Remove all PCB contaminated liquid, excluding water, in and below the floodplain.

6) If discovered, remove, to a level of 3.1 ppm total PCBs, all contaminated sediment in Fields Brook and in exposed or easily-erodable areas of the floodplain. The sediment cleanup level has been established to be consistent with past remedial requirements at the Site. Remove all PCB-contaminated free products in and below Fields Brook sediments.

7) Implement a Site Health and Safety plan; and

8) Develop and implement a Site security plan.

Millennium continued the work initiated with the verbal order to control the site and agreed to comply with the terms of the removal UAO. Millennium commenced installation of an interceptor trench along its north fence line to ensure that any subsurface DNAPL that could be present on the Millennium property could not migrate to the floodplain (See Fig. 12). Millennium also commenced the sampling and excavation of contaminated soils and sediment within the floodplain.

The excavation work found small areas of Therminol within cracks in the clay and at depths beyond what had previously been investigated. Excavation also uncovered areas of chlorinated DNAPL contamination, sometimes overlapping with the Therminol contamination. Excavation work continued until September 2008, when Millennium stopped its excavation work believing it had addressed the emergency removal and entered into discussion with EPA regarding additional work that may be needed in EU8. See the Fig. 13 for a map showing the extent of Millennium removal work within the floodplain. Additional information regarding the removal action work in EU8 can be found in the five-year review of OU1/OU4.

In parallel with the work in the floodplain, Millennium collected soil borings from the perimeter of its facility and within the facility in areas of historic PCB contamination. These facility samples did not identify any Therminol DNAPL or any PCB contamination that might be indicative of nearby Therminol DNAPL.

In February of 2009, the FBAG submitted a Focused Feasibility Study for EU8 to EPA. The Focused Feasibility Study provides options for providing long-term protection of the brook in

EU8. EPA anticipates that it will propose a remedy in 2009 to resolve the contamination issues within EU8.

With the interceptor trenches in place along the northern edge of the Millennium facility and no significant PCB contamination found within the facility, no additional source control actions have been identified for the Millennium facility. Water from the interceptor trenches has shown low-level PCB detections, but there have not been any indications of Therminol DNAPL collection within the trenches. At this time, the need for additional follow-up work to address Therminol DNAPL and associated PCB soil and sediment contamination appears to be limited to the Fields Brook floodplain.

Leachate data from the Millennium landfill shows that the Millennium landfill is successfully containing PCB and radium, as no concentrations above action levels have been seen..

VI. Five-Year Review Process

Administrative Components

Potentially interested parties, including the Ohio EPA and Millennium were consulted during the preparation of the five-year review. The members of the review team included:

Terese Van Donsel, RPM, EPA
Leah Evison, RPM, EPA
Peter Felitti, Associate Regional Counsel, EPA
Regan (Sig) Williams, Ohio EPA

Community Notification and Involvement

Notification was given to the Ohio EPA that the five-year review was being prepared. EPA placed an ad in the Ashtabula Star Beacon on December 5, 2008. A copy of the Ashtabula Star Beacon ad is provided in the OU1/OU4 section of this review as Fig. 7. No community interviews were conducted as part of the five-year review.

Document Review/Data Review

The following documents were reviewed:

- Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site, September 29, 1997;

- Completion of Remedial Action Report, dated May 2000;

- O&M Monitoring Results from the Millennium landfill;
- Unilateral Administrative Order for Emergency Response, dated October 18, 2007;
- Results from 2008 soil borings;
- April 16, 2009 consultation with James Mitchell (EPA) regarding radionuclide cleanup standards;
- Water quality data from interceptor trenches; and
- Millennium monthly reports.

A site inspection of the Fields Brook Site, including the Millennium property, was conducted on February 25, 2009.

VII. Technical Assessment

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

Yes, there is no data to indicate that the Millennium property is a current source of contamination to Fields brook. However, no ICs are in place and EPA will assess the need for ICs as a follow-up action to this five-year review. Since Millenniium exceeded ROD requirements by excavating to a stricter cleanup level, ICs are not necessary to restrict the future use of the entire facility in order to protect against recontamination of the brook. However, EPA will assess whether ICs are needed to protect certain remedy components.

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

Yes, there has been no change to the PCB or radium cleanup requirements for the facility. The Remedial Action Objectives for the Millennium $TiCl_4$ Property are still valid.

The Source Control ROD was issued in 1997. The ROD and supporting risk assessment assumed a carcinogenic slope factor of 7.7 (mg/kg)/day for PCBs. A slope factor is a means of indicating the relevant potency of a cancer causing chemical. Since issuance of the Source Control ROD, the recommended slope factor for PCBs has been modified. On November 9, 1999, EPA issued updated regulations regarding PCB toxicity, recommending a range of dose response slopes. The new regulations changed the single-dose caner potency factor of 7.7 (mg/kg)/day to a range from 0.07 (mg/kg)/day (lowest risk and persistence) to 2.0 (g/kg)/day (high risk and persistence). The slope factor used for the development of the Fields Brook cleanup standards is slightly more conservative than that currently used. No additional remedial actions are necessary based on the reevaluation of PCB toxicity.

On April 11, 2000, EPA issued Directive 9200.4-35P, "Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A, I, Criterion 6(6)." This guidance recommends the cumulative evaluation of radionuclides to ensure that the residual concentration of radionuclides does not exceed the radium standard identified in 40 CFR 1912.12 (OSWER Directive 9200.4-25). EPA has evaluated the types and concentrations of the radionucludes that were present at the site and has determined that radium-226 and radium-228 were appropriately identified as the primary radionuclide contaminants of concern. Any thorium contamination would have been co-located with the radium, and thus sufficiently addressed at the time of cleanup. The EPA has found that the radionuclide cleanup standards implemented at the site remain protective.

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

Initially yes, but after investigation no. The results of verification sampling from the original cleanup at the $TiCl_4$ facility provided documentation that a thorough cleanup was performed. However, the discovery of Therminol in Fields Brook caused concern that Therminol could be present at the facility at depths below what was previously investigated. EPA has reevaluated the condition of the Millennium facility to ensure that there is no Therminol source present that could threaten Fields Brook. Interceptor trenches were installed as a protective measure. Soil sampling within the facility has not found any Therminol or concentrations of PCBs indicative of Therminol impact. At this time, there does not appear to be contamination within the facility that poses a threat to Fields Brook.

VIII. Issues

Institutional Controls

EPA will assess whether Millenium should install institutional controls and a plan to ensure long-term steweardship at their property to protect remedial controls. EPA will also coordinate with Ohio EPA to ensure that the Millennium on-site landfill meets permit requirements for institutional controls.

IX. Recommendations and Follow-up Actions (Millenium $TiCl_4$ Plant Source Area, OU6)

Recommendation/Follow-up Action for Millenium TiCl4 Plant Source Area (OU 6)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Assess the need to implement institutional controls at their property to restrict access and protect remedial controls. If required by EPA, implement ICs and develop a plan to monitor ICs to ensure long-term stewardship.	EPA Millenium	EPA	12/15/2009 If required by EPA, IC Work Plan shall be submitted by 6/30/2010	N	Y

XI. Protectiveness Statement

The remedy as implemented exceeded the requirements of the Source Control ROD and is protective of human health and the environment in the short term pursuant to the remedial action objective of preventing recontamination of Fields Brook in excess of the PCB and radium cleanup goals. However, the implementation of Institutional Controls (ICs) may be necessary. If ICs are required by EPA, long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Although the source control remedial actions were not developed to address human health or ecological risks within each source control area, no human health or ecological concerns have been identified regarding the Millennium cleanup. The remedial action utilized a cleanup level of 3.1 ppm total PCBs for areas outside of the FSCA. PCB field screening kits were used in conjunction with periodic laboratory confirmation to verify the extent of necessary PCB excavation. The target cleanup level of 3.1 ppm total PCBs is acceptable for the current industrial land use. Within the FSCA, Millennium voluntarily addressed soils that had PCB contamination at or above 50 ppm total PCBs. As it is beyond of the scope of the Fields Brook source control cleanup, an evaluation was not performed to determine the adequacy of the 50 ppm total PCBs cleanup to address human health and ecological risk issues from subsurface contamination within the FSCA. In terms of radionuclide contamination, verification sampling showed that Millennium exceeded the radium cleanup level of 10 pCi/g above background. All grids met this industrial criterion, and all grids except for one met the residential radium cleanup level of 5 pCi/g above background.

Five Year Review Report Section
North Sewers Source Area (Operable Unit 7)

Executive Summary

The purpose of this five-year review is to determine if the remedy selected to address the contamination problem at the North Sewer Operable Unit of the Fields Brook Superfund Site is protective of human health and the environment. The remedy included the closure, grouting and replacement of three storm and industrial outfall process sewers that contained sediment with elevated levels of PCBs and other organic constituents

The assessment of this five-year review found that the remedy is functioning as designed. The scope of the cleanup was limited to actions necessary to protect Fields Brook from recontamination from sediment within the sewers. Since the sewers have been closed and grouted and are no longer in use, there is no mechanism for any sediment within the sewers (now rendered immobile) to move to the brook. The immediate and long-term threats to Fields Brook from contamination in the North Sewers have been addressed and the remedy implemented for this operable unit is protective of human health and the environment in terms of preventing recontamination to Fields Brook. Institutional controls are in place to prevent activities that would disrupt or disturb the grouted and sealed sewer pipe. No O&M monitoring is required.

I. Introduction

The purpose of the five-year review is to determine whether the remedy implemented at a site is protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in Five-Year Review reports. Five-Year Review reports identify any issues and concerns found during the review, if any, and make recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

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

The NCP at 40 CFR Section 300.430(f)(4)(ii) states:

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

The United States Environmental Protection Agency (EPA), Region 5, conducted a five-year review of the remedial actions implemented at the Fields Brook Site in Ashtabula, Ohio. This section of the report documents the results of the review for the North Sewers Source Control Operable Unit. The Ohio Environmental Protection Agency (Ohio EPA) provided support in the development of this five-year review.

This is the second five-year review for the North Sewers Operable Unit of the Fields Brook Site. The cleanup of the North Sewers was initiated in September 2000 and completed in October of 2000. EPA issued a letter on May 14, 2001, approving the completion of Remedial Action and the submittal of the Remedial Action Report. The first (2004) Five-Year Review found the remedy for this OU to be protective of human health and the environment, in that the grouting of sewer sediment prevents its movement to Fields Brook.

II. Site Chronology – North Sewers (OU 7)

Event	Date
EPA initiated negotiations for the performance of a Source Control RI/FS.	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigated possible source control areas.	1992 – 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including the North Sewers	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the North Sewers RD/RA.	December 1997
Approval of Remedial Design for North Sewers	June 1, 2000
Abandonment of Sewer Lines	September – October, 2000
EPA approves Completion of Remedial Action Report	May 14, 2001
EPA completes First Five-Year Review	June 7, 2004

III. Background

Physical Characteristics

The North Sewers are located in the northwest portion of the industrialized area near Fields Brook (Fig. 14). Three sewers were identified as part of this operable unit:

- Combined Sewer - The RI identified this sewer as a 48-in diameter reinforced concrete combined storm and facility outfall sewer. The sewer was later found to be 42 inches in diameter. The sewer is approximately 2,400 ft in length and runs along the west side of State Road, north of Fields Brook. The sewer is partially blocked in certain parts by debris which includes bricks, wood, sediment, and pieces of concrete. This sewer is commonly referred to as the North Sewer.

- Storm Sewer - The RI identified a 5-in. vitrified clay storm water sewer that is approximately 250 ft in length. It runs from the southwest corner of the intersection of State Road and East 6th Street, south to join the north end of the combined sewer on the west side of State Road, north of Fields Brook. This sewer was later determined to have a 6-in. diameter.

- Detrex Outfall Sewer - This sewer connected the Detrex facility with the combined sewer. A portion of the sewer was constructed of PVC and was relatively free of sediment. This PVC sewer section discharged to a manhole that contains an older section of sewer line that crosses under State Road to connect to the combined sewer.

Land and Resource Use

- Combined Sewer - The North Sewer accepted surface and facility outfall water, which at several locations included both plant surface water, process water and sanitary effluent. On-site treatment of sanitary waste was handled by all facilities that discharged to the sewer. No untreated effluent water entered the combined sewer system. The combined sewer collected outfall water from three facilities (the former Occidental Chemical facility, RMI Sodium, and Detrex) through three outfalls located at East 6th Street and State Road.

- Storm Sewer - This sewer line collected storm water from the RMI Sodium property and discharged into a manhole located at the former Occidental Chemical outfall.

- Detrex Outfall Sewer - This sewer transferred water from the Detrex water treatment system to the combined sewer.

History of Contamination

The Source Control Remedial Investigation found that sediment in these storm and outfall process facility sewers were a source of potential recontamination to Fields Brook.

- Combined Sewer - Sediment samples from the combined sewer had concentrations of benzo(z)pyrene and hexachlorobenzene that ranged from 1.9 ppm to 11 ppm and 13 ppm to 5,800 ppm, respectively.

- Storm Sewer - A sediment sample from this storm sewer had a 5.4 ppm concentration of benzo(a)pyrene.

- Detrex Facility Outfall Sewer - A sediment sample was collected within a manhole on the east side of State Road in the northwest corner of the Detrex property.

- This manhole is between the Detrex facility sewer and the combined sewer that eventually discharges to Fields Brook on the west side of State Road. The sediment sample was collected from the bottom of the manhole where the sediment accumulates. This sediment had concentrations of 1,1,2,2-tetrachloroethane, 1,1,-dichloroethene, tetrachloroethene, benzo(a)pyrene, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, heptachlor and gamma-BHC (Lindane).

Initial Response

In late 1986, the EPA began negotiating with a number of Potentially Responsible Parties (PRPs) to conduct the source control (then considered OU2) RI/FS activities and sediment (OU1) design activities. In 1989, the PRPs were issued a Unilateral Order to design a remedy for the Fields Brook sediments, complete a RI to identify the sources of contamination, and develop and evaluate cleanup alternatives for the sources of contamination. From 1992 to 1995, the PRPs evaluated 94 areas of potential contamination within the Fields Brook watershed to determine whether they were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the brook from flowing groundwater.

As a result of this evaluation, the PRPs identified five industrial properties as potential sources of recontamination to Fields Brook. The industrial properties include Detrex, Millennium Plant II $TiCl_4$ (formerly SCM), Acme Scrap Iron and Metal, RMI Metals, and Conrail. In addition, several sewer systems located to the north and south of Fields Brook were also found to be potential sources of contamination. Detailed information about the types and extent of contamination at the source areas can be found in the Source Control RI reports. The final Phase 1 Source Control RI was approved in May of 1997.

In conjunction with the preparation of the Source Control Remedial Investigation report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June 1997. The report describes the initial screening of alternatives, the identification of a range of remedial alternatives, and the detailed analysis of the assembled alternatives for each of the five properties and the sewer systems.

Basis for Taking Action

The Source Control RI and FS reports form the basis for EPA's cleanup strategy, as selected in the 1997 Source Control ROD. These reports have been included in the information repositories and the Administrative Record. These reports identified five industrial facilities and two sewer systems as sources areas with the potential to recontaminate Fields Brook. A variety of contaminants were identified.

IV. Remedial Actions

The selected remedy for the North Sewer source control area required the cleaning of the sewers. If the sewers could not be cost-effectively cleaned, sewer sections would be fully grouted to contain sediment and debris within the pipe. Specifically, the remedy included the following activities.

a) Cleaning of Sewer Lines and Catch Basins

For portions of the sewer that could be cleaned, the remedy required the removal of sediment and debris from inside the sewer lines and the associated catch basins to reduce the potential of recontamination of the Fields Brook sediments in excess of cleanup goals (CUGs). Sediment removal would be accomplished by cleaning the inside of the sewer using manual and mechanical techniques to remove sediment, followed by rinsing. Selection of the equipment to be used was to be based on the size and conditions of the sewer lines at the time of work activities. The equipment selected would be capable of removing sediments, dirt, grease, rocks, and other foreign materials. Mechanically powered cleaning equipment consists of belt-operated buckets and a power rodding machine that are powerful enough to remove sediments and large debris from the sewer lines. Rinsing equipment would include a high velocity gun for washing and scouring sewer walls and floors.

b) Sediment Containment

Sewer sections that could not be cost-effectively cleaned were to be filled with grout to contain contaminated sediment and debris. The sediments in this sewer segment would be contained by filling the sewer pipe with a cement grout to restrict flow in the sewer and prevent migration of sediments into Fields Brook. The sewer segment would be plugged at both ends before grouting proceeds. Lean cement grout or fly ash grout would be used to grout the inner space of the sewer. Grouting would be accomplished from both ends and at several locations along the sewer pipe. Grout holes would be drilled at the crest of the sewer pipe through the overburden. Grout pipes would be inserted through the grout holes to pump the grout. Vents would be installed to allow air and water in the sewer to escape as it is replaced with the grout material. Sections of the existing sewer line that were to be grouted were to be abandoned and replaced with a new sewer diversion line.

c) Institutional Controls

Institutional controls were to be implemented to control excavation into sewers that have been sealed to contain contaminants and to define handling and disposal requirements for such sewers. Institutional controls which have been put in place to control excavation into the North Sewer and disturbance of grouted material appear to be effective; however, the ICs must be further evaluated to ensure long-term protectiveness.

Remedy Implementation

The PRPs evaluated the possibility of cleaning and restoring the existing sewers. However, because of the depth and condition of the sewers and the large amount of utility lines running near the sewers, the PRPs determined that it was more practical to close the sewers and build new sewer lines. The Source Control ROD accepted either approach. The remedial design for the abandonment work was approved on June 1, 2000. Based upon discussions held during the remedial design process, it was agreed that grouting to a minimum depth of 6 inches would sufficiently fixate the accumulated sediment. This would be done in conjunction with plugging the end of the combined sewer and all connections, and constructing replacement sewer lines.

Prior to the abandonment of the North Sewer, each facility completed rerouting of stormwater and wastewater that formerly discharged into the North Sewer. Because the construction of replacement storm sewers was not within the scope of the remedial action, EPA and the USACE did not oversee the design and construction of the new sewer lines.

The abandonment of the North Sewers was completed during September and October of 2000, with the Completion of Remedial Action report approved on May 14, 2001.

The former Detrex outfall was abandoned on Detrex property when the new outfall was installed. The old line was not grouted, but a large section was cut and removed to allow for the installation of the slurry wall on the Detrex property. Connections to a former RMI outfall and a former Occidental Chemical outfall were accessible through manholes, and closed by brick and mortar. The 6-in. storm sewer was plugged with a commercial expansion plug. The 6-in. storm sewer was located in a common manhole with the former Occidental Chemical outfall. After the brick and mortar closure of the Occidental Chemical and RMI outfalls had cured, concrete was poured into the manholes to a level corresponding with the ground surface.

In addition to the closure of connections for sewers entering the North Sewer, the North Sewer outfall to Field Brook was also closed. As part of the remedial action, a wooden form was constructed around the North Sewer outfall at Fields Brook and the pipe was filled with concrete, forming a plug five feet in length.

Within the North Sewer itself, lean concrete grout was poured into the sewer through vertical access shafts. At each shaft enough grout was poured into achieve a depth of 6 inches, sufficient to immobilize sediment within the sewer. In addition to the grouting, concrete was poured at three access shaft locations to ensure adequate sewer closure.

Institutional Controls

Institutional controls (ICs) are sometimes required by EPA to ensure the protectiveness of a remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. For source areas at the Fields Brook Site, ICs are required to assure long-term protectiveness for any areas that have the potential to recontaminate the brook above cleanup levels or otherwise are required to maintain the integrity of the remedy. ICs are required at the

North Sewer line portion of the North Sewers OU because contaminated sediment is contained within the sewer.

Currently the North Sewer OU is subject to the institutional controls listed in the table below:

Map of Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions.	**IC Objective**	**Title of IC Instrument Implemented**
North Sewer line: Length of North Sewer from the DS Tributary to the old outfall at Fields Brook. Sewer length is approximately 2,400 feet.*	Provide advisory information to workers who may encounter grout within sewer. Prohibit actions which could disturb the grouted material within the combined sewer.	Deed notice is in place. (Long-term stewardship plan is needed.)

* A map which depicts the north sewer line will be developed as part of the long-term stewardship plan.

Current Status of Access and Use Restrictions (Institutional Controls)

The ICs were put in place in September 2004. In a letter dated November 30, 2004, Richard Mason (RMI) provided documentation to EPA regarding a notice that had been placed on the three deeds that contain the combined North Sewer. The IC explains the work that was performed on the sewer and states:

> *"that the public be notified of such work and made aware that no construction or other activity should be undertaken which would disrupt, disturb, interfere with or otherwise breach such grouted and sealed sewer pipe".*

Considering the relatively low concentration of contaminants that are present within the grouted sediment, U. S. EPA has determined that the deed notices provide sufficient protectiveness for the maintenance of the implemented remedy. Institutional controls which have been put in place to control excavation into the North Sewer and disturbance of the grouted material appear to be effective; however, the ICs must be further evaluated to ensure long-term proteciveness. A plan shall be prepared to ensure long-term stewardship of the ICs.

System Operation/Operation and Maintenance

The North Sewers have been abandoned and no further monitoring or maintenance was required. The sewer ends and connections were capped, the length of the sewers was grouted to prevent future use, and replacement sewers were constructed.

V. Progress Since the Last Five-Year Review

The 2004 five-year review found that the abandonment of the sewers has addressed concerns about accumulated sediment moving from the sewers to the brook. The remedy was found to be protective of Fields Brook. The first five year review documented that institutional controls were not yet in place and that EPA had required the PRPs to coordinate with landowners and use best efforts to place deed notices. The controls are now in place, as documented above.

This is the second five-year review for the Fields Brook Site. There is no information that would suggest that the remedy is no longer protective and that sediment within the sewer lines is mobilizing and moving towards the brook.

However, the discovery of contamination at and near the North Sewer outfall at Fields Brook has raised the possibility that the North Sewer could be serving as a conduit for transport of chlorinated dense non-aqueous phase liquid (DNAPL) to the brook.

The EPA RPM noted chlorinated DNAPL at the North Sewer outfall at Fields Brook during a December 2006 site visit. Detrex investigated the North Sewer area and installed test trenches, which were placed perpendicular to the North Sewer and exposed the soil below the structure. No indication of DNAPL material moving in or below the sewer line was found. Contamination appeared to be limited to the end of the North Sewer, within the floodplain. The FBAG agreed to excavate impacted material from the area and install and sump to collected chlorinated DNAPL and impacted water. Detrex was to maintain the sump and treat extracted water in its on-site water treatment system.

In December 2008, Ashtabula County began a project to replace the State Road Bridge. During this work additional chlorinated DNAPL was found in the area around the North Sewer outfall, in close proximity to the sump. EPA will continue to evaluate concerns as part of the Detrex source control evaluation.

The work completed as part of the remedial action at the North Sewers operable unit is protective as it prevents the movement of sediment within the North Sewer to the brook. Issues regarding the potential that the North Sewer may be acting as a conduit for DNAPL migration will be evaluated as part of the Detrex source control evaluation.

VI. Five-Year Review Process

Administrative Components

Potentially interested parties, including the Ohio Environmental Protection Agency (Ohio EPA) and the potentially responsible parties for the North Sewer source control area, were consulted during the preparation of the five-year review. The members of the review team included:

Terese Van Donsel, RPM, EPA
Leah Evison, RPM, EPA
Regan (Sig) Williams, Ohio EPA

Community Notification and Involvement

Notification was given to the Ohio EPA that the five-year review was being prepared. EPA placed an ad in the Ashtabula Star Beacon on December 5, 2008. A copy of the Ashtabula Star Beacon ad is provided in Fig. 7. No community interviews were conducted as part of the five-year review.

Document Review/Data Review

The following documents were reviewed:

- Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site, September 29, 1997;
- First Five-Year Review, June 7, 2004;
- Correspondence from Fields Brook Action Group and Detrex regarding DNAPL contamination in EU6 of Fields Brook;
- Correspondence from RMI regarding Institutional Controls; and
- FBAG monthly reports.

A site inspection of the Fields Brook Site, including the North Sewers Operable Unit, was conducted on February 25, 2009.

VII. Technical Assessment

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

Yes. The abandonment of the sewers has addressed concerns about accumulated sediment moving from the sewers to the brook. Since the North Sewers have been closed and grouted, historical sediment and debris accumulated in the sewers can no longer flow into Fields Brook. ICs are in place to prevent disturbance of the grouted sediment within the combined sewer. However, a plan is required to ensure that the ICs are maintained and monitored. Concerns that the North Sewer structure could be acting as a conduit for DNAPL movement from the DS Tributary area, including the need for any additional ICs, will be evaluated as part of the Detrex source control evaluation.

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

Yes. The Remedial Action Objective for the North Sewers is still valid. The goal of the cleanup was to eliminate sources of possible recontamination to Fields Brook. Issues related to cleanup standards are not relevant to this cleanup, because historical sediment within the North Sewer has been immobilized.

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

No. The remedy is protective and ICs are in place.

VIII. Issues

The remedial action is sufficient to protect the brook from recontamination from accumulated sediment in the sewers. A plan must be developed to ensure long-term stewardship of the ICs.

IX. Recommendations and Follow-up Actions (North Sewers Source Area, OU7)

Recommendation/Follow-up Action for North Sewers Source Area (OU 7)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Implement a plan to ensure long-term stewardship	North Sewer property owners	EPA	Plan shall be submitted by 3/31/2010	Y	Y

IX. Protectiveness Statement

The remedy implemented for the North Sewers Source Control operable unit is protective of human health and the environment pursuant to the remedial action objective of preventing recontamination of Fields Brook. Institutional controls have been put in place to control excavation into the North Sewer and disturbance of the grouted material. Their long-term stewardship is required to ensure continued protectiveness.

Although the source control remedial actions were not developed to address human health or ecological risks within each source control area, no human health or ecological concerns have been identified regarding the grouting and containment of sediment within unused sewers. Institutional controls have been put in place to control excavation into the North Sewer and disturbance of the grouted material.

Issues regarding potential movement of chlorinated DNAPL within or alongside the North Sewer structure will continue to be investigated by EPA as part of the Detrex source control evaluation, including any need for additional ICs.

Five Year Review Section
Acme Scrap Iron and Metals and South Sewers Source Area (Operable Unit 8)

Executive Summary

The purpose of this five-year review is to determine if the remedies selected to address the contamination at the Acme Scrap Iron and Metal operable unit and the South Sewer operable unit of the Fields Brook Superfund Site are protective of human health and the environment. The remedies required the excavation of PCB-contaminated soil and the cleaning of the sewers, with long-term monitoring to ensure that residual PCB-contaminated soil and sediment does not move into Fields Brook in excess of cleanup goals. The scopes of the cleanups were limited to actions necessary to protect Fields Brook from recontamination.

This five-year review has found that the remedies selected for the Acme Scrap and South Sewers source control operable units are functioning as designed. The monitoring of sediment from stormwater runoff has demonstrated that the risk of recontamination has been abated. The immediate and long-term threats to Fields Brook from contamination at the Acme Scrap and South Sewers operable units have been addressed and the remedies have been determined to be protective of human health and the environment. No additional monitoring is required, and no additional five-year reviews are required for this Operable Unit.

I. Introduction

The purpose of the five-year review is to determine whether the remedy implemented at a site is protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in Five-Year Review reports. Five-Year Review reports identify any issues and concerns found during the review, if any, and make recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

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

The NCP at 40 CFR Section 300.430(f)(4)(ii) states:

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

The United States Environmental Protection Agency (EPA), Region 5, conducted a five-year review of the remedial actions implemented at the Fields Brook Site in Ashtabula, Ohio. This report section documents the results of the review for the Acme Scrap Iron and Metal Source Control Operable Unit. The Ohio Environmental Protection Agency (Ohio EPA) provided support in the development of this five-year review.

This is the second five-year review for the Acme Scrap Operable Unit of the Fields Brook Site. The cleanup of the Acme Scrap property was initiated and completed in September 2000. EPA issued a letter on March 17, 2003, approving the completion of the remedial action and the submittal of the Remedial Action Construction Quality Assurance Report.

The purpose of the cleanup at the Acme Scrap operable unit was to address PCB-contaminated soils that had the potential to erode into Fields Brook. In addition, the Acme remedial action included the cleaning of the property's storm sewers, commonly known as the South Sewers, to remove accumulated sediment that could adversely impact Fields Brook. The storm sewer from the Acme property still empties into Fields Brook.

Sediment that accumulates in the discharge pipe was collected with a temporary weir and was analyzed for PCBs. Since not all eroded soils are collected in the storm sewer system, samples were also collected from a drainage ditch on site. Monitoring commenced in 2001. Frequency of sampling was initially every six months. After three sampling events, monitoring was reduced to yearly.

II. Site Chronology – Acme (OU 8)

Event	Date
Acme Scrap property owned by U.S. government	Late 1940's
Site operated as a calcium carbide manufacturing facility	1943 - 1952
Site was vacant	1952 - 1974
Acme purchased the property	1974
EPA initiated negotiations for the performance of a Source Control RI/FS	1986
EPA issued a Unilateral Administrative Order for performance of a Source Control RI/FS	1989
Fields Brook PRPs investigate possible source control areas	1992 - 1995
EPA approved the PRPs' Source Control RI	May 1997
EPA approved the PRPs' Source Control FS	June 1997
EPA issued the Source Control ROD, which addressed 6 individual source control areas, including Acme Scrap and the South Sewers	September 29, 1997
EPA issued a Unilateral Administrative Order for the performance of the Acme Scrap and South Sewers RD/RA	December 1997
EPA approved the Remedial Design for the Acme Scrap and South Sewers operable units	August 30, 2000
Performance of the Remedial Action	September 2000
Acme Scrap purchased by Lakeside Industrial Park and Railyard, Inc.	December 2001
EPA approved the 12/28/2000 Remedial Action Construction Quality Assurance Report for Acme Scrap and South Sewers	March 17, 2003

Event	Date
Routine monitoring of sediment from stormwater runoff	September 2001 – September 2006

III. Background

Physical Characteristics

The Acme property is located in the southwest portion of the industrialized area near Fields Brook (Fig. 15). Structures at the site include former manufacturing plant buildings, loading and unloading areas, drum storage areas, and an oil retention lagoon.

The South Sewer operable unit consists of a 36 to 48-inch diameter sewer east of State Road that runs between the Acme facility and Fields Brook, as well as a 30-inch outfall sewer that connects the former oil retention pond on the Acme property to the catch basin at the corner of the intersection of State and Middle Roads. See Figure 16.

Land and Resource Use

The site is currently vacant, but was previously a scrap recycling facility. The site was owned by the U.S. Government in the late 1940's and was later sold to National Carbide Corporation. Specific industrial activities by the U.S. Government and National Carbide are not known. However, the Acme site was operated as a calcium carbide manufacturing plant from 1943 until 1952. The facility was then vacant until 1974, when Acme purchased the property and used it as a recycling facility. The property was purchased in December 2001 by Lakeside Industrial Park and Railyard, Inc. (Lakeside). Lakeside has leased the northern section of the property for the operation of a cement/asphalt plant and is evaluating possible industrial development options for the remainder of the property, which includes the response area.

History of Contamination

In the past, Acme dismantled and recycled transformers to recover copper, aluminum, and steel for resale as scrap metal. On several occasions, the cutting operation used to dismantle the transformers would set the residual oil on fire. Oil containing PCBs may have been released into the environment from the transformers during this process. A preliminary assessment of the Acme facility in 1985 identified the chemicals of interest to include PCBs and several metals, including aluminum, arsenic, copper, iron, lead, mercury and zinc.

Initial Response

In late 1986, the EPA began negotiating with a number of Potentially Responsible Parties (PRPs) to conduct the source control RI/FS activities. In 1989, the PRPs were issued a Unilateral Order to design a remedy for the Fields Brook sediments, complete a RI to identify the sources of contamination, and develop and evaluate cleanup alternatives for the sources of contamination.

From 1992 to 1995, the PRPs evaluated 94 areas of potential contamination within the Fields Brook watershed to determine whether these areas were a source of past contamination or could cause future recontamination once the Brook cleanup is underway. Contamination could be caused by discharges from pipes, the movement of contaminated soil or sediment during rainstorms, and subsurface releases to the brook from flowing groundwater.

As a result of this evaluation, the PRPs identified five industrial properties as potential sources of re-contamination to Fields Brook. The industrial properties include Detrex, Millennium Plant II TiCl4 (formerly SCM), Acme Scrap Iron and Metal, RMI Metals, and Conrail. In addition, several sewer systems located to the north and south of Fields Brook were also found to be potential sources of contamination. Detailed information about the types and extent of contamination at the source areas, including Acme, can be found in the Source Control Remedial Investigation (RI) reports. The final Phase 1 Source Control RI was approved in May of 1997.

In conjunction with the preparation of the Source Control RI report, the PRPs prepared a Source Control FS to identify and evaluate cleanup alternatives. The Source Control FS was finalized in June 1997. The report describes the initial screening of alternatives, the identification of a range of remedial alternatives, and the detailed analysis of the assembled alternatives for each of the five properties and the sewer systems.

Basis for Taking Action

Evaluations of PCB concentrations in the storm sewer system at the Acme property and in the surface soils led EPA to believe that Acme was a potential source of recontamination to the brook. Remedial actions for the Acme Scrap Iron and Metal property and the associated South Sewers were selected in the 1997 Source Control ROD.

IV.Remedial Actions

As documented in the Record of Decision, the goal of the source area remedial actions at the Fields Brook site was to prevent recontamination of Fields Brook sediment above cleanup goals. Where institutional controls were required, those controls were intended to limit the future use of areas so as to ensure that contamination does not migrate to the Brook.

Remedy Selection - Acme Scrap and Iron Property

The selected remedy for the Acme property included the excavation of soil with PCB concentrations greater than or equal to 50 ppm. The ROD called for the excavated soil to be either disposed of at the on-site landfill or at an off-site landfill, whichever was more cost-effective. More specifically, the selected remedy included the following components:

a) Clear Scrap, Debris and Vegetation / Remove Physical Hazards

In order to implement the remedial action, scrap, debris and vegetation were to be cleared in response and work areas. Physical hazards (i.e., unstable building sections) that could threaten workers also had to be addressed prior to implementation of the remedial action.

b) Excavation of Soils with Total PCB Concentrations ≥ 50 ppm

This ROD required excavation of soils with total PCB concentrations greater than or equal to 50 ppm. Based on existing data, it appeared that limiting excavations to a depth of approximately 1 foot would remove all TSCA-regulated soil. However, the remedy required removal of all TSCA-regulated soils (≥ 50 ppm PCBs), regardless of depth. Therefore, if areas of additional contamination were to have been identified, the excavation depth would have been adjusted accordingly. The ROD specified that additional soil samples were to be collected during the remedial design phase to further delineate the design remedial response area and ensure that the PCB contamination is not present on other areas of the Acme property.

Upon excavation, the soil was to be placed in lined roll-off containers or dump trucks for transportation to either the on-site landfill or to an off-site landfill. Verification sampling could be required to ensure removal of TSCA-regulated soils. Following completion of excavation activities, the excavated areas were to be backfilled with clean soil and graded to allow for adequate drainage. Any disturbed areas not receiving an erosion control cover were to be graded and seeded, as necessary.

c) Refinement of Area to Be Covered

As part of the remedial design, soil loss calculations were to be reviewed to finalize the area to be covered. The cover areas have been developed based on current operations and include the proposed excavation area since it is located within the cover interior. The areas may be altered during remedial design if assumptions on future operations are revised and/or the remedial design includes consolidation.

d) Construction of Cover, Surface Drainage Controls

For the cover areas, the erosion control cover materials consists of a 12-inch thick layer of clean soil, an erosion control blanket and will be vegetated to reduce the potential for erosion. For anticipated future traffic areas, a 6-in. gravel layer underlain by geotextile was used instead of the soil.

Remedy Selection - South Sewers

The South Sewers discharge into Fields Brook and potentially contained contaminated sediment. There was concern that such accumulated material could move into the brook and lead to exceedances of sediment and soil cleanup standards. The Source Control ROD identified the following actions as being necessary to eliminate the risk of recontamination of Fields Brook from the South Sewers:

a) Removal of sediment and debris from inside the sewer lines and the associated catch basin.

b) For any portions of sewers that were blocked and difficult to clean, these sections were to be closed off, and the sediment within the sewers contained.
The sediments in these sewer segments was to be contained by filling the sewer pipe with

a cement grout to restrict flow in the sewer and prevent migration of sediments into Fields Brook.

c) For areas where sewers were to be closed-off, replacement sewers were to be constructed to connect the remaining sections of the sewers that have been cleaned.

Remedy Implementation - Acme Scrap Iron and Metal

The cleanup requirements at the Acme Scrap property were based on erosion of Acme soils through the storm sewer system to Fields Brook. Therefore, the cleanup standard was determined based on an evaluation of anticipated erosion from the property. Pre-design studies concluded that soils with contamination equal to or greater than 50 ppm would need to be removed to ensure that erosion would not lead to an exceedance of the PCB cleanup goal at the brook. Design studies also found that with the removal of soils with 50 ppm or greater PCBs, no cover would be required to ensure erosion would not exceed the cleanup standard at the brook.

Because the Acme Scrap Iron and Metal was an operating facility, EPA encouraged the Acme PRPs to expand the cleanup beyond what was required for Fields Brook to reduce on-site PCB concentrations in soils below the 50 ppm level that was determined to be required to protect Fields Brook. This additional work was beyond the scope of the Fields Brook source control cleanup. The Acme Scrap PRPs elected not to expand the soil excavation beyond those areas with 50 ppm.

As part of the cleanup design, supplemental sampling was performed to clearly delineate PCB contamination areas so that verification sampling would not be necessary. EPA approved the remedial design on April 17, 2000 and the Remedial Action Work Plan on August 30, 2000. Construction commenced on September 11, 2000 and was completed on September 26, 2000. Approximately 2,085 cubic yards of PCB-contaminated soil was excavated and disposed in the Fields Brook on-site landfill. EPA issued a letter on March 17, 2003, approving the completion of the remedial Action and the submittal of the Remedial Action Report.

Remedy Implementation - South Sewers

As part of the remedial design for the South Sewers (which was included as part of the Acme Scrap RD), the PRPs for the South Sewers made a video inspection of the sewers and determined that the sewers could be effectively cleaned. Because of the limited amount of sediment within the sewers, it was agreed that a follow-up video inspection would not be required. EPA approved the remedial design on August 30, 2000. Each length of sewer line was cleaned a minimum of two times. Approximately 12,000 gallons of wash water was collected and sent to the Fields Brook water treatment system for treatment prior to discharge to Fields Brook. Collected sediment was transported to the Fields Brook landfill for disposal. The cleaning of the sewers was performed in September 2000. As noted above, EPA issued a letter on March 17, 2003, approving the completion of the remedial action and accepting the report documenting the work performed at the site.

Institutional Controls

Institutional controls (ICs) are sometimes required by EPA to ensure the protectiveness of a remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. For source areas at the Fields Brook Site, ICs are required to assure long-term protectiveness for any areas that have the potential to recontaminate the brook above cleanup levels or otherwise are required to maintain the integrity of the remedy. The industrial source area facilities are subject to other environmental regulations such as the Resource Conservation and Recovery Act (RCRA) Corrective Action provisions that may require additional cleanup or institutional controls in the future.

ICs were required for the Acme Scrap and South Sewers operable units to prevent recontamination of Fields Brook.

System Operation and Maintenance - Acme Scrap Iron and Metal

Because PCB-contaminated soil remains on site at the Acme Scrap property, long-term monitoring was required to ensure that the Field Brook was protected from recontamination. Sediment samples from three locations were collected biannually from the fall of 2001 through 2003, and then collected annually to ensure that residual PCB contamination from the Acme property is not moving off-site at concentrations that could lead to an exceedance of the PCB CUG in Fields Brook. According to the approved O&M Plan, EPA would assess the need for the continuation of sampling beyond 2005. The three monitoring locations were, as follows:

Sample location #1 — The south sewer at the outfall to Fields Brook. A removable weir (approximately 4 - 6 inches high) was installed inside the mouth of the South Sewer outfall. The weir is placed in the sewer pipe about one month prior to sampling to trap a sufficient amount of sediment for laboratory analysis. After sample collection the weir is removed. This is a compliance monitoring location.

Sample location #2 — The northwest corner of the property at the intersection of Middle and State Roads. Overland stormwater runoff from the Acme Scrap site, not captured by the underground stormwater collection system, discharges from the property and collects within the drainage ditch located in this area. This is a compliance monitoring location.

Sample location #3 — The outlet pipe of the Acme Scrap stormwater retention pond (the inlet to the pipe of the South Sewers). The retention and outlet pipe is located approximately 550 feet southeast of the intersection of Middle and State Roads. A removable weir (approximately 4 - 6 inches high) is installed inside the mouth of the South Sewer. The removable weir is placed in the sewer pipe about 1 month prior to sampling to trap a sufficient amount of

sediment for laboratory analysis. After sample collection, the weir is removed. This is not a compliance monitoring location. The sample point provides information on the quality of sediment moving into the South Sewers prior to discharge at Fields Brook.

As of the date of the first five-year review, all PCB monitoring data was below the industrial cleanup goal of 3.1 parts per million (ppm) total PCBs.

System Operation and Maintenance - South Sewers

The South Sewers were fully cleaned and remain in use. Because the storm sewer outfall at Fields Brook is one of the three long-term monitoring points discussed above, the Operation and Maintenance for the South Sewers is addressed as part of the overall Acme facility O&M. Since the storm sewers have been cleaned, the O&M is more a mechanism for evaluating recontamination of the sewers from the Acme property than it is a monitoring of the performance of the sewer cleanout remedy.

V. Progress Since the Last Five-Year Review

The 2004 five-year review found that the Acme Scrap cleanup was protective of Fields Brook. Monitoring data collected up until the time of the review did not show any exceedances of the PCB cleanup level for the industrial area of the brook.

Sediment discharge from the Acme Scrap property to Fields Brook has been essentially eliminated. Sometime between September 2003 and December 2004, the property owner filled the stormwater retention pond near the northwest corner of the Acme property. This pond was the headwater for surface water discharge to the South Sewer and ultimately Fields Brook. The soil that has been placed in the pond now filters the water that originates from the property and discharges through the South Sewer to Fields Brook.

Monitoring continued with the collection of samples in December 2004, October 2005, and September of 2006. All results indicated that soil and sediment eroding from the former Acme Scrap facility had levels below that which could cause an exceedance of the occupational cleanup goal for PCBs. With the filing of the retention pond, one sample point was eliminated.

EPA felt that sufficient information had been collected to evaluate the performance of the Acme Scrap cleanup and determined it was not necessary that monitoring continue beyond the originally approved timeframe. See Table 1 for a summary of results from post-Remedial Action monitoring.

VI. Five-Year Review Process

Administrative Components

Potentially interested parties, including the Ohio EPA and the potentially responsible parties for the Acme Scrap and South Sewers source control area, were consulted during the preparation of the five-year review. The members of the review team included:

Terese Van Donsel, RPM, EPA
Leah Evison, RPM, EPA
Regan (Sig) Williams, Ohio EPA

Community Notification and Involvement

Notification was given to the Ohio EPA that the five-year review was being prepared. EPA placed an ad in the Ashtabula Star Beacon on December 5, 2008. A copy of the Ashtabula Star Beacon ad is provided in Fig. 7. No community interviews were conducted as part of the five-year review.

Document Review/Data Review

The following documents were reviewed:

- Record of Decision for the Source Control Operable Unit of the Fields Brook Superfund Site, September 29, 1997;
- O&M Monitoring Data - September 2001 to September 2006.

Site Inspection

An inspection of the Fields Brook Site was conducted on February 25, 2009. The former Acme Scrap property was not directly inspected, but property use was observed as industrial.

VII. Technical Assessment

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

Yes, monitoring data collected confirms that the soils eroding from the Acme property (through the storm sewer system to the outfall at Fields Brook and in the drainage ditch at the northwest corner of the property) would not cause an exceedance of the PCB CUG in Fields Brook. With the elimination of the former retention pond at the South Sewer inlet, any potential risks to Fields Brook are even further reduced. However, to ensure long-term protection for the Acme Scrap and South Sewers OU, ICs may be required. EPA will assess the need for ICs at this OU as a follow-up action to this five-year review.

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

Yes. There has been no change to the PCB cleanup requirement for Fields Brook. The Remedial Action Objectives for the Acme Scrap Property and the South Sewers are still valid.

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

No new information has come to light that would cause the Agency to question the protectiveness of the remedy in terms of contributions of PCBs to Fields Brook. The cleanup was limited to actions necessary to protect Fields Brook.

During the design stage of the project, the Acme PRPs were encouraged to excavate additional soils that were contaminated with low-levels of PCBs. The excavation of these soils was not required by the remedial action, as the soil loss equations showed that the brook could be protected by excavated soils that met or exceeded 50 ppm total PCBs. The PRPs for the Acme operable unit considered EPA's suggestion and opted not to excavate additional impacted soils. Thus, the cleanup remains protective in terms of contributions to Fields Brook.

VIII. Issues

EPA should clarify whether ICs are needed for the property to prevent recontamination of Fields Brook. If needed, such ICs, including their long-term stewardship, would restrict the use of the property to industrial uses and protect any remedial controls.

The remedial action is sufficient to address the scope of the cleanup, which is to protect the brook from recontamination. EPA reviewed the monitoring data for the OU and determined that no additional sampling was warranted. However, institutional controls may be needed to ensure the protectiveness of the remedy in the long term.

IX. Recommendation and Follow-up Action (Acme Scrap Source Area OU 8)

Recommendation/Follow-up Action for Acme Scrap (OU 8)	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness? (Y/N)	
				Current	Future
Assess the need to install institutional controls to restrict use of property, and protect remedial controls. If required by EPA, implement ICs and develop a plan to monitor ICs to ensure long-term stewardship.	EPA Acme Scrap property owner	EPA	12/15/2010 If required by EPA, IC Work Plan shall be submitted by 6/30/2010	N	Y

X. Protectiveness Statement

The remedy implemented for the Acme Scrap and South Sewers operable unit is protective in the short-term of human health and the environment in the short term pursuant to the remedial action objective of preventing recontamination of Fields Brook in excess of the PCB cleanup goal. The implementation of ICs may be necessary to ensure long-term protectiveness. If ICs are required by EPA, long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

No assessment was performed to determine whether the source control cleanup performed at the Acme Scrap and South Sewers operable unit would be protective of human health and the environment for current and future exposure scenarios other than those related to Fields Brook.

FIGURES

(1) Site map showing land use areas
(2) Site map detail showing location of exposure units
(3A/B) Ohio Sport Fish Consumption Advisory for Ashtabula River and Statewide
(4) Site map showing source control areas
(5) Location of Detrex Corp. interceptor trenches
(6A/B/C) Location of Millenium 2008 removal work (EU-8 excavation area; conditions observed)
(6D/E) 2008 conditions in EUs 5 and 6 (Hexachlorobenzene, Hexachlorobutadiene, and PCBs)
(7) Copy of Five Year Review Ad
(8) Components of Detrex Corp. source control remediation system
(9) Millenium $TiCl_4$ facility - historical areas of contamination
(10) Millenium $TiCl_4$ facility - extent of soil excavation in mining residual pile
(11) Millenium $TiCl_4$ facility - extent of soil excavation in plant process areas
(12) Location of Millennium interceptor trenches
(13) Extent of soil excavation in EU8 of Fields brook
(14) Location of North Sewer
(15) Location of Acme Scrap and South Sewer; and Consolidated Landfill Area
(16) Layout of South Sewers / O&M Sampling Locations
(17) Location of Millenium On-site Landfill

TABLE

(1) Results of Acme post-remedial PCB monitoring

ATTACHMENTS

(1) Monthly Report – Operation and Maintenance, Fields Brooke Superfund Site, April 6, 2009
(2) Monthly Report – Detrex Source Area Remedial Action, May 14, 2009
(3) Monthly Report – Millenium Plant Removal Action, March 2009Correspondence
(4) EPA Pollution Reports – Fields Brook Removal Action, January - May 2008
(5) November 30, 2004 letter from Richard L. Mason (RMI) to T. Van Donsel (EPA) regarding implementation of institutional controls at the North Sewers Source Area
(6) Site Monitoring Report – Groundwater Sampling Performed October 2008, Fields Brook Landfill

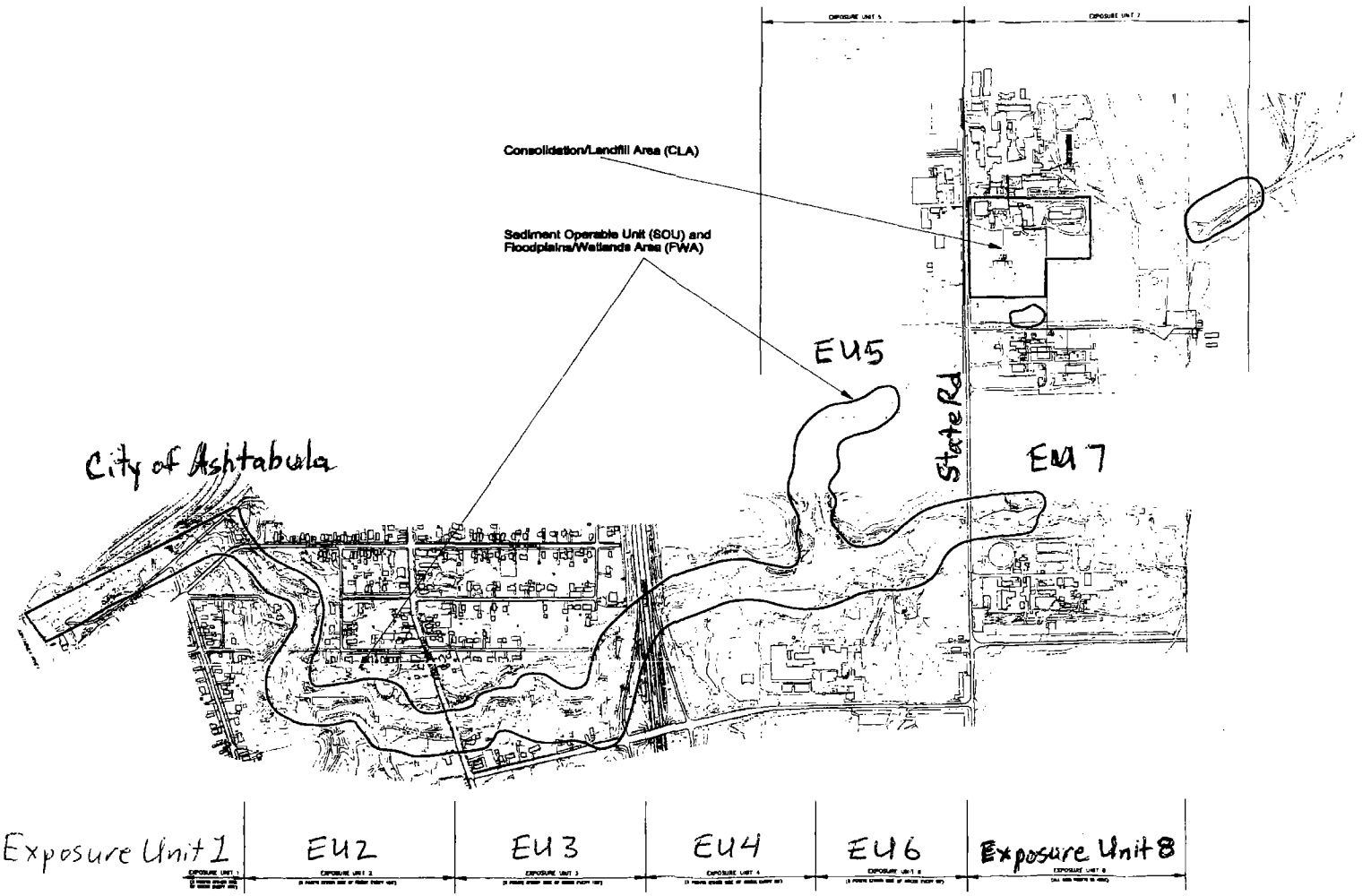

Figure 1

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ENGINEER:	SCALE: 1"=800'
CHECKED:	APPROVED
DATE:	DATE

HLA
Harding Lawson Associates
Engineering and Environmental Services
707 Seventeenth Street
Suite 2400
Denver, Colorado 80202
(303) 292-5365

FIELDS BROOK SUPERFUND SITE

ASHTABULA, OHIO

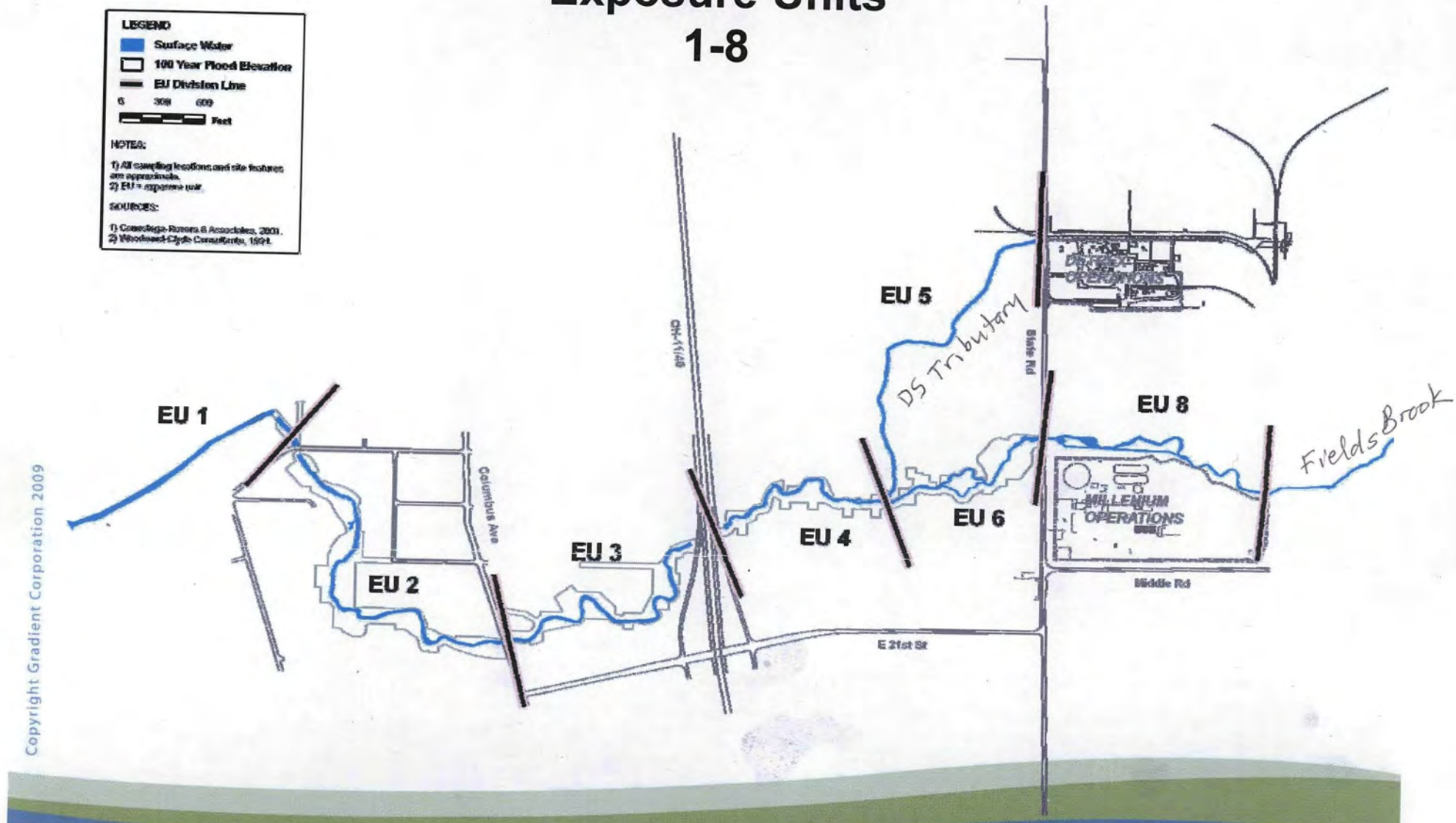
DRAWING NO: X

X / X

NO. | DATE | REVISIONS | BY | CHK

49484/CAD/49484027 03/21/00 LDZ

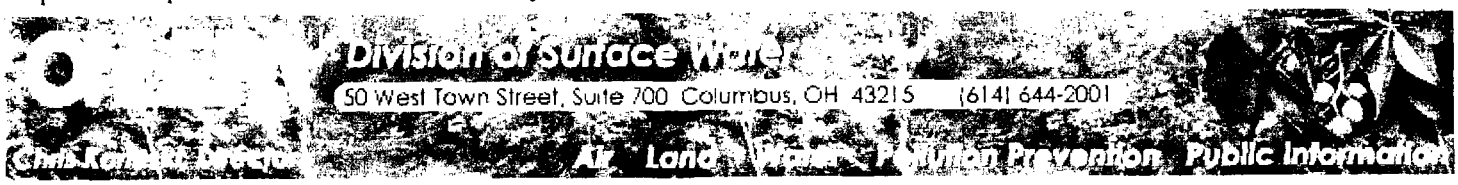
Exposure Units 1-8



Science and Strategies for Safe Environments

Gradient CORPORATION

Figure 2



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Ohio Sport Fish Consumption Advisory

Detailed Waterbody Map (PDF 66K) | **Common Ohio sport fish** | **Printer friendly version of this Web page** (PDF 68K)

Ashtabula River

Species and Maximum Recommended Meal Frequency

Statewide Advisories

In addition to the waterbody specific advisories below, there are the following statewide advisories for mercury and, in the case of Steelhead Trout, for PCBs. See the **Overall Advice** *page for more information.*

2 meals per week Sunfish **(see exceptions)** Yellow Perch	**1 meal per week** All sport fish not specifically listed in the statewide and waterbody specific advisories	**1 meal per month** Flathead Catfish 23" and over Northern Pike 23" and over Steelhead Trout (L. Erie & tribs. only)

Waterbody Specific Advisories for Ashtabula River

Hilldom Road to U.S. Route 20 (Prospect Road) (Ashtabula County)

Largemouth Bass

All Sizes
1 meal per month
Contaminant - Mercury

U.S. Route 20 (Prospect Road) to mouth (Lake Erie) (Ashtabula County)

All Species

All Sizes

Figure 3A

Do Not Eat
Contaminant - PCBs

Back to **Limit Meals** Page
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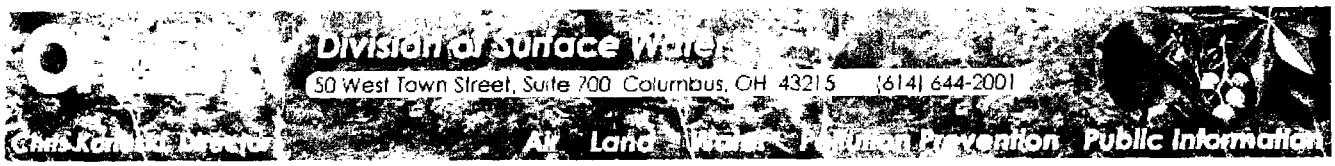

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2009 Ohio Sport Fish Consumption Advisory - Statewide Advisory

General and Statewide Advisories

The Ohio Department of Health advises that **all persons** limit consumption of sport fish caught from **all waterbodies in Ohio** to **one meal per week**, unless there is a **more or less restrictive advisory**.

This advisory protects sensitive populations, including women of child bearing age and children under age 15. The one meal per week advisory was extended to all persons in 2003 because of:

- the statewide/nationwide mercury advisory for sensitive populations (see below) and
- the increasing number of location-specific one meal per week advisories.

The listings of waterbodies that have been sampled for fish contaminants are available on the **Questions & Answers** page. These lists are provided for those anglers, local citizens and groups who desire detailed information on specific waterbodies, fish species and contaminants.

Statewide/Nationwide Mercury Advisory for Sensitive Populations

The statewide mercury advisory, issued in 1997, is primarily for women of child-bearing age and children (age 15 and under). They are advised to eat no more than one meal per week of fish (any species) from any Ohio body of water unless there is a **more or less restrictive advisory**. Although the one meal per week advice applies mainly to these sensitive populations, the general advisory, issued in 2003, recommends that everyone follow that advice.

In 2004, the United States Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) jointly issued a national mercury-related advisory for store-bought fish and fish served in restaurants. This advice is for women who might become pregnant, women who are pregnant, nursing mothers, and young children. This advice states:

1. "Do not eat Shark, Swordfish, King Mackerel, or Tilefish because they contain high levels of mercury.
2. Eat up to 12 ounces (two average meals) a week of a variety of fish and shellfish that are lower in mercury.
   - Five of the most commonly eaten fish that are low in mercury are shrimp, canned light tuna, salmon, pollock, and catfish.
   - Another commonly eaten fish, albacore ("white") tuna has more mercury than canned light tuna. So, when choosing your two meals of fish and shellfish, you may eat up to six ounces (one average meal) of albacore tuna per week.
3. Check local advisories about the safety of fish caught by family and friends in your local lakes, rivers and coastal areas. If no advice is available, eat up to six ounces (one average meal) per week of fish you catch from local waters, but don't consume any other fish during that week."

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Figure 3B

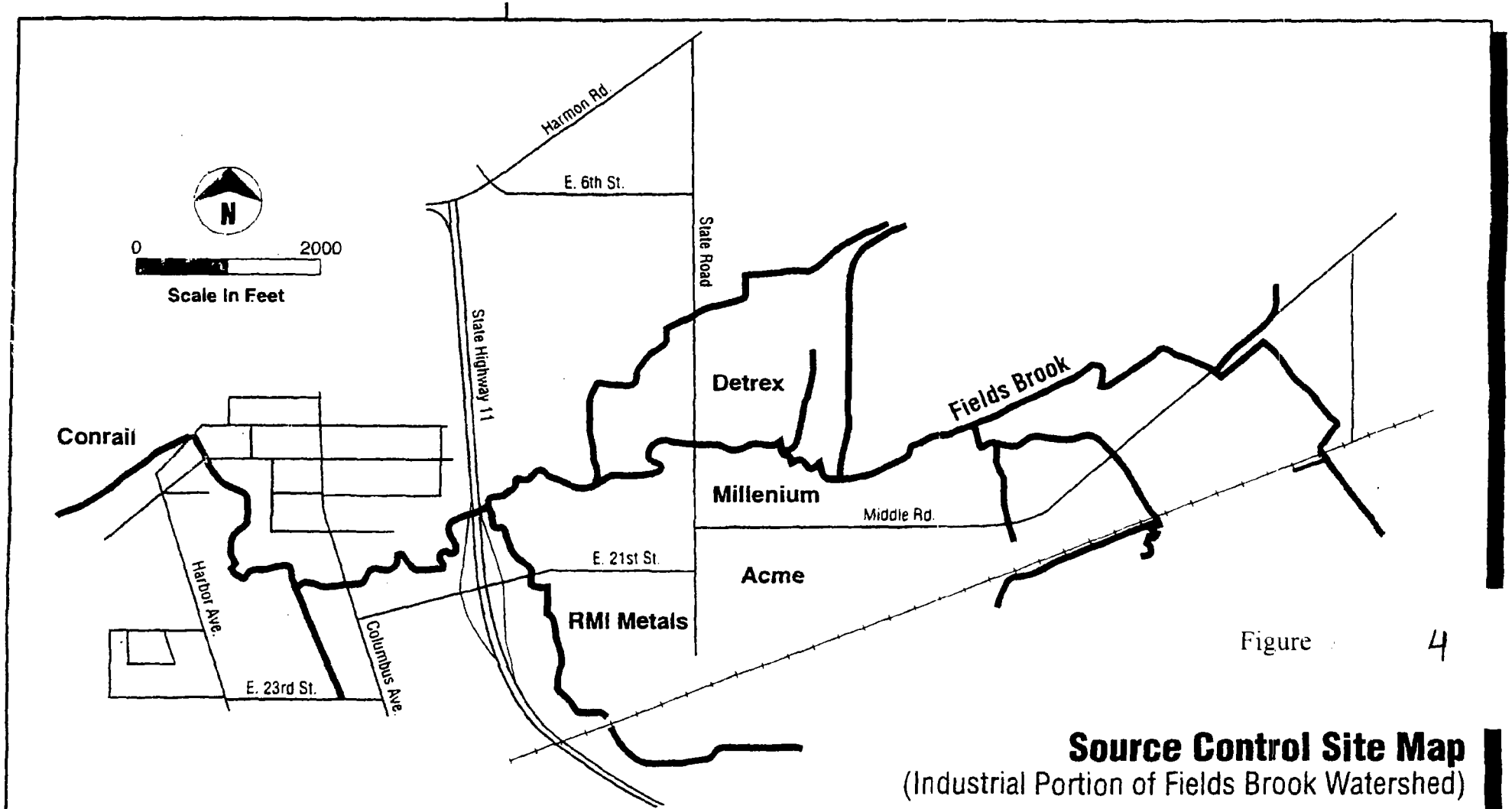
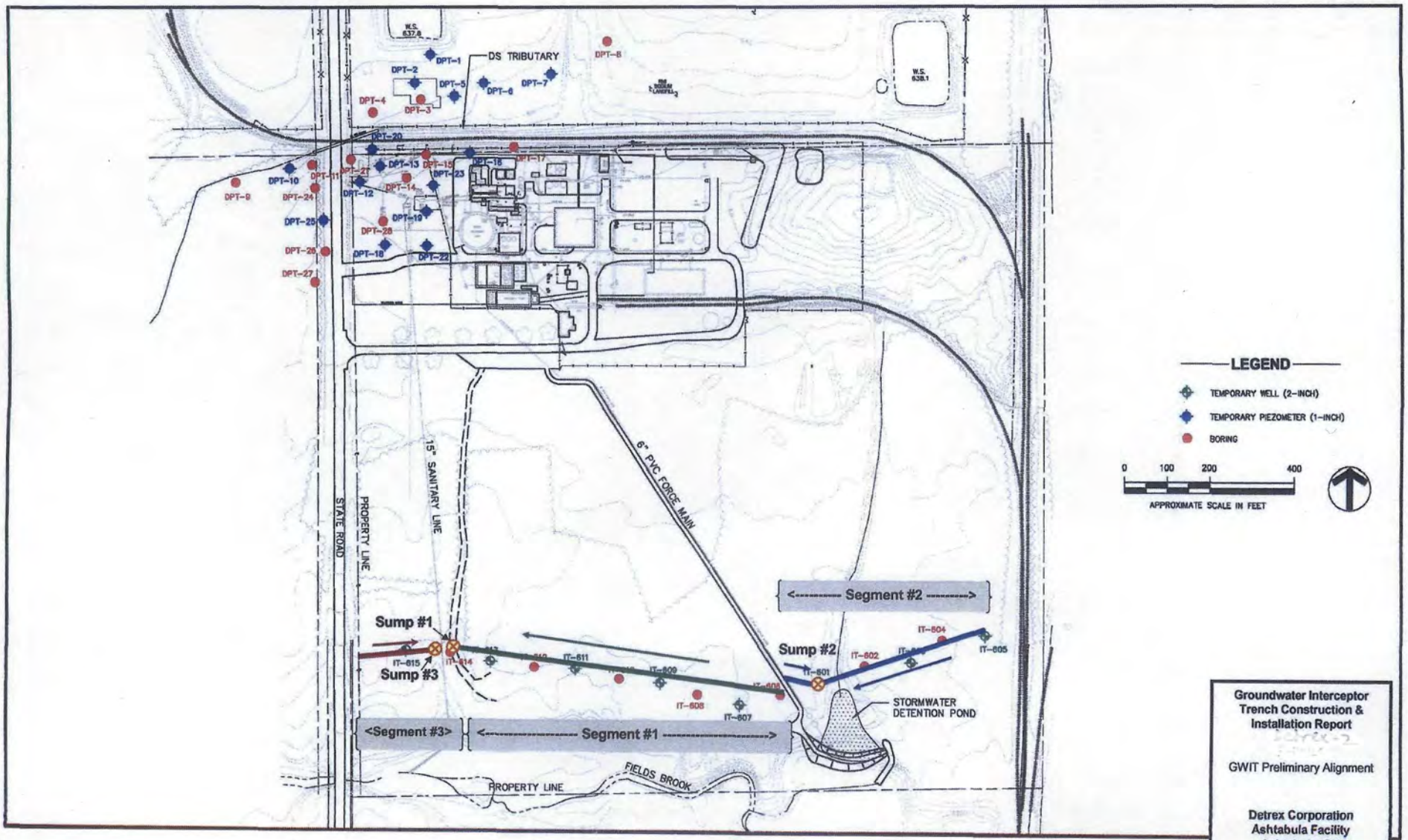


Figure 4

Source Control Site Map
(Industrial Portion of Fields Brook Watershed)


DS TRIBUTARY
DPT-1
DPT-2
DPT-3
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DPT-27
DPT-28
W.S. 637.8
W.S. 638.1
STATE ROAD
PROPERTY LINE
15" SANITARY LINE
6" PVC FORCE MAIN
Sump #1
Sump #2
Sump #3
IT-601
IT-602
IT-604
IT-605
IT-606
IT-607
IT-608
IT-609
IT-611
IT-614
IT-615
<---------- Segment #2 ---------->
<Segment #3>
<---------- Segment #1 ----------
STORMWATER DETENTION POND
PROPERTY LINE
FIELDS BROOK
LEGEND
TEMPORARY WELL (2-INCH)
TEMPORARY PIEZOMETER (1-INCH)
BORING
0 100 200 400
APPROXIMATE SCALE IN FEET
Groundwater Interceptor Trench Construction & Installation Report
GWIT Preliminary Alignment
Detrex Corporation
Ashtabula Facility
Ashtabula, OH
URS
August 2007

Figure 5

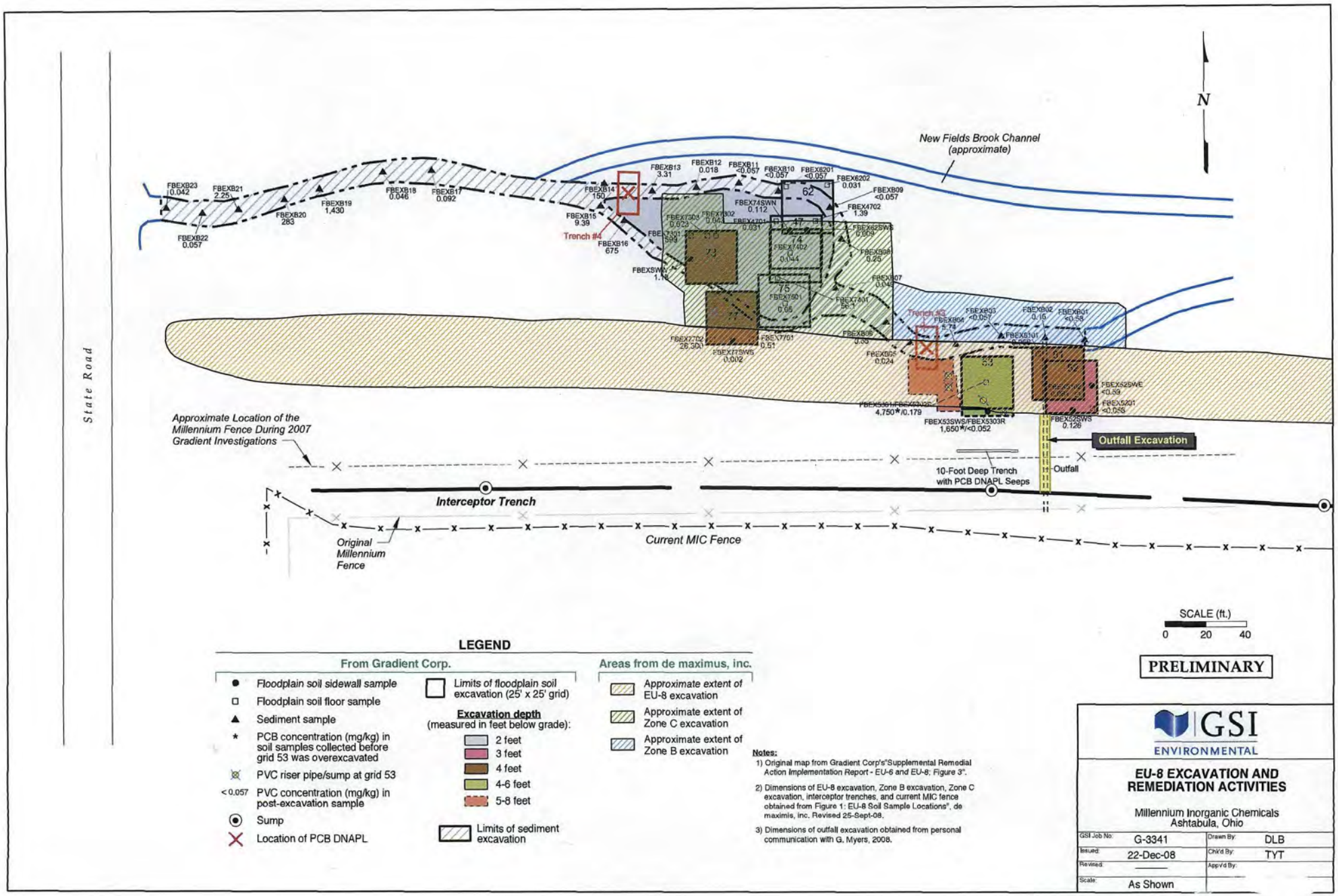

State Road
N
New Fields Brook Channel (approximate)
Trench #4
Trench #3
Approximate Location of the Millennium Fence During 2007 Gradient Investigations
Interceptor Trench
Original Millennium Fence
Current MIC Fence
10-Foot Deep Trench with PCB DNAPL Seeps
Outfall
Outfall Excavation
SCALE (ft.)
0 20 40
PRELIMINARY
LEGEND
From Gradient Corp.
Floodplain soil sidewall sample
Floodplain soil floor sample
Sediment sample
PCB concentration (mg/kg) in soil samples collected before grid 53 was overexcavated
PVC riser pipe/sump at grid 53
< 0.057 PVC concentration (mg/kg) in post-excavation sample
Sump
Location of PCB DNAPL
Limits of floodplain soil excavation (25' x 25' grid)
Excavation depth (measured in feet below grade):
2 feet
3 feet
4 feet
4-6 feet
5-8 feet
Limits of sediment excavation
Areas from de maximus, inc.
Approximate extent of EU-8 excavation
Approximate extent of Zone C excavation
Approximate extent of Zone B excavation
Notes:
1) Original map from Gradient Corp's"Supplemental Remedial Action Implementation Report - EU-6 and EU-8; Figure 3".
2) Dimensions of EU-8 excavation, Zone B excavation, Zone C excavation, interceptor trenches, and current MIC fence obtained from Figure 1: EU-8 Soil Sample Locations", de maximis, inc. Revised 25-Sept-08.
3) Dimensions of outfall excavation obtained from personal communication with G. Myers, 2008.
GSI ENVIRONMENTAL
EU-8 EXCAVATION AND REMEDIATION ACTIVITIES
Millennium Inorganic Chemicals
Ashtabula, Ohio
GSI Job No: G-3341
Drawn By: DLB
Issued: 22-Dec-08
Chk'd By: TYT
Revised: ——
App'd By:
Scale: As Shown

Figure 6A

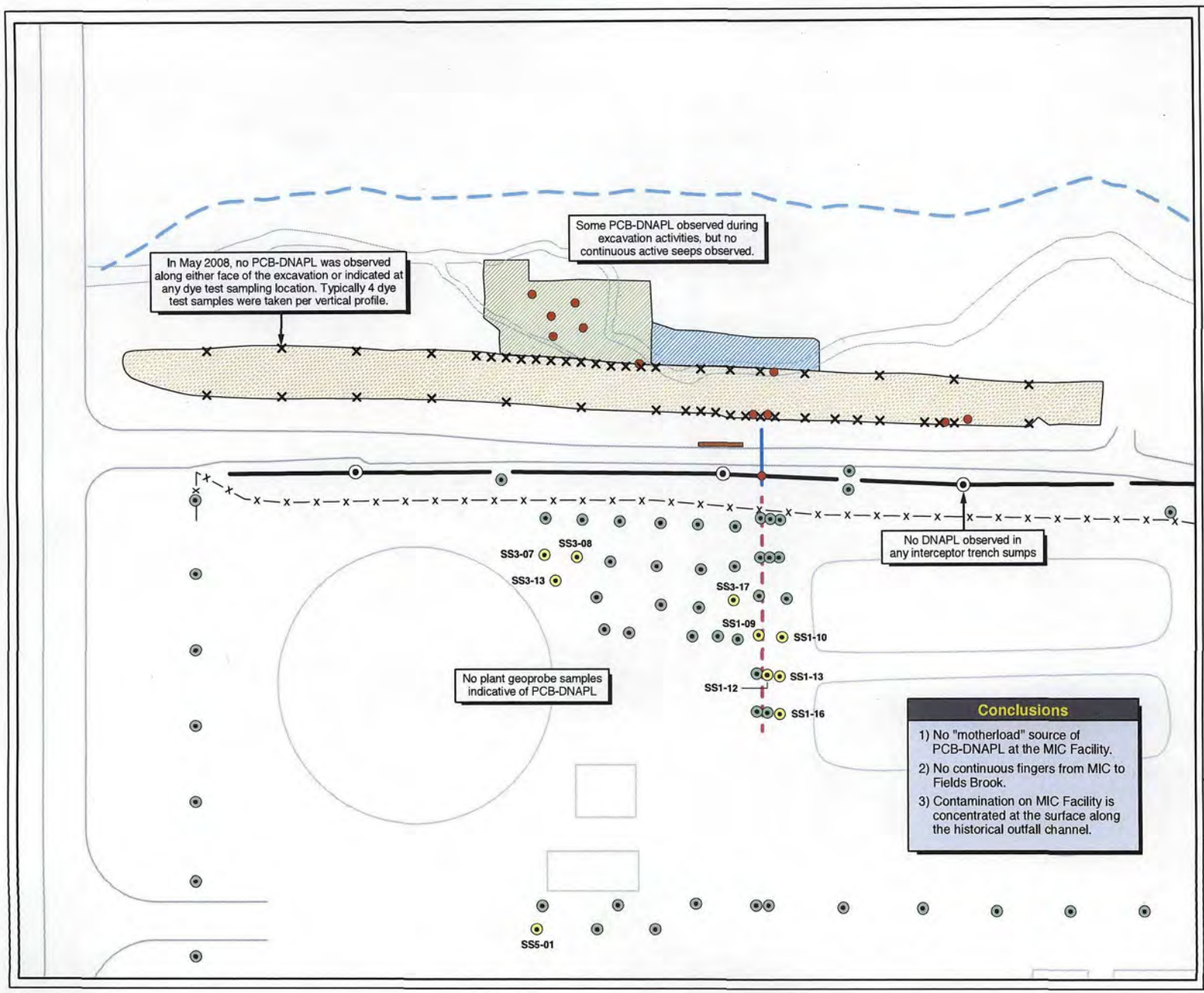
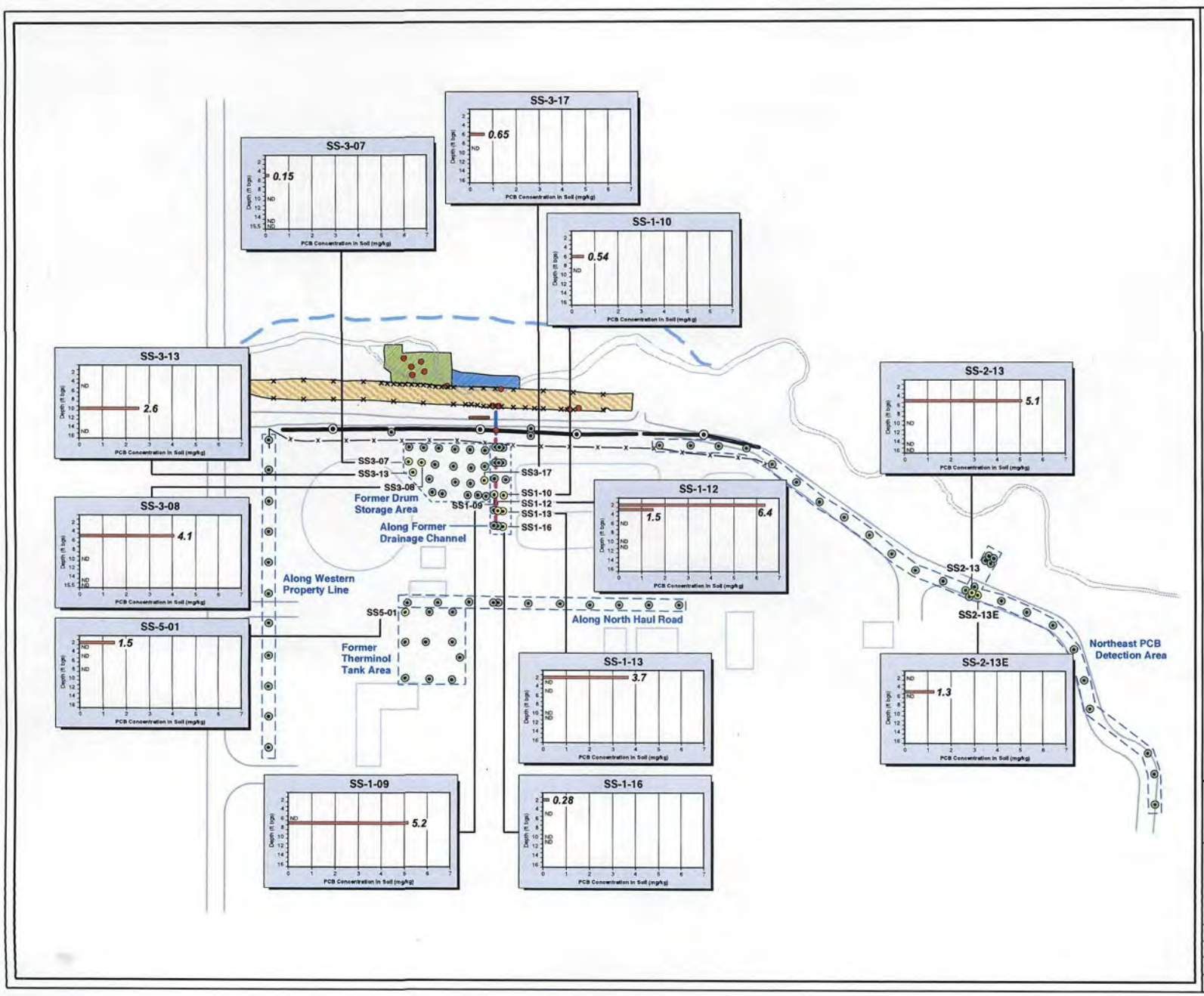


Figure Brook 6B



N

LEGEND

- Non-detect plant geoprobe sample
- Detected PCB plant geoprobe sample (maximum concentration 6.4 mg/kg; CRG = 50 mg/kg)
- Interceptor trench sump
- PCB DNAPL observed during MIC excavations
- Vertical profile sampling location showing no DNAPL present (GSI, 2008)
- Approximate extent of EU-8 excavation
- Approximate extent of Zone C excavation
- Approximate extent of Zone B excavation
- Fields Brook diversion
- Approximate location of groundwater interceptor trench
- Historical outfall
- Historical plant drainage channel
- 10 ft deep trench with PCB-DNAPL seeps
- Current MIC fence

Note:
Dimensions of EU-8 excavation, Zone B excavation, Zone C excavation, interceptor trenches, and current MIC fence obtained from Figure 1: EU-8 Soil Sample Locations", de maximis, inc. Revised 25-Sept-08.

Approx. Scale (ft.)
0 75 150

PRELIMINARY

GSI ENVIRONMENTAL

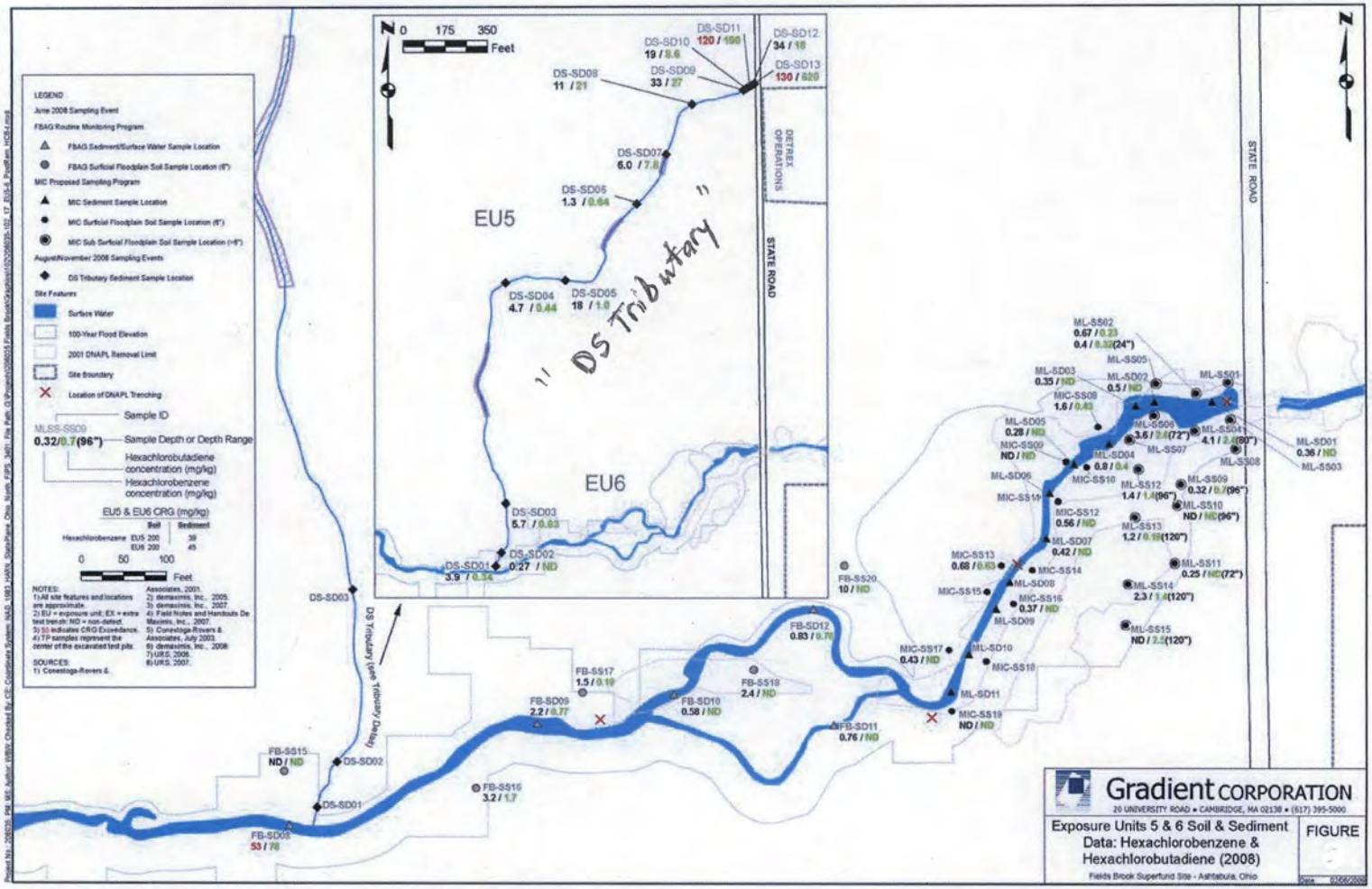
CONDITIONS OBSERVED DURING MIC's REMEDIAL ACTIVITIES

Millennium Inorganic Chemicals
Ashtabula, Ohio

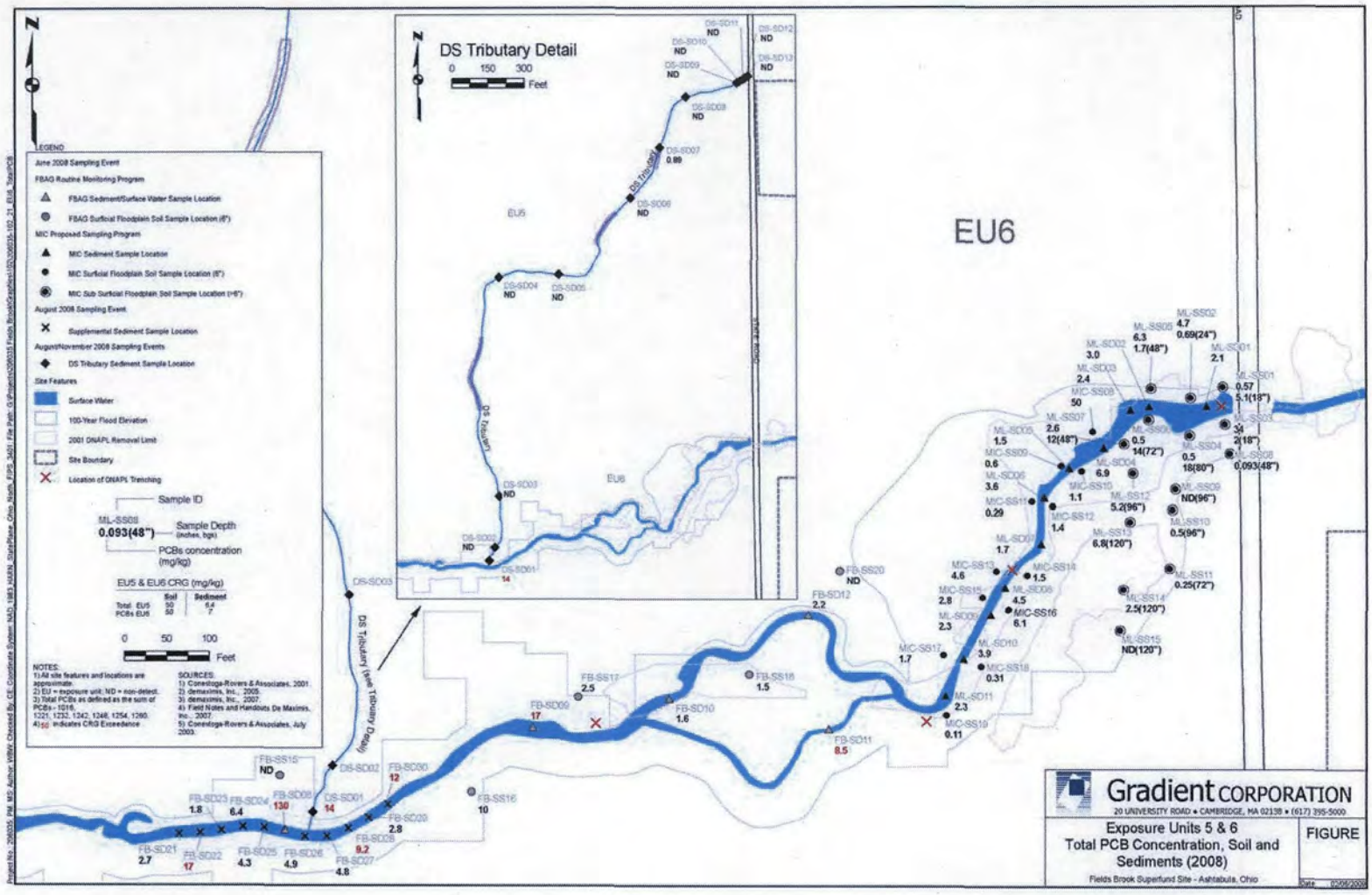
GSI Job No:	G-3341	Drawn By:	DLB
Issued:	22-Dec-08	Chk'd By:	TYT
Revised:	———	App'd By:	
Scale:	As Shown		

Figure [illegible]-6C

Hexachlorobenzene & Hexachlorobutadiene - EUs 5 & 6



PCB Concentrations - EUs 5 & 6



Geneva wrestlers to sell mattresses

GENEVA — The Geneva High School wrestling team will sell new mattresses from 10 a.m. to 5 p.m. Saturday at GHS.

The team will sell name brand pillow top, orthopedic and memory foam mattresses at 40 percent to 60 percent off the retail price.

All proceeds benefit the wrestling team. For more information call (440) 250-0115.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EPA Begins Review of Fields Brook Superfund Site

Ashtabula, Ohio

U.S. Environmental Protection Agency is conducting a five-year review of the Fields Brook Superfund site. It is located about 55 miles east of Cleveland in the city and county of Ashtabula. The site comprises the six-square-mile watershed of a brook where up to 19 separate facilities have operated since 1940. Fields Brook flows into the Ashtabula River, which flows into Lake Erie approximately 1-1/2 miles downstream of the site.

The Superfund law requires regular checkups of sites that have been cleaned up or where cleanup has been ongoing for at least five years – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the second five-year review of this site.

The cleanup includes four miles of the Fields Brook channel and floodplain, and six industrial areas. The cleanup addresses PCBs, chlorinated solvents and metals found in sediment (mud) and soil. The original cleanup of the Fields Brook channel and floodplain was completed in 2002. However, because routine monitoring found additional contamination in an industrial area, more excavation was required.

This review should be completed by June 2009.

More information is available at: www.epa.gov/region5/sites/fieldsbrook and at:

Ashtabula County District Library
335 W. 44th St.
Ashtabula

Kent State Library
3431 W. 13th St.
Ashtabula

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

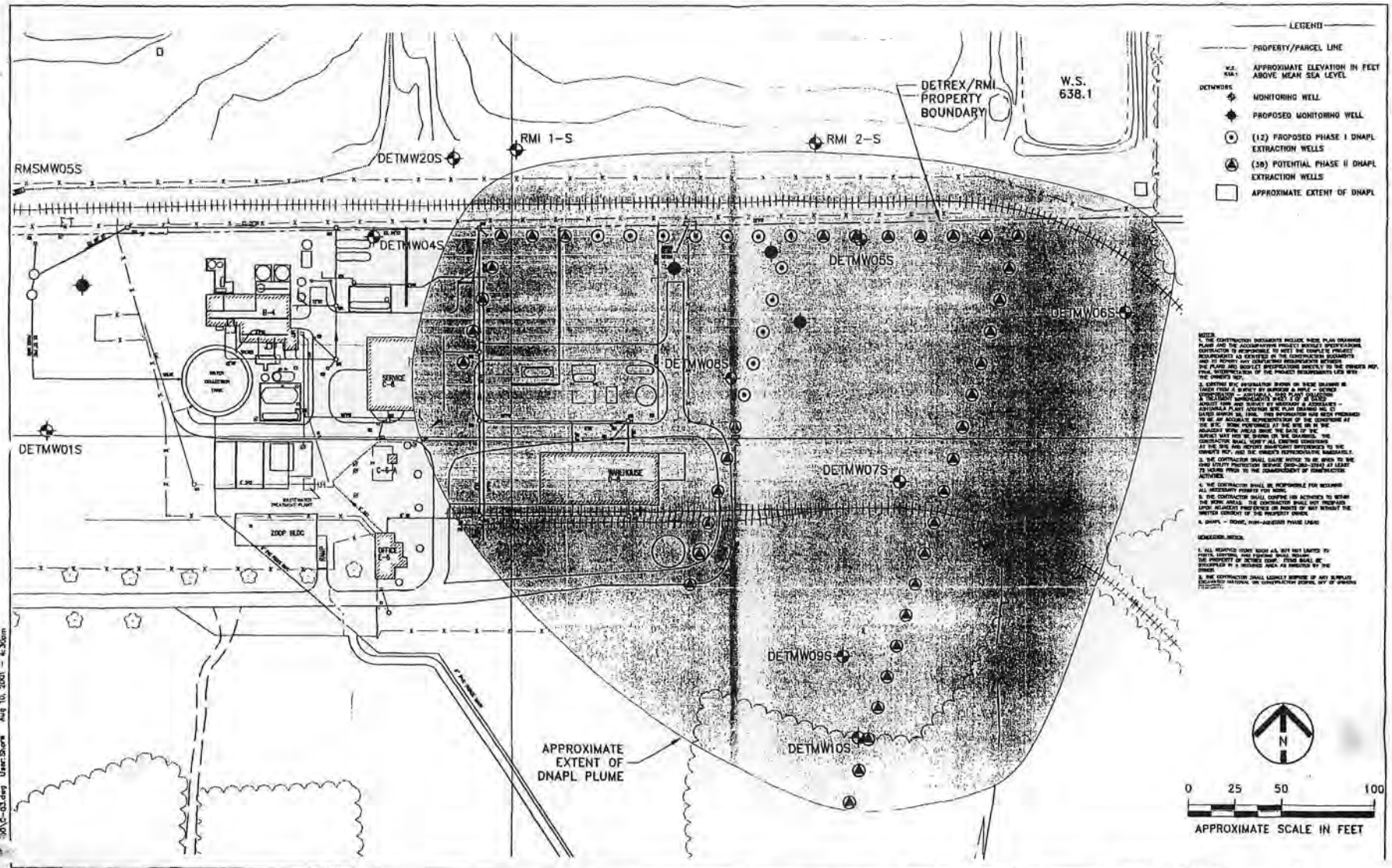
Contact:

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

Terese Van Donsel
Remedial Project Manager
312-353-6564
vandonsel.terese@epa.gov

You may also call toll-free at 800-621-8431, 9:30 a.m. – 5:30 p.m., weekdays.

Figure 7



REV	DESCRIPTION OF REVISION	BY	DATE
A	100 PERCENT DESIGN SUBMITTAL	MAS	3/29/01
B	REVISED FOR IRD	MAS	7/24/01
C	REVISED FOR IRD	MAS	8/15/01

FINAL DESIGN SUBMITTAL
Revision 2

URS
800 W. St. Clair Ave., Suite 500
Cleveland, Ohio 44113

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED	DAS
DRAWN	MMS
CHECKED	DAS
PEER REVIEWED	KMA
PROJECT MANAGER	MLS
DATE	4-10-01

SITE PLAN WITH AREA OF DNAPL PLUME IDENTIFIED
SOURCE CONTROL REMEDIAL COMPONENTS
DETREX CORPORATION FACILITY
ASHTABULA, OHIO

Figure 8

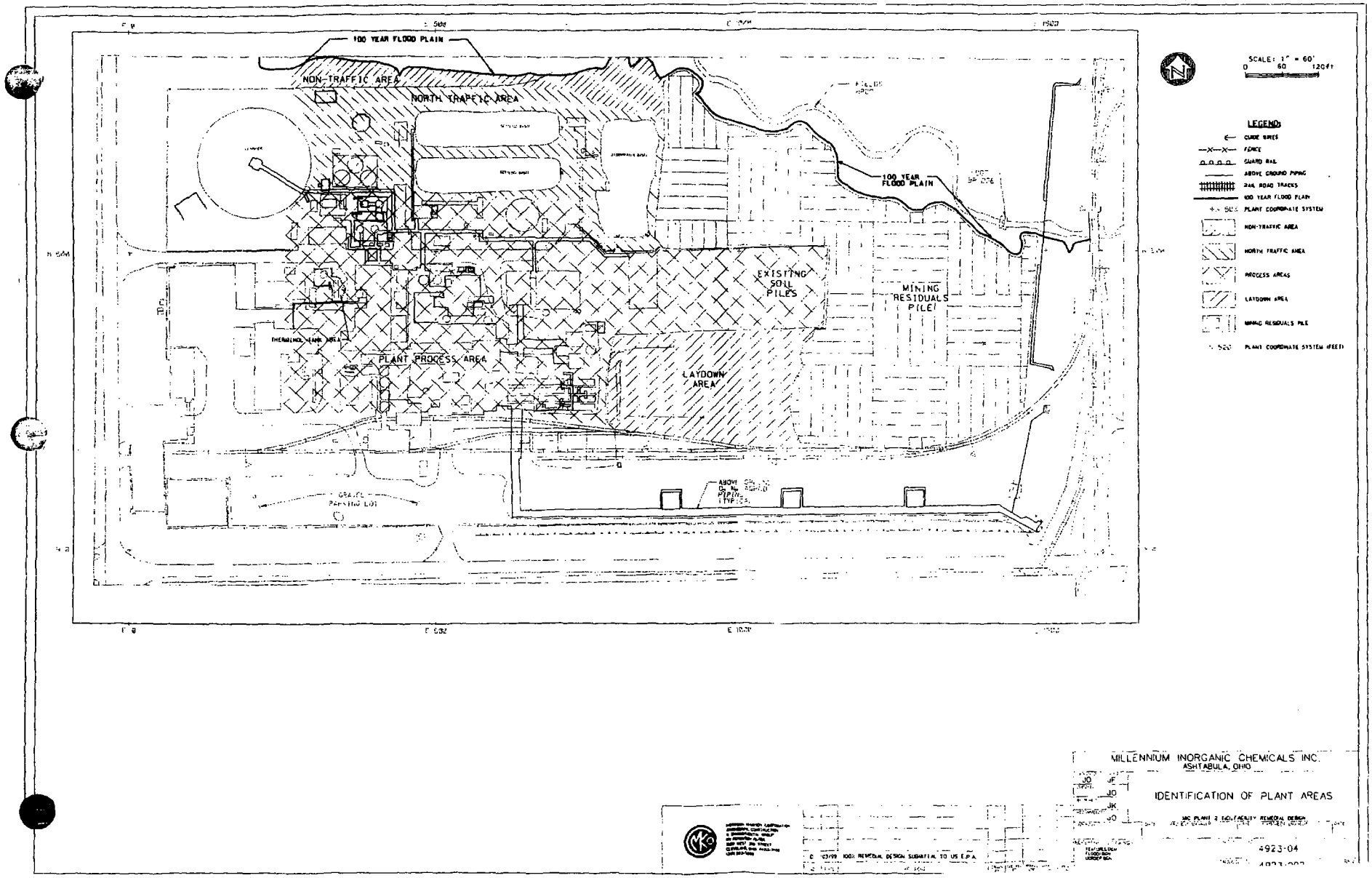

100 YEAR FLOOD PLAIN
NON-TRAFFIC AREA
NORTH TRAFFIC AREA
100 YEAR FLOOD PLAIN
EXISTING SOIL PILES
MINING RESIDUALS PILE
PLANT PROCESS AREA
LAYDOWN AREA
SCALE: 1" = 60'
0 60 120Ft
LEGEND
GUIDE WIRES
FENCE
GUARD RAIL
ABOVE GROUND PIPING
RAIL ROAD TRACKS
100 YEAR FLOOD PLAIN
PLANT COORDINATE SYSTEM
NON-TRAFFIC AREA
NORTH TRAFFIC AREA
PROCESS AREAS
LAYDOWN AREA
MINING RESIDUALS PILE
PLANT COORDINATE SYSTEM (FEET)
MILLENNIUM INORGANIC CHEMICALS INC.
ASHTABULA, OHIO
IDENTIFICATION OF PLANT AREAS
4923-04

Figure 9

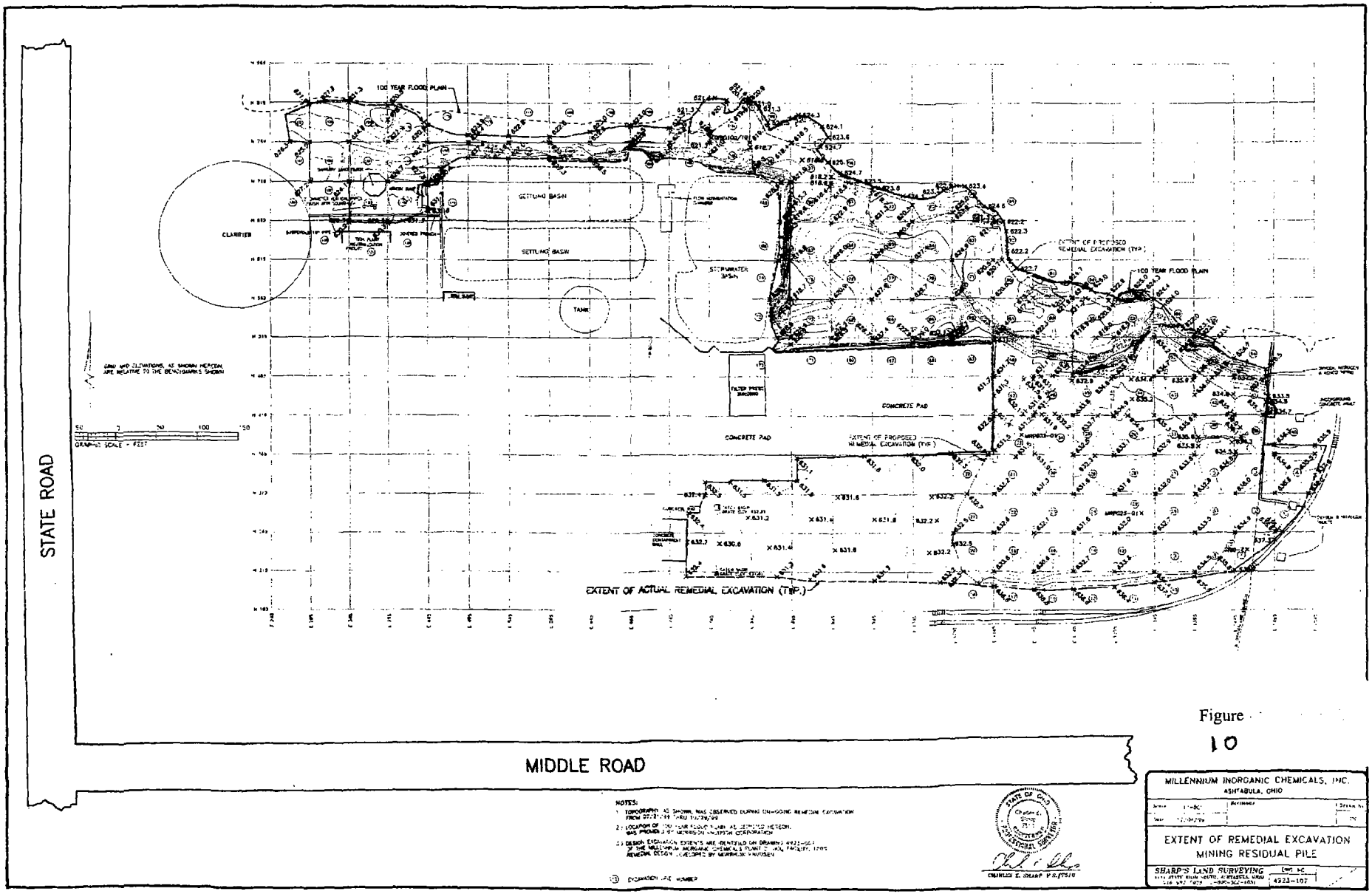


Figure 10

NOTES:

1. TOPOGRAPHIC AS SHOWN, WAS OBSERVED DURING ONGOING REMEDIAL EXCAVATION FROM 07/21/99 THRU 11/29/99.
2. LOCATION OF 100 YEAR FLOOD PLAIN AS DEPICTED HEREON WAS PROVIDED BY MERRICK-THOMPSON CORPORATION.
3. DESIGN EXCAVATION EXTENTS ARE IDENTIFIED ON DRAWING 4923-SK1 OF THE MILLENNIUM INORGANIC CHEMICALS PLANT'S "AS FACILITY" 12/99 REMEDIAL DESIGN DRAWINGS BY MERRICK-THOMPSON.

(3) EXCAVATION LIFT NUMBER

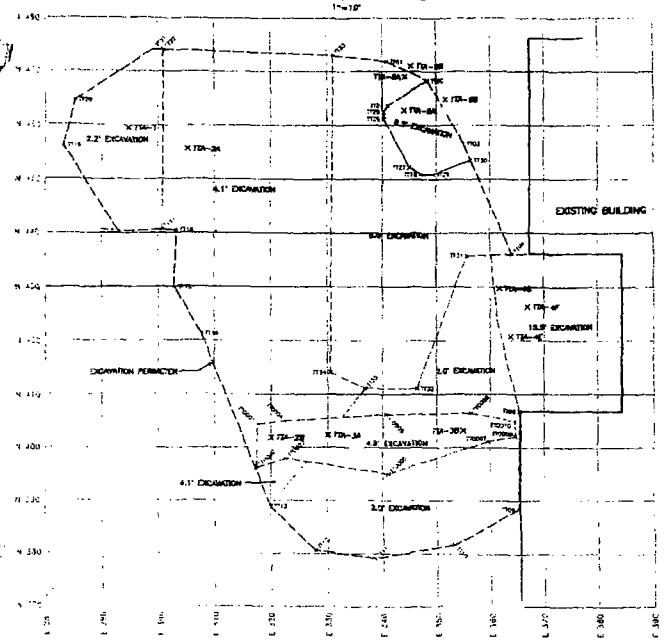
STATE OF OHIO — CHARLES E. SHARP P.S. 7570 — PROFESSIONAL SURVEYOR

MILLENNIUM INORGANIC CHEMICALS, INC.
ASHTABULA, OHIO

EXTENT OF REMEDIAL EXCAVATION
MINING RESIDUAL PILE

SHARP'S LAND SURVEYING — Dwg. No. 4923-107

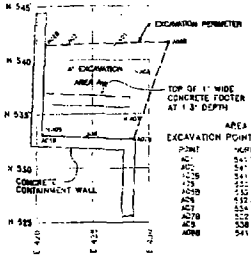
THERMINOL TANK AREA



THERMINOL TANK AREA
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
T101	491.8	340.8
T102	488.4	348.6
T103	456.5	395.1
T104	436.1	384.1
T105	408.8	365.6
T106	388.4	343.3
T107	381.8	353.2
T108	373.2	366.4
T109	380.7	337.7
T110	384.3	330.9
T111	451.3	307.8
T112	429.9	309.9
T113	445.5	303.2
T114	440.6	300.8
T115	440.4	292.8
T116	456.2	283.1
T117	464.5	288.1
T118	474.2	294.2
T119	474.3	300.9
T120	473.1	333.3
T121	465.8	341.0
T122	465.4	346.3
T123	469.1	360.3
T124	453.2	345.1
T125	490.9	347.1
T126	450.9	343.4
T127	453.4	354.6
T128	435.8	353.9
T129	411.1	346.3
T130	411.1	336.7
T131	414.1	330.9
T132	404.3	322.9
T133	396.3	317.2
T134	398.0	322.8
T135	405.3	322.8
T136	389.3	341.0
T137	408.0	342.6
T138	401.2	358.5
T139	406.4	368.4
T140	401.1	364.8
T141	404.4	364.5

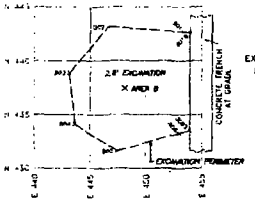
AREA "A"



AREA "A"
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
A01	545.3	421.1
A02	541.1	433.6
A03	541.4	437.5
A04	533.6	431.0
A05	533.6	426.5
A06	533.6	424.5
A07	533.6	424.5
A08	534.5	437.9
A09	534.5	438.5
A10	538.8	438.5
A11	541.7	431.8

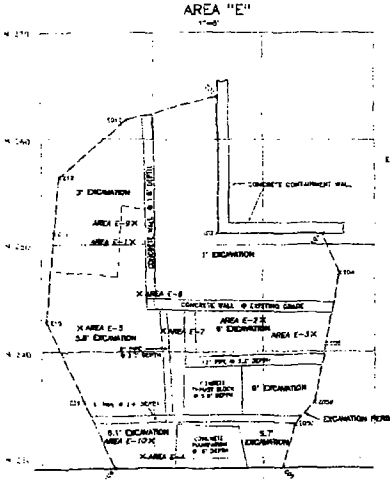
AREA "B"



AREA "B"
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
B01	442.7	453.6
B02	442.6	454.3
B03	435.1	444.9
B04	434.9	442.1
B05	434.3	442.7
B06	431.6	441.6
B07	433.0	453.1
B08	433.5	454.1

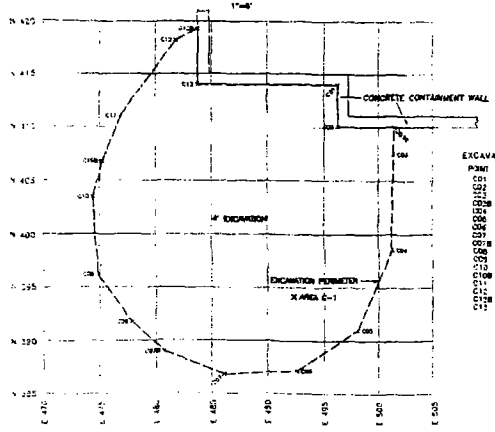
AREA "E"



AREA "E"
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
E01	351.0	465.3
E02	347.4	466.9
E03	347.7	485.6
E04	338.2	484.6
E05	338.1	482.9
E06	328.0	482.7
E07	328.0	484.5
E08	328.0	448.5
E09	330.7	448.8
E10	342.7	448.3
E11	351.7	447.1
E12	354.4	447.5
E13	354.8	447.7
E14	354.0	456.9

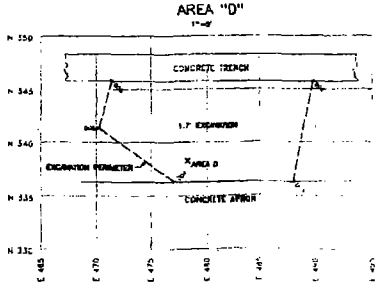
AREA "C"



AREA "C"
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
C01	414.0	496.2
C02	410.1	496.2
C03	407.5	501.4
C04	410.1	501.4
C05	398.5	511.2
C06	391.1	498.1
C07	387.7	492.5
C08	388.8	488.1
C09	383.0	480.7
C10	381.8	477.8
C11	388.1	474.8
C12	403.5	474.4
C13	406.8	475.1
C14	411.1	478.8
C15	418.3	484.8
C16	419.3	483.8
C17	414.0	483.9

AREA "D"



AREA "D"
EXCAVATION POINT COORDINATES

POINT	NORTHING	EASTING
D01	345.1	488.2
D02	336.3	488.4
D03	336.3	474.4
D04	343.3	470.3
D05	345.8	471.4

NOTE: DESIGN EXCAVATION EXTENTS ARE SHOWN ON DRAWING #01-1-106 OF THE MILLENNIUM INORGANIC CHEMICALS, PLANT 2, TICL FACILITY. 100% REMEDIAL DESIGN DEVELOPED BY HARDESTY & HANOVER

STATE OF OHIO
Charles E. Sharp
7510
PROFESSIONAL SURVEYOR

CHARLES E. SHARP P.S. #7510

Figure

MILLENNIUM INORGANIC CHEMICALS, INC.
ASHTABULA, OHIO

Scale	VARIES	Surveyed	Drawn by
Date	12/07/99		CEH

EXTENT OF REMEDIAL EXCAVATION
PLANT PROCESS AREAS

SHARP'S LAND SURVEYING
4144 STATE ROAD P.O. BOX 4 ASHTABULA, OHIO
216-998-5958 / 800-321-4041

Dwg. No. 4975-106

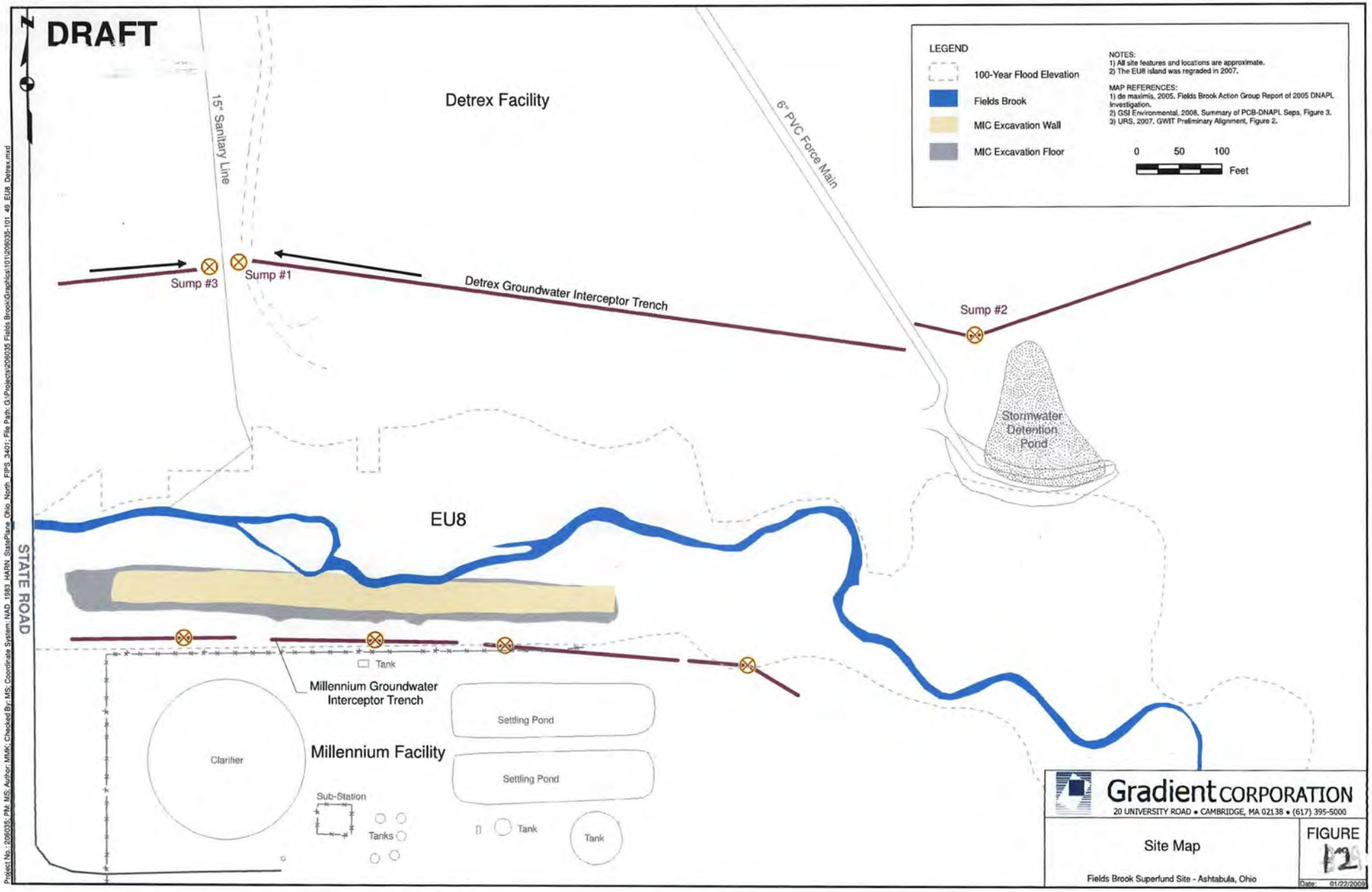
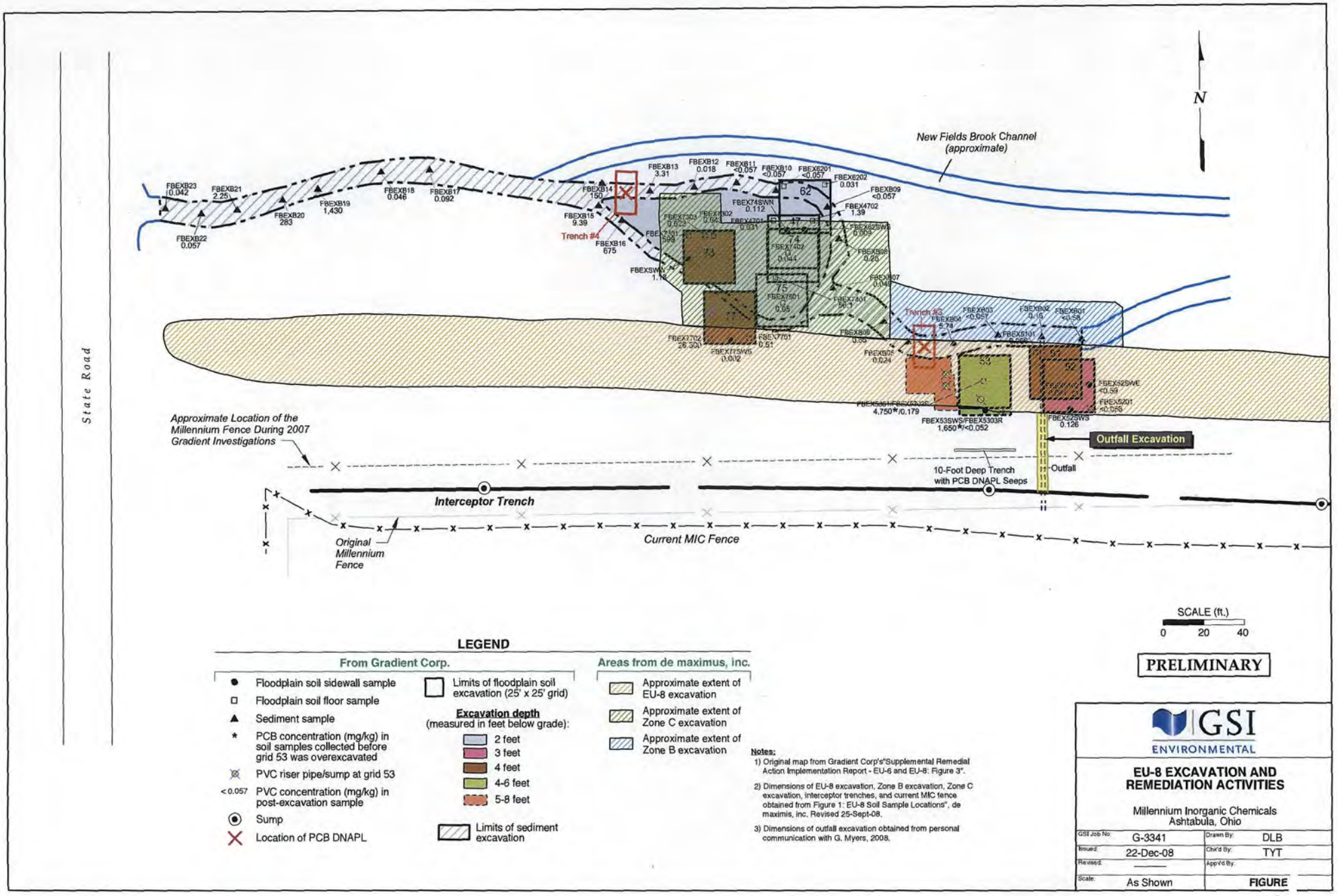


Figure Millenium -



LEGEND

From Gradient Corp.

- Floodplain soil sidewall sample
- Floodplain soil floor sample
- Sediment sample
- * PCB concentration (mg/kg) in soil samples collected before grid 53 was overexcavated
- PVC riser pipe/sump at grid 53
- <0.057 PVC concentration (mg/kg) in post-excavation sample
- Sump
- Location of PCB DNAPL
- Limits of floodplain soil excavation (25' x 25' grid)

Excavation depth (measured in feet below grade):

- 2 feet
- 3 feet
- 4 feet
- 4-6 feet
- 5-8 feet

- Limits of sediment excavation

Areas from de maximus, inc.

- Approximate extent of EU-8 excavation
- Approximate extent of Zone C excavation
- Approximate extent of Zone B excavation

Notes:

1) Original map from Gradient Corp's"Supplemental Remedial Action Implementation Report - EU-6 and EU-8: Figure 3".

2) Dimensions of EU-8 excavation, Zone B excavation, Zone C excavation, interceptor trenches, and current MIC fence obtained from Figure 1: EU-8 Soil Sample Locations", de maximis, inc. Revised 25-Sept-08.

3) Dimensions of outfall excavation obtained from personal communication with G. Myers, 2008.

PRELIMINARY

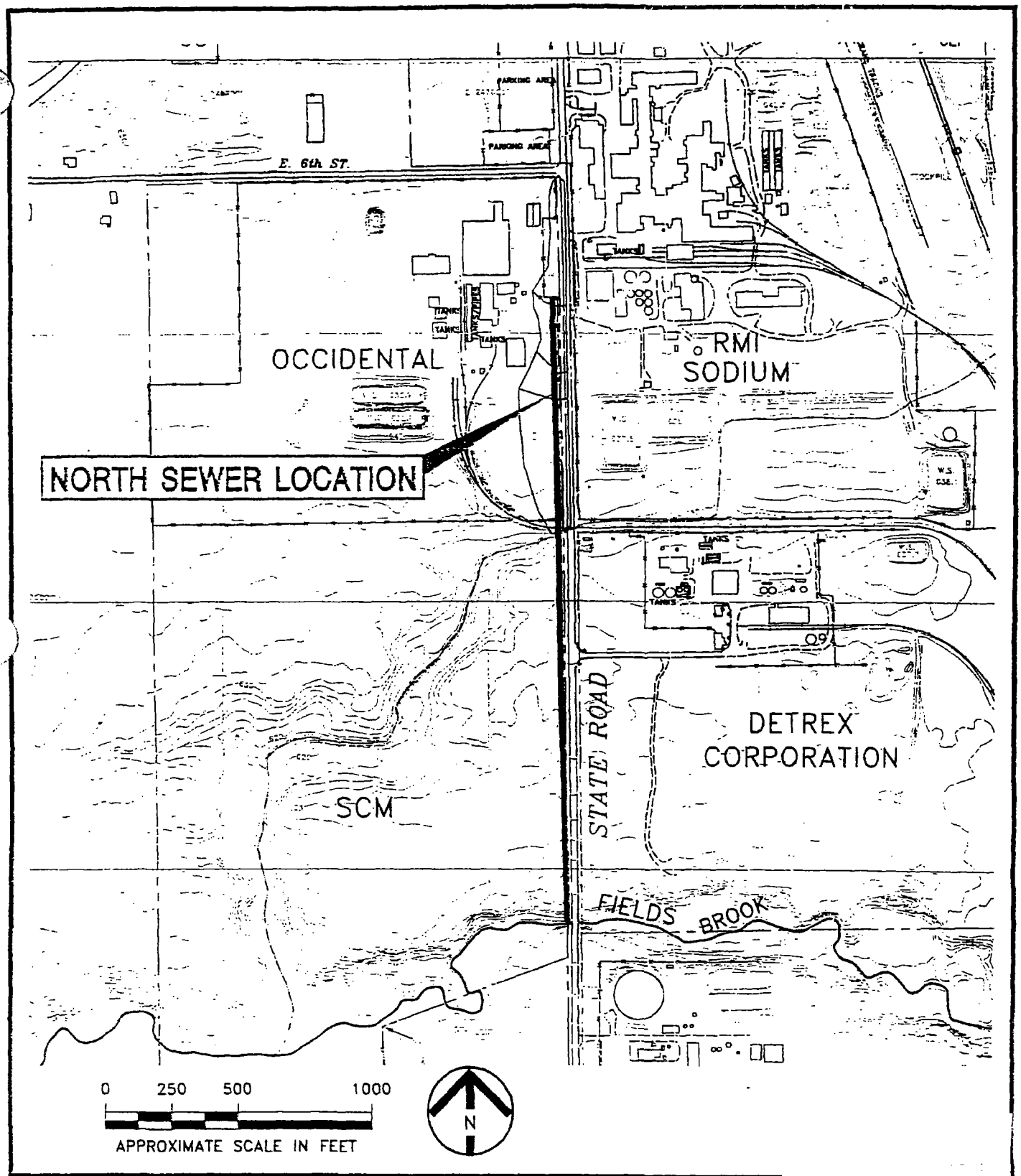
GSI ENVIRONMENTAL

EU-8 EXCAVATION AND REMEDIATION ACTIVITIES

Millennium Inorganic Chemicals
Ashtabula, Ohio

GSI Job No:	G-3341	Drawn By:	DLB
Issued:	22-Dec-08	Chk'd By:	TYT
Revised:	———	App'd By:	
Scale:	As Shown		FIGURE

13



SITE MAP

NORTH SEWER REMEDIAL ACTION ACTIVITIES

DRAWN BY: TBC	CHECKED BY: KMA	PROJECT NUMBER: 38-8E06013	DATE: 9/27/00	FIGURE NO: 14

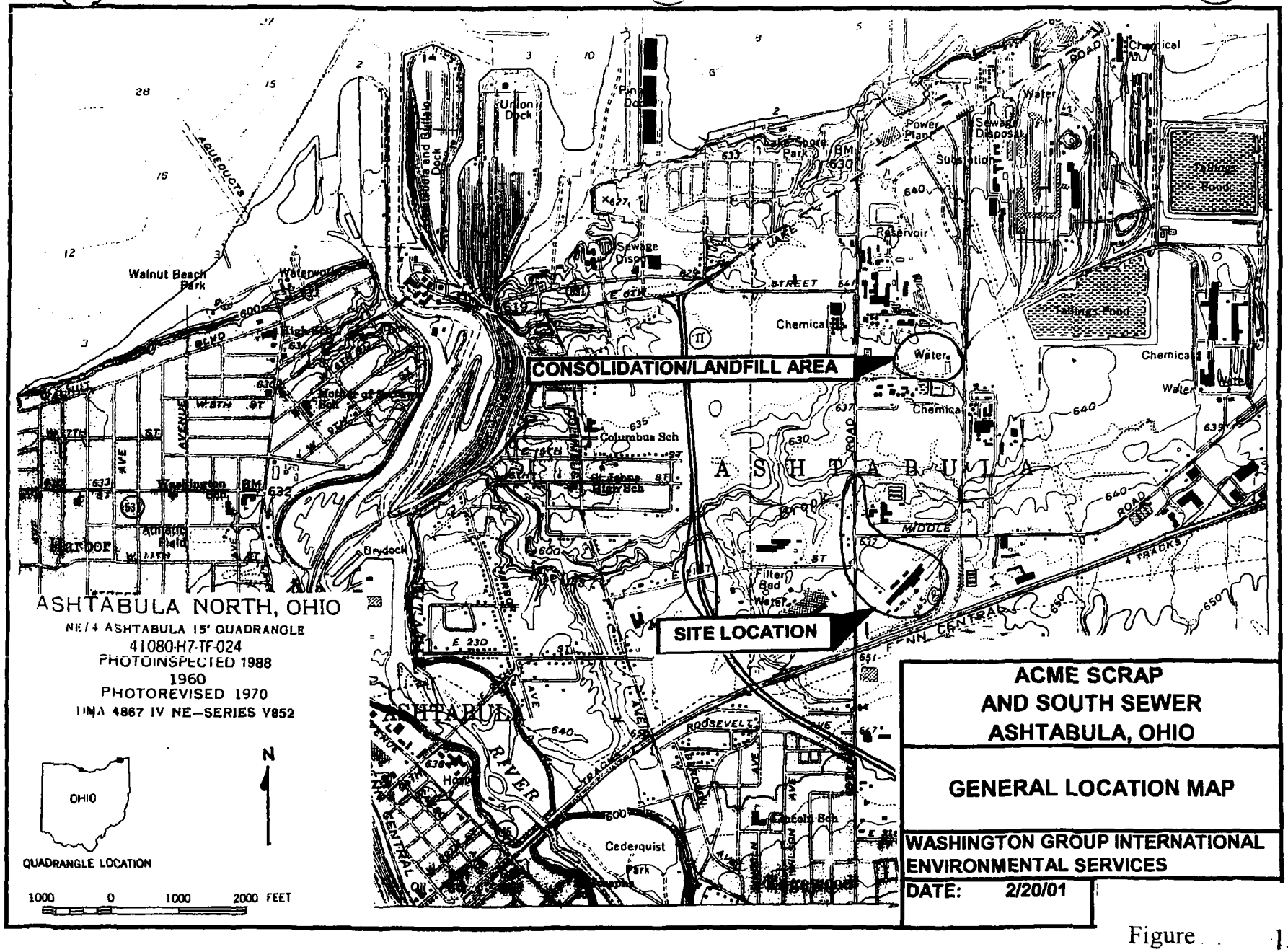

CONSOLIDATION/LANDFILL AREA
SITE LOCATION
ASHTABULA NORTH, OHIO
NE/4 ASHTABULA 15' QUADRANGLE
41080-H7-TF-024
PHOTOINSPECTED 1988
1960
PHOTOREVISED 1970
DMA 4867 IV NE—SERIES V852
OHIO
QUADRANGLE LOCATION
N
1000 0 1000 2000 FEET
ACME SCRAP
AND SOUTH SEWER
ASHTABULA, OHIO
GENERAL LOCATION MAP
WASHINGTON GROUP INTERNATIONAL
ENVIRONMENTAL SERVICES
DATE: 2/20/01

Figure 15

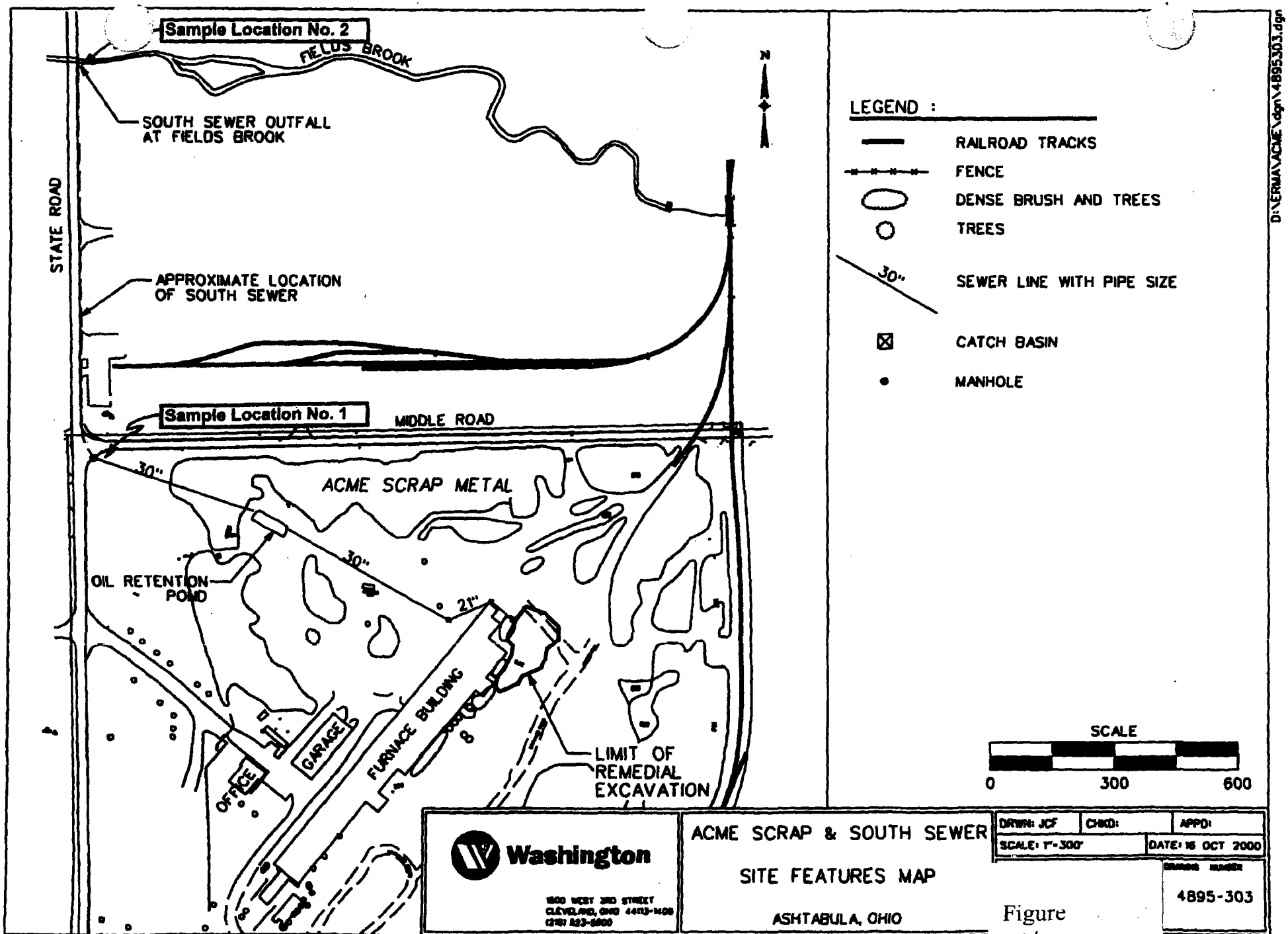
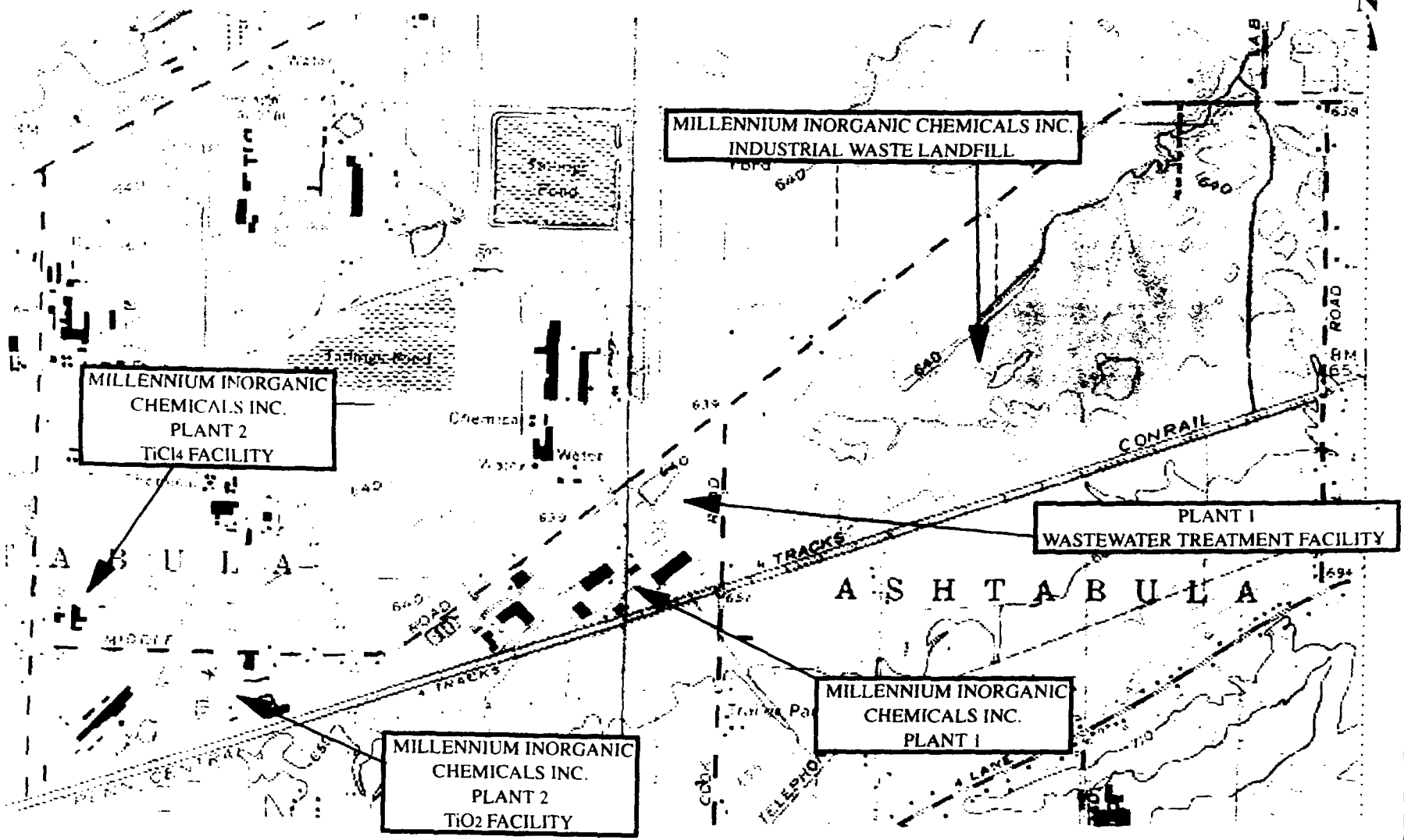

Sample Location No. 2
FIELDS BROOK
SOUTH SEWER OUTFALL AT FIELDS BROOK
STATE ROAD
APPROXIMATE LOCATION OF SOUTH SEWER
Sample Location No. 1
MIDDLE ROAD
30"
ACME SCRAP METAL
30"
OIL RETENTION POND
21"
GARAGE
FURNACE BUILDING
OFFICE
LIMIT OF REMEDIAL EXCAVATION
N
LEGEND :
RAILROAD TRACKS
FENCE
DENSE BRUSH AND TREES
TREES
30"
SEWER LINE WITH PIPE SIZE
CATCH BASIN
MANHOLE
SCALE
0
300
600
D:\ERM\ACME\.dgn\4895303.dgn
Washington
1600 WEST 3RD STREET
CLEVELAND, OHIO 44113-1406
(216) 523-5600
ACME SCRAP & SOUTH SEWER
SITE FEATURES MAP
ASHTABULA, OHIO
DRWN: JCF
CHKD:
APPD:
SCALE: 1"=300'
DATE: 16 OCT 2000
DRAWING NUMBER
4895-303

Figure 16



SOURCE: USGS 7.5 min TOPOGRAPHIC MAP, QUADRANGLES ASHTABULA NORTH, OH, 1970; NORTH GAGEVILLE, OH, 1979.

FIGURE 17
AREA MAP

Table 1 Acme

Results of O&M Sample - Presented as PPM total PCBs

Sample Date	Sample Location - South Sewer Outfall	Sample Location - (duplicate) South Sewer Outfall	Sample Location - NW Corner of Property	Sample Location - (duplicate) NW Corner of Property	Sample Location - Stormwater Outlet Pipe / South Sewer Inlet Pipe
9/20/2001	2.5	-	0.25	0.061	Not yet included as sample point.
3/7/2002	0.600	-	< 0.041	0.056	Not yet included as sample point.
10/15/2002	1.282	-	0.294	0.229	0.137
4/10/03	0.184	0.22	0.2	-	0.84
9/23/2003	0.050	-	0.031 J	0.018 J	0.23
12/3/2004	No sediment present.	No sediment present.	0.150	0.080	Sample point eliminated. Retention pond has been filled with soil.
10/28/2005	No sediment present	No sediment present	0.082	0.110	Sample point eliminated. Retention pond has been filled with soil.
9/22/2006	No sediment present	No sediment present	0.110	0.069	Sample point eliminated. Retention pond has been filled with soil.

Attachment 1

Environmental Operations and Management
450 Montbrook Lane
Knoxville, TN 37919
(865) 691-6254
Fax (865) 691-9595
Acct. Fax (865) 691-9835

MONTHLY REPORT
OPERATION & MAINTENANCE
FIELDS BROOK SUPERFUND SITE
ASHTABULA, OHIO
March 2009

Date: April 6, 2009
To: Robert Rule, ***de maximis, inc.***
From: Valerie Rule, O & M, Inc. VAR

This report summarizes the conditions and activities related to the Fields Brook Superfund Site (the Site) and Landfill, as well as other pertinent information regarding the Site for the month of March 2009. The Site Manager is Mr. Stan Baker.

Activities Performed:

- FBAG is providing support to the County Contractor who is performing replacement of the State Road Bridge. The FBAG Crew performed air monitoring, and removed product impacted soils in support of Bridge Contractor excavation of the South section lower headwalls and concrete footers. Product impacted soils and urban fill were removed from the area near the Trunk Waterline and footer concrete blocks. Product stained concrete blocks were noted and removed along with soils and other impacted debris. Analysis indicated TCE and PCE (chlorinated solvents) as the primary contaminants present. PCB concentrations were less than 3 mg/kg in soil samples from the South section excavation. The analytical data is attached. Approximately 315 tons of product impacted soils were removed from the South Section excavation, and approximately 40,000 gallons of contact water was pumped and transferred to Detrex for treatment. Further details are provided in the attached document and tables.

- An estimated total of 588 tons of impacted soil have been removed from the bridge area to date.

- The Fields Brook Landfill property is being used to provide support zones for construction activities associated with the Ashtabula River Cleanup Project. Visitors included:
  - O&M, Inc. employees: Bob Morris, Chuck Mitchell, and Kenny Bozman.
  - *de maximis, inc.* employees Stan Baker, and Bob Rule

Problems Encountered:

No problems were encountered beyond the activities listed above.

Leachate Pumped:

A total of 130,985 gallons have been removed from the leachate collection system. The leachate is now transferred to the Ashtabula River Transfer Station on East 21st Street, Ashtabula, Ohio, 44004 for treatment and disposal by the City of Ashtabula, Ohio.

Scheduled Activities:

- Waste shipments for soils from the bridge south section will begin in April (Pile E and Pile F). Destination is EQ Wayne Disposal in Michigan (some of this by others).
- The County Contractor is now assembling pre-cast concrete structural members and should complete work bridge by May 2009.
- O& M, Inc. will perform the quarterly groundwater sampling for Fields Brook Superfund Site and for the neighboring Ashtabula River Landfill beginning April 13, 2009.
- O& M, Inc. will continue to perform inspections and routine maintenance activities in conformance with the Consent Decree / Fields Brook OM&M.

STATE RD BRIDGE: SOUTH SECTOR PRODUCT REMOVAL

WATERLINE AND SE SEWER

By volume, the area beneath and adjacent to the trunk waterline, and beneath the 24 inch SE Sewer, yielded the most free product. The gravel bedding and urban fill appear to have been a preferential pathway as evidenced by the ubiquitous presence of product, while in contrast, product generally terminated at fill interface with native soils, except where sand seams were present. A product containing sand seam was found 3 ft below and 4 ft East of the SE sewer, at roughly the same elevation as the Waterline. The area beneath and East of the Sewer is a mixture of urban fill containing, gravel, brick, wood and assorted stone. Product was pervasive in this material. The 24inch sewer is located 24 ft East of the centerline of State Rd.

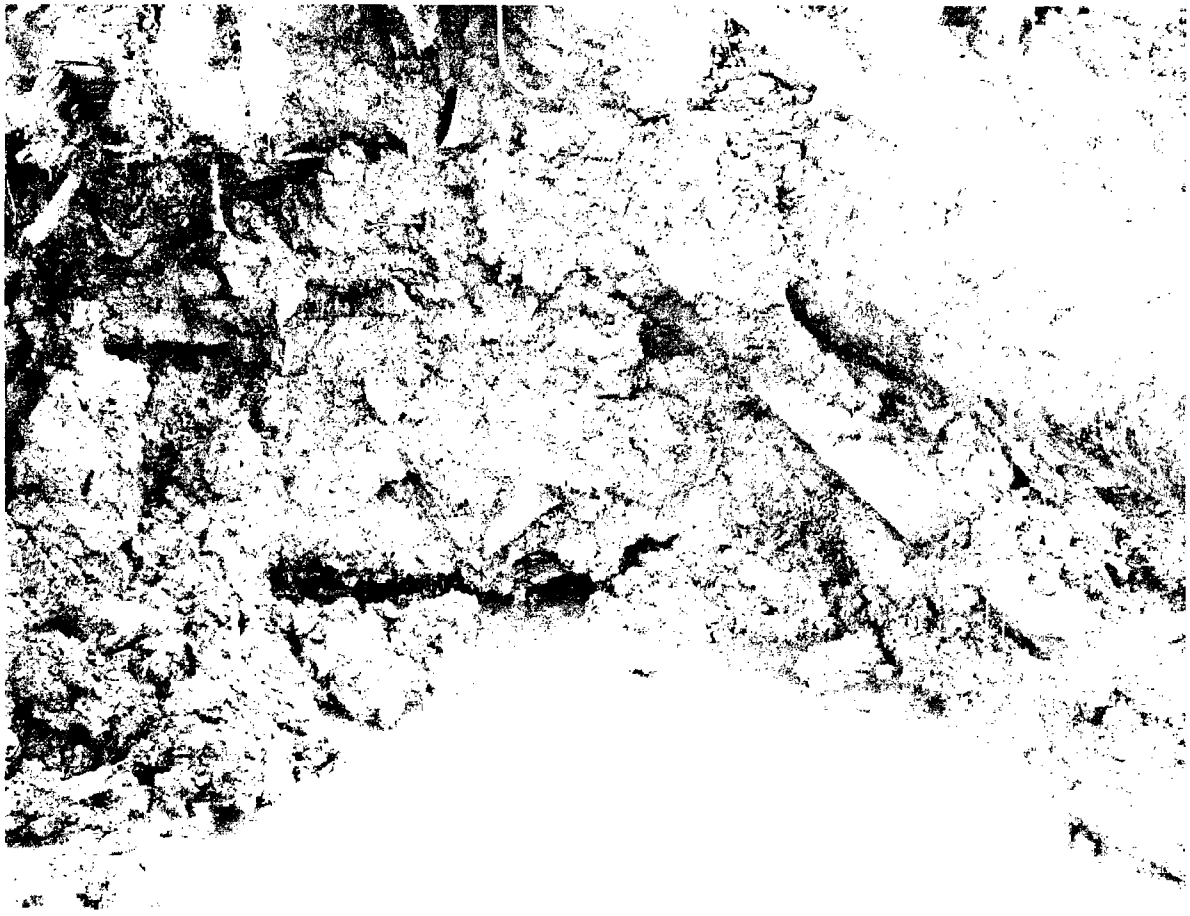
Estimated Product Volume: ½ gallon (typically in soil matrix – no large free pools)

Depth: 12-13ft below ground surface (BGS) or Gradient G – G' Cross Section: 611-612 Elevation (Aprox.)

Lithology: Interface of Clayey Silt/Lacustrine Clay

Tech is standing on Trunk Water line and looking South at 24" Sewer

Product stained urban fill beneath SE Sewer and Trunk water line



BRIDGE FOOTERS

Bridge Footers were impacted along the entire length of the South Sector. Product stained concrete and soils in vicinity were removed and accounted for bulk of soil removal.

Estimated Product Volume: Difficult to determine volume (typically in soil matrix)

Depth: 13-14ft below ground surface (BGS) or Gradient G – G' Cross Section: 610-609 Elevation (Aprox.)

Lithology: Lacustrine Clay and Silty Clay interface (Lacustrine Dominant)

SMALL VOLUME PRODUCT FIND 1

On 3/3/09, an estimated 1 ounce of DNAPL product was encountered at approximately 12 ft BGS near centerline of State Rd. Product appeared isolated and did not require extensive removal activity.

Estimated Product Volume: 1 ounce (with soil matrix)

Depth: 12ft below ground surface (BGS) or Gradient G – G' Cross Section: 612 Elevation (Aprox.)

Lithology: Lacustrine Clay and Silty Clay interface

SMALL VOLUME PRODUCT FIND 2

On 3/3/09, an estimated ½ to 1 ounce of DNAPL product was encountered at approximately 12 ft BGS and was 20 ft West of centerline of State Rd (near gasline). Product appeared isolated and did not require extensive removal activity.

Estimated Product Volume: <1 ounce (with soil matrix)

Depth: 12ft below ground surface (BGS) or Gradient G – G' Cross Section: 612 Elevation (Aprox.)

Lithology: Lacustrine Clay and Silty Clay interface

Additionally:

The North Side appears to mirror the South in that the footers were impacted at similar elevation as the South Footers and that copious Free Product finds were most often associated with urban fill around utility structures such as waterlines and sewers. The fill chosen by builders of the original bridge was construction rubble mixed with clayey silty soils including: brick, stone, slag, gravel and wood.

The North Sewer and the area in and around the Waterline yielded the greatest product volumes. North Sewer produced the greatest volume: soil matrix with 1/2 gallon to a gallon of product.

North Section of Waterline produced a similar volume as the South Section (aprox. 1/2 gal) in the same basic bedding plain and materials:

Depth: 12-13ft below ground surface (BGS) or Gradient G – G' Cross Section: 611-612 Elevation (Aprox.)
Lithology: Interface of Clayey Silt/Lacustrine Clay

The sand seam in F-F' was not prevalent under the bridge (that we could see).

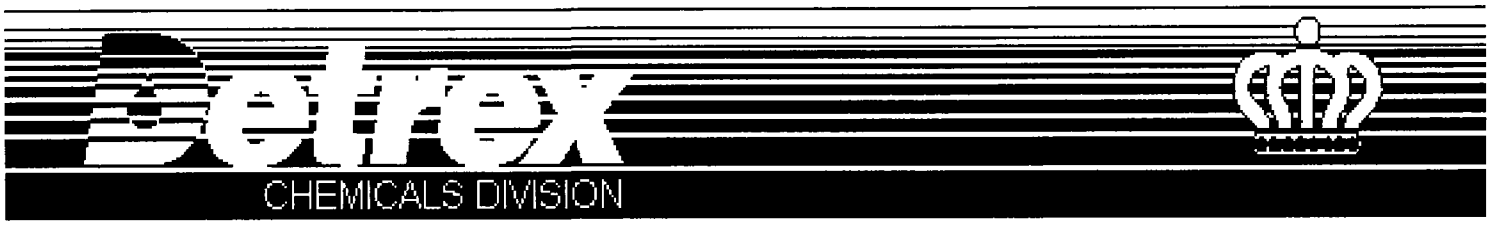
CompuChem, a division of Liberty Analytical

Client: DEMAXIMIS **Work:** 0903112

Project FBAG 3075F STATE RD. BRIDGE **Sdg:** 0903112

Lab ID	Client ID	Matrix	Date Sampled	Date Received
0903112-01	PILE E1	Soil	03/17/2009 14:15	03/19/2009 09:12
0903112-02	PILE E2	Soil	03/17/2009 14:30	03/19/2009 09:12
0903112-03	PILE F	Soil	03/18/2009 12:30	03/19/2009 09:12

Attachment 2



May 14, 2009

Ms. Leah Evison
United States Environmental Protection Agency
Office of Superfund, Region 5
SR-6J
77 West Jackson Blvd.
Chicago, IL 60604-3590

Certified Mail, Return Receipt: 7004 1160 0003 4669 0562

Subject: Monthly Status Report-April 2009
Fields Brook Superfund Site
Detrex Source Area-Ashtabula, Ohio

Dear Ms. Van Donsel,

Detrex is submitting the enclosed monthly status report for the month of April 2009, for the Detrex Source Area Project.

If you have any questions, please contact me at (440) 997-6131, ext. 201.

Sincerely,

Thomas W. Steib
Operations Manager

cc: T. Doll, D. Church, R. Currie, J. Vence, K. Buell, URS, R. Williams

FIELDS BROOK SUPERFUND SITE, OPERABLE UNIT #2
DETREX SOURCE AREA
MONTHLY TECHNICAL STATUS REPORT

Project Phase: Remedial Design and Remedial Action.

Prepared by: Tom Steib of Detrex Corporation.

Period: Month of April 2009.

1. Progress Made This Reporting Period:

ACTIVITY	THIS PERIOD GALLONS	YEAR TO DATE GALLONS	TOTAL GALLONS
Estimated DNAPL Recovered	**-0- (Does not include volume in settling tank)**	**-0-**	**15,680**
DNAPL Disposed	**-0-**	**-0-**	**13,980**

A. There were -0- gallons of DNAPL pumped from the inside settling tank to the outside settling tank during April 2009.
B. Vacuum is at 20 inches.
C. Wells 1, 2, 4, 5, 6, 9, 10, 11, and 12 are being pumped on a regular basis.
D. Well 3, 7, and 8 are not pumpable and will be repaired.
E. Wells 13 and 14 do not pump.
F. All pumpable wells have to be flushed with water frequently to get the sediment out of the well insert to be able to pump.
G. Generating excessive amount of silt with the northern wells showing more silt than the east wells. Some of this silt causes difficulty in phase separation. Some of the silt settles to the bottom, while some silt gets caught in the rag layer between the DNAPL and the water, making the phase separation more difficult.
H. The collection trench across State Road was dug in April. Only a little product around the north sewer was encountered.
I. See results of DNAPL well measurement, DNAPL well sampling, and sump samples.

2. Work Planned During the Next 90 Days.

A. Continue re-developing the wells due to excessive silt build up.
B. All wells that are not pumpable will be attempted to be brought back on line.
C. Continue general repair.

Detrex Ashtabula, OH DNAPL Well VOC Analyses

May 27, 2009

Date Sampled	05/11/09	04/23/09	04/23/09	04/23/09	04/23/09	04/23/09	04/23/09	04/23/09	04/23/09
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<1.0	<5.0	<250	<500	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<5.0	<250	808	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/l	<1.0	<5.0	<250	<500	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/l	<1.0	<5.0	1,140	<500	<5.0	<5.0	<5.0	<5.0	<5.0
Choroform, ug/l	<1.0	<5.0	<250	<500	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride, ug/l	<5.0	<5.0	<250	505	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene, ug/l	<1.0	6.92	35,500	44,800	<5.0	<5.0	<5.0	28.8	<5.0

Date Sampled	01/29/09	01/29/09	01/29/09	01/29/09	01/29/09	01/29/09	01/29/09	01/29/09	01/29/09
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<5.0	<1.0	<100	<100	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<100	1,780	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<100	<100	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	949	<100	<1.0	<1.0	<1.0	<1.0	<1.0
Choroform, ug/l	<1.0	<1.0	<100	<100	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<4.0	<4.0	<400	<400	<4.0	<4.0	<4.0	<4.0	<4.0
Trichloroethene, ug/l	<5.0	<1.0	40,500	58,200	<1.0	<1.0	3.8	<1.0	<1.0

Date Sampled	11/12/08	11/12/08	11/12/08	11/12/08	11/12/08	11/12/08	11/12/08	11/12/08	11/12/08
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<5.0	<5.0	<1,250	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5.0	<1,250	2,600	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/l	<5.0	<5.0	<1,250	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/l	<5.0	<5.0	1,270	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0
Choroform, ug/l	<5.0	<5.0	<1,250	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride, ug/l	<5.0	<5.0	<1,250	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene, ug/l	<5.0	<5.0	39,400	63,600	<5.0	<5.0	<5.0	<5.0	<5.0

Date Sampled	08/07/08	08/07/08	08/07/08	08/07/08	08/07/08	08/07/08	08/07/08	08/07/08	08/07/08
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<10	<50	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<10	2,470	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	24.2	<50	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	216	<50	<1.0	<1.0	<1.0	<1.0	<1.0
Choroform, ug/l	<2.0	<2.0	<20	296	<2.0	<2.0	<2.0	<2.0	<2.0
Methylene Chloride, ug/l	<5.0	<5.0	<50	<250	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene, ug/l	<2.0	<2.0	24,500	49,060	9.04	<2.0	9.46	5.89	<2.0

Date Sampled	05/08/08	05/08/08	05/08/08	05/08/08	05/08/08	05/08/08	05/08/08	05/08/08	05/08/08
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<250	<250	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<250	3,010	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<250	<250	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	940	<250	<1.0	<1.0	<1.0	<1.0	<1.0
Choroform, ug/l	<1.0	<1.0	<250	346	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<4.0	<4.0	<2500	<2500	<4.0	<4.0	<4.0	<4.0	<4.0
Trichloroethene, ug/l	<1.0	<1.0	45,900	66,100	<1.0	<1.0	<1.0	<1.0	<1.0

Date Sampled	02/21/08	02/21/08	02/21/08	02/21/08	02/21/08	02/21/08	02/21/08	02/21/08	02/21/08
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<250	<250	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<250	1,900	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<250	<250	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	943	<250	<1.0	<1.0	<1.0	<1.0	<1.0
Choroform, ug/l	<1.0	<1.0	<250	<250	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<4.0	<4.0	<1000	<1000	<4.0	<4.0	<4.0	<4.0	<4.0
Trichloroethene, ug/l	<1.0	<1.0	38,400	66,400	<1.0	<1.0	<1.0	<1.0	<1.0

Date Sampled	11/26/07	11/26/07	11/26/07	11/26/07	11/26/07	11/26/07	11/26/07	11/26/07	11/26/07
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank

1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	1920	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	771	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	287	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	35,400	59,400	2.61	ND	ND

Date Sampled	11/03/06	11/03/06	11/03/06	11/03/06	11/03/06	11/03/06	11/03/06
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	Trip Blank
VOC							
1,1,1-Trichloroethane, ug/l	ND	ND	ND	9.64	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	2620	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	61.6	80	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	806	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	405	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	40,500	77,000	ND	ND	ND

Date Sampled	09/15/06	08/10/06	08/10/06	08/10/06	08/10/06	08/10/06	08/10/06
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	Trip Blank
VOC							
1,1,1-Trichloroethane, ug/l	ND	ND	ND	6.56	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	3320	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	58.5	31.3	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	798	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	334	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	33,200	45,300	ND	ND	ND

Date Sampled	05/19/06	05/19/06	05/19/06	05/19/06	05/19/06	05/19/06	05/19/06
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	Trip Blank
VOC							
1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND

VOC									
1,1,1-Trichloroethane, ug/l	<5.0	<1.0	<25.0	<50.0	<1.0	<1.0	<5.0	<5.0	ND
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<1.0	<25.0	3,073	<1.0	<1.0	<5.0	<5.0	ND
1,1,2-Trichloroethane, ug/l	<5.0	<1.0	57	<50.0	<1.0	<1.0	<5.0	<5.0	ND
1,1-Dichloroethene, ug/l	<5.0	<1.0	1,240	333	<1.0	<1.0	<5.0	<5.0	ND
1,3-Dichlorobenzene, ug/l	NA	NA	NA	NA	NA	NA	NA	NA	ND
Choroform, ug/l	<5.0	<1.0	<25.0	447	<1.0	<1.0	<5.0	<5.0	ND
Methylene Chloride, ug/l	<10.0	<4.0	<100	<200	<4.0	<4.0	<10.0	<10.0	ND
Trichloroethene, ug/l	<5.0	<1.0	41,100	63,160	<1.0	<1.0	<5.0	<5.0	ND

Date Sampled	09/13/07	09/13/07	09/13/07	09/13/07	09/13/07	09/13/07	09/13/07	09/13/07	09/13/07
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	36	2380	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	62	32	ND	ND	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	1,160	185	ND	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	298	ND	ND	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	40,900	57,560	ND	3.83	ND	1.02	ND

Date Sampled	06/01/07	06/01/07	06/01/07	06/01/07	06/01/07	06/01/07	06/01/07	06/01/07	06/01/07
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	RMI-N	RMI-S	Trip Blank
VOC									
1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	1910	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	47	34	ND	ND	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	890	186	ND	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	330	ND	ND	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	39,300	66,600	ND	ND	ND	8.93	ND

Date Sampled	03/15/07	03/15/07	03/15/07	03/15/07	03/15/07	03/15/07	03/15/07
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	Trip Blank
VOC							

1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	2060	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	736	ND	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND	ND	1.02
Trichloroethene, ug/l	ND	ND	50,300	77,500	ND	1.15	5.27
Date Sampled	03/13/06	03/13/06	03/13/06	03/13/06	03/13/06	03/13/06	
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S	
VOC							
1,1,1-Trichloroethane, ug/l	ND	ND	ND	NA	ND	ND	
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	NA	ND	ND	
1,1,2-Trichloroethane, ug/l	ND	ND	53	NA	ND	ND	
1,1-Dichloroethene, ug/l	ND	ND	1,060	NA	ND	ND	
1,3-Dichlorobenzene, ug/l	ND	ND	ND	NA	ND	ND	
Choroform, ug/l	ND	ND	ND	NA	ND	ND	
Methylene Chloride, ug/l	ND	ND	ND	NA	ND	ND	
Trichloroethene, ug/l	ND	ND	84,000	NA	ND	ND	

Date Sampled	01/10/06	01/10/06	01/10/06	01/10/06	01/10/06	01/10/06
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S
VOC						
1,1,1-Trichloroethane, ug/l	ND	ND	ND	15.4	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	1790	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	64.4	21.2	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	733	209	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	431	ND	ND
Methylene Chloride, ug/l	ND	ND	2.57	ND	ND	ND
Trichloroethene, ug/l	3.43 est.	1.36 est.	44,400	87,100	1.49 est.	1.79 est.

Note: Est. means results are estimated. Trichloroethene was detected in the 1/13/06 method blank at 1.02 ug/l, which applies to samples above marked est. For the samples analyzed on 1/13/06, Trichloroethene was flagged as estimated. Results my be biased high due to presence in the method blank. No other quality control irregularities were identified.

Date Sampled	09/29/05	09/29/05	09/29/05	09/29/05	09/29/05	09/29/05
Well Number	MW-21	MW-02S	MW-04S	MW-10	MW-17S	MW-18S

VOC						
1,1,1-Trichloroethane, ug/l	ND	ND	ND	15	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	1190	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	29.3	24.9	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	753	237	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	2.07	ND	ND
Choroform, ug/l	ND	ND	ND	199	ND	ND
Methylene Chloride, ug/l	ND	ND	2.57	6.44	ND	ND
Trichloroethene, ug/l	ND	ND	31,700	71,500	1.38	ND

Date Sampled	06/15/05	06/15/05	06/15/05	06/15/05	07/08/05	06/15/05
Well Number	MW-21	MW-02S	MW-04S	MW-17S	MW-17S	MW-18S
VOC						
1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	1.39*	1.39*	ND
1,1,2-Trichloroethane, ug/l	ND	ND	40.8	ND	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	912	ND	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	2.51	ND	ND	ND
Trichloroethene, ug/l	ND	ND	27,100	1.6*	1.26*	ND
*Well 17S is suspected of being contaminated by the oil/water phase sample tape.						

Date Sampled	03/18/05	04/22/05	03/31/05	03/31/05	04/22/05
Well Number	MW-21	MW-02S	MW-04S	MW-17S	MW-18S
VOC					
1,1,1-Trichloroethane, ug/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, ug/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, ug/l	ND	ND	21.1	ND	ND
1,1-Dichloroethene, ug/l	ND	ND	1,030	ND	ND
1,3-Dichlorobenzene, ug/l	ND	ND	ND	ND	ND
Choroform, ug/l	ND	ND	ND	ND	ND
Methylene Chloride, ug/l	ND	ND	ND	ND	ND
Trichloroethene, ug/l	ND	ND	26,300	ND	ND

Detrex Ashtabula, OH Well Water and DNAPL Levels

May 27, 2009

April 20, 2009

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	3.60	19.50	26.70	7.20
RMW-2	5.00	20.90	23.80	2.90
RMW-3	5.20	19.30	24.70	5.40
MW-7	3.90	12.00	12.70	0.70
MW-10	4.90	None	19.90	None
MW-02S	2.90	None	15.10	None
MW-02D	5.60	None	52.50	None
MW-04S	6.80	None	16.60	None
MW-17D	4.30	None	50.30	None
MW-17S	3.30	None	17.20	None
MW-18D	5.40	None	52.60	None
MW-18S	2.00	None	17.00	None
MW-21	4.30	None	28.20	None
SLURRY NORTH	7.20	None	18.30	None
SLURRY SOUTH	8.70	None	22.00	None

Note: Depths measured in feet from top of outer protective casing.

January 8, 2009

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	3.60	19.40	26.80	7.40
RMW-2	5.70	20.70	23.90	3.20
RMW-3	5.30	19.50	24.80	5.30
MW-7	3.90	12.00	12.80	0.80
MW-10	5.40	None	20.00	None
MW-02S	3.50	None	14.90	None
MW-02D	5.70	None	52.20	None
MW-04S	6.80	None	16.60	None
MW-17D	5.30	None	50.30	None
MW-17S	3.90	None	17.20	None
MW-18D	6.20	None	52.50	None
MW-18S	2.10	None	17.00	None
MW-21	4.00	None	28.20	None
SLURRY NORTH	8.90	None	18.40	None
SLURRY SOUTH	9.10	None	22.30	None

Note: Depths measured in feet from top of outer protective casing.

November 5, 2008				
Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	5.90	18.60	27.00	8.40
RMW-2	6.80	22.00	24.30	2.30
RMW-3	9.40	17.10	25.20	8.10
MW-7	5.50	12.90	12.90	0.00
MW-10	12.90	None	19.90	None
MW-02S	14.30	None	14.90	None
MW-02D	6.20	None	52.30	None
MW-04S	6.40	None	16.70	None
MW-17D	5.30	None	50.30	None
MW-17S	15.60	None	17.20	None
MW-18D	5.40	None	52.50	None
MW-18S	12.20	None	17.10	None
MW-21	6.70	None	28.10	None
SLURRY NORTH	9.20	None	18.50	None
SLURRY SOUTH	9.70	None	22.30	None

Note: Depths measured in feet from top of outer protective casing.

June 11, 2008				
Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	4.30	18.80	26.70	7.90
RMW-2	5.40	21.90	23.80	1.90
RMW-3	8.90	13.90	24.70	10.80
MW-7	5.50	12.90	13.30	0.40
MW-10	8.10	None	19.70	None
MW-02S	7.00	None	15.00	None
MW-02D	5.70	None	52.00	None
MW-04S	6.30	None	16.70	None
MW-17D	4.20	None	50.30	None
MW-17S	9.50	None	17.20	None
MW-18D	4.60	None	52.50	None
MW-18S	7.40	None	17.00	None
MW-21	5.50	None	28.20	None
SLURRY NORTH	8.90	None	18.30	None
SLURRY SOUTH	9.80	None	22.20	None

Note: Depths measured in feet from top of outer protective casing.

March 24, 2008				
Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	4.30	18.40	26.80	8.40
RMW-2	5.60	20.60	23.90	3.30

RMW-3	6.10	15.10	24.90	9.80
MW-7	6.60	6.90	14.60	7.70
MW-10	7.90	None	19.90	None
MW-02S	4.10	None	15.10	None
MW-02D	6.20	None	52.30	None
MW-04S	6.90	None	16.60	None
MW-17D	6.50	None	50.30	None
MW-17S	6.30	None	17.20	None
MW-18D	6.60	None	52.60	None
MW-18S	3.50	None	17.20	None
MW-21	4.60	None	28.30	None
SLURRY NORTH	8.40	None	18.40	None
SLURRY SOUTH	9.30	None	22.20	None

Note: Depths measured in feet from top of outer protective casing.

December 18, 2007

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	4.30	18.40	26.80	8.40
RMW-2	5.60	20.60	23.90	3.30
RMW-3	6.10	15.10	24.90	9.80
MW-7	6.10	6.80	14.50	7.70
MW-10	7.10	None	19.90	None
MW-02S	3.90	None	15.10	None
MW-02D	5.80	None	52.20	None
MW-04S	6.50	None	16.70	None
MW-17D	6.20	None	50.30	None
MW-17S	5.90	None	17.20	None
MW-18D	6.10	None	52.60	None
MW-18S	2.70	None	17.20	None
MW-21	3.20	None	28.30	None
SLURRY NORTH	8.10	None	18.40	None
SLURRY SOUTH	9.00	None	22.20	None

Note: Depths measured in feet from top of outer protective casing.

September 12, 2007

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	5.10	18.50	26.80	8.30
RMW-2	5.70	20.60	23.70	3.10
RMW-3	10.00	12.70	24.80	12.10
MW-7	6.60	9.20	14.20	5.00
MW-10	5.00	18.60	20.10	1.50
MW-02S	9.10	None	15.10	None

MW-02D	6.20	None	52.50	None
MW-04S	6.30	None	16.60	None
MW-17D	4.90	None	50.80	None
MW-17S	15.40	None	17.20	None
MW-18D	5.90	None	52.60	None
MW-18S	12.00	None	17.10	None
MW-21	5.90	None	28.30	None
SLURRY NORTH	8.60	None	18.40	None
SLURRY SOUTH	9.60	None	22.20	None

Note: Depths measured in feet from top of outer protective casing.

May 21, 2007				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	4.20	19.40	26.80	7.40
RMW-2	6.10	20.90	23.80	2.90
RMW-3	7.40	14.70	24.80	10.10
MW-7	6.60	9.20	14.20	5.00
MW-10	5.00	18.60	20.10	1.50
MW-01S	Well no longer exists.			
MW-02S	4.20	None	15.10	None
MW-02D	37.00	None	52.80	None
MW-04S	7.00	None	16.80	None
MW-17D	3.50	None	50.50	None
MW-17S	4.60	None	17.20	None
MW-18D	7.00	None	53.10	None
MW-18S	2.80	None	17.20	None
MW-20S				
MW-21	5.20	None	28.20	None
SLURRY NORTH	8.70	None	18.90	None
SLURRY SOUTH	10.60	None	22.40	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

February 2, 2007				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	4.10	18.00	26.70	8.70
RMW-2	6.00	20.30	23.80	3.50
RMW-3	6.00	15.50	24.80	9.30
MW-7	6.00	6.60	14.40	7.80
MW-10	5.00	18.70	20.30	1.60
MW-01S	Well no longer exists.			
MW-02S	2.80	None	14.90	None

MW-02D	37.60	None	52.90	None
MW-04S	7.00	None	16.70	None
MW-17D	5.80	None	50.70	None
MW-17S	3.10	None	17.20	None
MW-18D	14.60	None	51.00	None
MW-18S	2.60	None	17.00	None
MW-20S				
MW-21	3.50	None	28.20	None
SLURRY NORTH	Access	Blocked		
SLURRY SOUTH	Access	Blocked		
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

November 7, 2006

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	4.50	18.00	26.60	8.60
RMW-2	6.10	20.40	23.80	3.40
RMW-3	6.30	15.50	24.80	9.30
MW-7	6.60	6.70	14.40	7.70
MW-10	5.10	18.80	20.20	1.40
MW-01S	Well no longer exists.			
MW-02S	3.10	None	15.00	None
MW-02D	38.50	None	52.90	None
MW-04S	6.40	None	16.70	None
MW-17D	10.40	None	50.40	None
MW-17S	3.20	None	17.20	None
MW-18D	14.20	None	52.50	None
MW-18S	1.80	None	17.20	None
MW-20S				
MW-21	3.50	None	28.20	None
SLURRY NORTH	Access	Blocked		
SLURRY SOUTH	Access	Blocked		
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

August 9, 2006

Well Number	Depth To Water	Depth to DNAPL	Depth to Bottom	Depth of DNAPL
RMW-1	4.60	19.70	26.80	7.10
RMW-2	5.70	21.40	23.90	2.50
RMW-3	7.70	16.60	24.90	8.30
MW-7	NA	NA	NA	NA

MW-10	5.10	18.80	20.00	1.20
MW-01S	Well no longer exists.			
MW-02S	3.80	None	15.10	None
MW-02D	16.70	None	52.90	None
MW-04S	6.70	None	16.70	None
MW-17D	15.50	None	50.80	None
MW-17S	7.20	None	17.10	None
MW-18D	19.90	None	53.10	None
MW-18S	4.70	None	17.00	None
MW-20S				
MW-21	4.80	None	28.30	None
SLURRY NORTH	Access	Blocked		
SLURRY SOUTH	Access	Blocked		
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

May 18, 2006				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	4.20	19.40	26.80	7.40
RMW-2	5.30	21.00	23.80	2.80
RMW-3	6.40	14.60	18.20	3.60
MW-7	NA	NA	NA	NA
MW-10	5.00	None	20.10	None
MW-01S	Well no longer exists.			
MW-02S	2.90	None	14.90	None
MW-02D	24.80	None	52.20	None
MW-04S	5.50	None	16.80	None
MW-17D	26.30	None	50.30	None
MW-17S	3.30	None	17.20	None
MW-18D	30.00	None	52.60	None
MW-18S	1.90	None	17.20	None
MW-20S				
MW-21	4.00	None	28.30	None
SLURRY NORTH	7.50	None	18.80	None
SLURRY SOUTH	9.00	None	22.40	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

March 16, 2006				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	3.90	19.90	26.80	6.90

RMW-2	5.10	21.70	23.80	2.10	
RMW-3	5.00	15.80	18.20	2.40	
MW-7	6.50	6.90	14.50	7.60	
MW-10	5.30	19.00	21.10	2.10	
MW-01S	Well no longer exists.				
MW-02S	3.00	None	15.00	None	
MW-02D	38.60	None	53.00	None	
MW-04S	6.90	None	16.60	None	
MW-17D	37.50	None	50.70	None	
MW-17S	3.40	None	17.20	None	
MW-18D	38.70	None	52.60	None	
MW-18S	2.00	None	17.20	None	
MW-20S					
MW-21	3.40	None	28.20	None	
SLURRY NORTH	7.80	None	20.20	None	3/22/2006
SLURRY SOUTH	8.80	None	22.30	None	3/22/2006
RMIMW-05S	Well no longer exists.				

Note: Depths measured in feet from top of outer protective casing.

December 14, 2005				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	4.20	19.70	26.80	7.10
RMW-2	5.40	21.80	23.90	2.10
RMW-3	6.10	14.80	18.30	3.50
MW-7	7.30	7.80	14.70	6.90
MW-10	7.00	19.00	20.20	1.20
MW-01S	Well no longer exists.			
MW-02S	3.50	None	15.10	None
MW-04S	6.90	None	16.90	None
MW-17D	7.30	None	50.40	None
MW-17S	10.20	None	17.20	None
MW-18D	7.30	None	52.60	None
MW-18S	2.60	None	17.30	None
MW-20S				
MW-21	3.80	None	28.30	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

September 29, 2005				
Well Number	**Depth To Water**	**Depth to DNAPL**	**Depth to Bottom**	**Depth of DNAPL**
RMW-1	5.70	19.10	27.20	8.10

RMW-2	6.10	21.50	24.40	2.90
RMW-3	10.20	12.90	18.80	5.90
MW-7	8.00	8.30	14.80	6.50
MW-10	11.60	19.00	20.10	1.10
MW-01S	Well no longer exists.			
MW-02S	7.00	None	15.10	None
MW-04S	6.80	None	16.90	None
MW-17D	6.00	None	50.20	None
MW-17S	15.20	None	17.20	None
MW-18D	5.80	None	52.60	None
MW-18S	8.40	None	17.20	None
MW-20S				
MW-21	4.80	None	28.30	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

June 5, 2005				
Well	**Depth**	**Depth**	**Depth to**	**Depth of**
Number	**To Water**	**to DNAPL**	**Bottom**	**DNAPL**
RMW-1	5.20	19.80	23.80	4.00
RMW-2	6.50	21.80	26.00	4.20
RMW-3	8.80	13.80	17.80	4.00
MW-01S	Well no longer exists.			
MW-02S	6.10	None	15.05	None
MW-04S	7.30	None	17.10	None
MW-17D	3.80	None	50.40	None
MW-17S	7.50	None	17.30	None
MW-18D	3.60	None	52.60	None
MW-18S	5.10	None	17.30	None
MW-20S				
MW-21	5.80	None	28.30	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

March 31, 2005				
Well	**Depth**	**Depth**	**Depth to**	**Depth of**
Number	**To Water**	**to DNAPL**	**Bottom**	**DNAPL**
RMW-1	5.20	21.70	23.80	2.10
RMW-2	4.23	22.40	26.00	3.60
RMW-3	6.06	16.50	17.80	1.30
MW-01S	Well no longer exists.			
MW-02S	2.79		15.10	None
MW-04S	7.31		16.20	None

MW-17D	3.32		50.30	None
MW-17S	3.37		16.70	None
MW-18D	4.12		52.65	None
MW-18S	1.93		17.20	None
MW-20S	8.90		20.70	None
MW-21	4.08		28.20	None
RMIMW-05S	Well no longer exists.			

Note: Depths measured in feet from top of outer protective casing.

September 1, 2004		
Well Number	Water Depth	DNAPL Depth
RMW-1	14.5	3.1
RMW-2	8.0	12.2
RMW-3	4.2	5.0

June 7, 2004		
Well Number	Water Depth	DNAPL Depth
RMW-1	14.9	3.1
RMW-2	14.3	7.1
RMW-3	6.3	4.6

Attachment 3

Millennium Plant Site at the Fields Brook Superfund Site
Ashtabula, Ohio
Monthly Progress Report

PROJECT PHASE: Removal Actions per the Administrative Order Docket V-W-08-C-883

PREPARED BY: *de maximis, Inc.*, Robert Rule, Project Coordinator

PERIOD: March 1 through March 31, 2009

1. SIGNIFICANT DEVELOPMENTS AND WORK PERFORMED THIS REPORTING PERIOD

- Successfully treated and discharged 502,396.0 gallons of water from the interceptor trenches, and main excavation. On March 31, 2009, composite sample FRAC 3/FRAC 4 failed (35,978 gallons) but was successfully re-treated and discharged in April.
- Began direct discharge of excavation water to Fields Brook on March 10, 2009 via a diffuser located in EU-6. Ceased direct discharge on March 11, 2009. Discharged an estimated 509,250 gallons to Fields Brook. Samples were taken at the diffuser located in EU-6 approximately 125ft West of State Rd Bridge (See General Water Sample Data Table).
- Began treatment of excavation water via the WTP March 12, 2009 and continued through rest of month (when not treating Interceptor Trench Water)
- Analyzed samples from different stages in the water treatment train: post filters and system effluent (See General Water Sample Data Table).
- Bi-weekly sampling was conducted of the main excavation, and interceptor trenches.
- Monitored and tracked water treatment system discharge for Millennium's NPDES requirements.

2. ANALYTICAL DATA RECEIVED THIS PERIOD

- See attachments

3. DEVELOPMENTS ANTICIPATED NEXT REPORTING PERIOD

- Continue to maintain (pump and treat) storm water in the main excavation and EU-8 on an as needed basis; and
- Continue bi-weekly sampling, pumping and treating of the four interceptor sumps.

4. ISSUES ENCOUNTERED AND RECOMMENDED SOLUTIONS

- N/A

5. ATTACHMENTS

- Sample Summary Sheet
- NPDES Discharge Tracking Sheet
- FRAC Tank Analysis Sheet
- Emergency Discharge Sample Sheet
- Interceptor Trench Raw Water Data Sheet
- Main Excavation Raw Water Data Sheet

Sample Summary
March 2009

Sample ID	Pass/Fail	Sample Date	Media	Analytes											Sample Description	Gallons
				PCB	VOC	TCLP VOC	SVOC	TCLP SVOC	Metals (Zn, Cr, Ni)	TDS	TSS	pH	TAL Metals	Waste Profile		
East 2	NA	03/03/09	W	X	X					X	X	X			Interceptor sump	
Primary	NA	03/03/09	W	X	X					X	X	X			Interceptor sump	
West	NA	03/03/09	W	X	X					X	X	X			Interceptor sump	
East 1	NA	03/03/09	W	X	X					X	X	X			Interceptor sump	
Main Excavation-030309	NA	03/03/09	W	X	X										Main excavation	
WTP Discharge	NA	03/03/09	W	X							X	X			WTP effluent	
Fracs 1 and 2	Pass	03/03/09	W	X	X						X	X			Treated Frac 1	18,956.0
															Treated Frac 2	19,008.0
Fracs 3 and 4	Pass	03/04/09	W	X	X						X	X			Treated Frac 3	18,143.0
															Treated Frac 4	19,161.0
WTP discharge	NA	03/04/09	W	X							X	X			WTP effluent	
Frac 2	Pass	03/05/09	W	X	X						X	X			Treated Frac 2	17,599.0
WTP discharge	NA	03/05/09	W	X							X	X			WTP effluent	
Raw Influent 100gpm	NA	03/10/09	W	X							X				Influent to WTP	
Raw Influent 200gpm	NA	03/10/09	W	X							X				Influent to WTP	
Post 10 100gpm	NA	03/10/09	W	X							X				Post 10 micron bags	
Post 10 200gpm	NA	03/10/09	W	X							X				Post 10 micron bags	
Post 1 100gpm	NA	03/10/09	W	X							X				Post 1 micron bags	
Post 1 200gpm	NA	03/10/09	W	X							X				Post 1 micron bags	
Diffuser	NA	03/11/09	W	X											Direct discharge diffuser	
Excavation 031009	NA	03/10/09	W	X											Excavation direct discharge	
Fracs 1 and 2	Pass	03/12/09	W	X	X						X	X			Treated frac 1	18,971.0
															Treated frac 2	18,282.0
Fracs 3 and 4	Pass	03/13/09	W	X	X						X	X			Treated frac 3	19,445.0
															Treated frac 4	17,794.0
East 2	NA	03/16/09	W	X	X					X	X	X			Interceptor sump	
East 1	NA	03/16/09	W	X	X					X	X	X			Interceptor sump	
Primary	NA	03/16/09	W	X	X					X	X	X			Interceptor sump	
West	NA	03/16/09	W	X	X					X	X	X			Interceptor sump	
Fracs 1 and 2	Pass	03/17/09	W	X	X						X	X			Treated frac 1	18,325.0
															Treated frac 2	19,420.0
Frac 3	Pass	03/17/09	W	X	X						X	X			Treated frac 3	19,420.0
Frac 4	Pass	03/18/09	W	X	X						X	X			Treated frac 4	18,297.0
Fracs 1 and 2	Pass	03/19/09	W	X	X						X	X			Treated frac 1	17,892.0
															Treated frac 2	19,469.0
Frac 4	Pass	03/20/09	W	X	X						X	X			Treated frac 4	19,075.0
Frac 3	Pass	03/23/09	W	X	X						X	X			Treated frac 3	18,345.0
Fracs 1 and 2	Pass	03/24/09	W	X	X						X	X			Treated frac 1	18,906.0
															Treated frac 2	17,177.0
Fracs 3 and 4	Pass	03/25/09	W	X	X						X	X			Treated frac 3	18,200.0
															Treated frac 4	18,286.0
Fracs 1 and 2	Pass	03/26/09	W	X	X						X	X			Treated frac 1	19,049.0
															Treated frac 2	18,726.0
Fracs 3 and 4	Pass	03/27/09	W	X	X						X	X			Treated frac 3	19,133.0
															Treated frac 4	17,955.0
Fracs 1 and 2	Pass	03/30/09	W	X	X						X	X			Treated frac 1	17,892.0
															Treated frac 2	19,470.0
East 2	NA	03/30/09	W	X	X					X	X	X			Interceptor sump	
East 1	NA	03/30/09	W	X	X					X	X	X			Interceptor sump	
Primary	NA	03/30/09	W	X	X					X	X	X			Interceptor sump	
West	NA	03/30/09	W	X	X					X	X	X			Interceptor sump	
Fracs 3 and 4	Fail	03/31/09	W	X	X						X	X			Treated frac 3	
															Treated frac 4	
Total Water Treated																502,396.0

NPDES Discharge Tracking Summary
March, 2009

Sample ID	Pass/Fail	Date Sampled	Date Discharged	Gallons Discharged	Analytes				
					PCB (Aroclor 1248)	TCE	cis-1,2 DCE	TSS	pH
Frac 2	Pass	Tuesday March 3, 2009	Thursday March 5, 2009	19,008.0	<0.10	<1.0	<1.0	<3	6.80
Frac 1	Pass	Tuesday March 3, 2009	Thursday March 5, 2009	18,956.0	<0.10	<1.0	<1.0	<3	6.80
Frac 3	Pass	Wednesday March 4, 2009	Thursday March 5, 2009	18,143.0	<0.10	<1.0	<1.0	<3	6.85
Frac 4	Pass	Wednesday March 4, 2009	Friday March 6, 2009	19,161.0	<0.10	<1.0	<1.0	<3	6.85
Frac 2	Pass	Thursday March 5, 2009	Friday March 6, 2009	17,599.0	<0.10	<1.0	<1.0	<3	7.19
Frac 1	Pass	Thursday March 12, 2009	Friday March 13, 2009	18,971.0	<0.10	<1.0	<1.0	<3	6.40
Frac 2	Pass	Thursday March 12, 2009	Friday March 13, 2009	18,282.0	<0.10	<1.0	<1.0	<3	6.40
Frac 3	Pass	Friday March 13, 2009	Tuesday March 17, 2009	19,445.0	<0.10	2	<1.0	<3	
Frac 4	Pass	Friday March 13, 2009	Monday March 16, 2009	17,794.0	<0.10	2	<1.0	<3	
Frac 1	Pass	Tuesday March 17, 2009	Wednesday March 18, 2009	18,325.0	<0.10	<1.0	<1.0	<3	7.08
Frac 2	Pass	Monday March 16,2009	Wednesday March 18, 2009	19,420.0	<0.10	<1.0	<1.0	<3	7.08
Frac 3	Pass	Tuesday March 17, 2009	Wednesday March 18, 2009	19,420.0	<0.10	<1.0	<1.0	<3	7.62
Frac 4	Pass	Wednesday March 18, 2009	Thursday March 19,2009	18,297.0	<0.10	<1.0	<1.0	<3	7.60
Frac 1	Pass	Thursday March 19,2009	Monday March 23, 2009	17,892.0	<0.10	<1.0	<1.0	<3	7.22
Frac 2	Pass	Thursday March 19,2009	Monday March 23, 2009	19,469.0	<0.10	<1.0	<1.0	<3	7.22
Frac 4	Pass	Friday March 20,2009	Monday March 23, 2009	19,075.0	<0.10	<1.0	<1.0	3.5	7.60
Frac 3	Pass	Monday March 23, 2009	Tuesday March 24, 2009	18,345.0	<0.10	<1.0	<1.0	<3	7.04
Frac 1	Pass	Tuesday March 24, 2009	Wednesday March 25, 2009	18,906.0	<0.10	<1.0	<1.0	<3	6.99
Frac 2	Pass	Tuesday March 24, 2009	Wednesday March 25, 2009	17,177.0	<0.10	<1.0	<1.0	<3	6.99
Frac 3	Pass	Wednesday March 25, 2009	Thursday March 26,2009	18,200.0	<0.10	<1.0	<1.0	<3	7.02
Frac 4	Pass	Wednesday March 25, 2009	Thursday March 26,2009	18,286.0	<0.10	<1.0	<1.0	<3	7.02
Frac 1	Pass	Thursaday March 26, 2009	Friday March 27, 2009	19,049.0	<0.10	<1.0	<1.0	<3	7.23
Frac 2	Pass	Thursday March 26, 2009	Monday March 30, 2009	18,726.0	<0.10	<1.0	<1.0	<3	7.23
Frac 3	Pass	Friday March 27, 2009	Monday March 30, 2009	19,133.0	<0.10	<1.0	<1.0	<3	7.18
Frac 4	Pass	Friday March 27, 2009	Monday March 30, 2009	17,955.0	<0.10	<1.0	<1.0	<3	7.18
Frac 1	Pass	Monday March 30,2009	Tuesday March 31, 2009	17,892.0	<0.10	<1.0	<1.0	<3	6.99
Frac 2	Pass	Monday March 30,2009	Tuesday March 31, 2009	19,470.0	<0.10	<1.0	<1.0	<3	6.99
					<0.10	<1.0	<1.0	<3	
Total amount of water discharged				**502,396.0**					

Millennium Inorganic Chemicals
Emergency Discharge Event Water Sample Data

Sample Identification	Date	PCB (ug/l)	ARACLOR	VOCs (ug/l)	SVOCs (ug/l)	TSS (mg/l)	pH (units)
Excavation Raw Water	10-Mar-09	1.1	1248	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Diffuser	11-Mar-09	1.4	1248	Not analyzed	Not analyzed	Not analyzed	Not analyzed

Millennium Inorganic Chemicals
Frac Tank Analysis

Sample Name	Date sent to lab	PCB Result ug/l	Aroclor	Chromium mg/l	Nickel mg/l	Zinc mg/l	TSS mg/l	TDS mg/l	pH	TCE ug/l	cis,1-2 DCE ug/l
Fracs 1 & 2	3-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.1	1.0 U	1.0 U
Fracs 3 & 4	4-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	6.92	1.0 U	1.0 U
Frac 2	5-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	6.92	1.0 U	1.0 U
Fracs 1 & 2	12-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	6.4	1.0 U	1.0 U
Fracs 3 & 4	13-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	NA	2.0	1.0 U
Fracs 1 & 2	17-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.4	1.0 U	1.0 U
Frac 3	17-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.7	1.0 U	1.0 U
Frac 3	19-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.8	1.0 U	1.0 U
Fracs 1 & 2	20-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.8	1.0 U	1.0 U
Fracs 4	20-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3.5	NA	7.9	1.0 U	1.0 U
Frac 3	23-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.8	1.0 U	1.0 U
Fracs 1 & 2	24-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.6	1.0 U	1.0 U
Fracs 3 & 4	25-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.9	1.0 U	1.0 U
Fracs 1 & 2	26-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	8.1	1.0 U	1.0 U
Fracs 3 & 4	27-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	8.1	1.0 U	1.0 U
Fracs 3 & 4	31-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	6.5	NA	7.6	1.0 U	1.0 U
Fracs 1 & 2	31-Mar-09	0.10 U		Not Analyzed	Not Analyzed	Not Analyzed	3 U	NA	7.7	1.0 U	1.0 U

Millennium Inorganic Chemicals
General Excavation Raw Water Sample Data

Sample Name	Sample Date	Aroclor Detections ug/L	Aroclor Number	VOC (long list) Detections	VOC Concentrations ug/L	SVOC (long list) Detections	SVOC Concentrations ug/L
Main Excavation	3-Mar-09	0.23	1248	cis 1,2 Dichloroethene Trichloroethene	11 44	Not Analyzed	
Main Excavation Field Filtered	3-Mar-09	0.10 U		Not Analyzed		Not Analyzed	
Excavation	10-Mar-09	1.1	1248	Not Analyzed		Not Analyzed	

Millennium Inorganic Chemicals
Raw Water Trench Samples

	DATE	Gallons Pumped	PCBs (ug/l)	ARACLOR	cis-1,2-DCE (ug/l)	TCE (ug/l)	TDS (mg/l)	TSS (mg/l)	pH (units)
Primary	2-Mar-09	19,530	0.082 J		1.0 U	1.0 U		3 U	6.7
East 1	2-Mar-09	14,616	0.10 U		1.0 U	1.0 U		3 U	7.0
East 2	2-Mar-09	44,604	0.12		1.0 U	1.0 U		7	7.9
West	2-Mar-09	19,950	0.10 U		1.0 U	1.0 U		4	6.9
Primary (Filtered)	2-Mar-09		0.10 U						
East 1 (Filtered)	2-Mar-09		0.10 U						
East 2 (Filtered)	2-Mar-09		0.11 U						
West (Filtered)	2-Mar-09		0.10 U						
Primary	16-Mar-09	27,888	0.10 U		1.0 U	1.0 U	2200	6.5	7.1
East 1	16-Mar-09	45,360	0.10 U		1.0 U	1.0 U	640	3 U	7.7
East 2	16-Mar-09	46,746	0.14	1248	1.0 U	1.0 U	230	4	8.0
West	16-Mar-09	19,656	0.10 U		1.0 U	1.0 U	1000	3 U	7.6
Primary (Filtered)	16-Mar-09		0.10 U						
East 1 (Filtered)	16-Mar-09		0.10 U						
East 2 (Filtered)	16-Mar-09		0.10 U						
West (Filtered)	16-Mar-09		0.10 U						
Primary	30-Mar-09	11,928	0.10 U		1.0 U	1.0 U	380	3 U	8
East 1	30-Mar-09	6,216	0.10 U		1.0 U	1.0 U	1500	4	7.4
East 2	30-Mar-09	20,076	0.10 U		4.3	1.0 U	2200	3 U	7.1
West	30-Mar-09	12,096	0.10 U		1.0 U	1.0 U	7600	4	6.8
Primary (Filtered)	30-Mar-09		0.10 U						
East 1 (Filtered)	30-Mar-09		0.10 U						
East 2 (Filtered)	30-Mar-09		0.10 U						
West (Filtered)	30-Mar-09		0.10 U						

Attachment 4

United States Environmental Protection Agency
Region V
POLLUTION REPORT

Date: Friday, May 23, 2008
From: Partap Lall, OSC

To:

beverly kush, oprs	william messenger, epa region 5
jason el-zein, ers1	john maritote, ers
mick hans, public affairs	david chung, epa
NRC Duty Officer, coast guard	peter felitti, epa
terese vandonsel, epa	joseph fredle, epa

Subject: Fields Brook/ Millenium Chemicals Site Removal
state road, Ashtabula, OH
Latitude: 41.8928
Longitude: -80.7722

POLREP No.:	2	**Site #:**	0546
Reporting Period:		**D.O. #:**	
Start Date:	9/16/2007	**Response Authority:**	CERCLA
Mob Date:		**Response Type:**	Time-Critical
Completion Date:		**NPL Status:**	NPL
CERCLIS ID #:		**Incident Category:**	Removal Action
RCRIS ID #:		**Contract #**	PRP Removal

Site Description

Fields Brook Site is an NPL site where PCB contamination was found in September 2007 during the routine O&M work on site. The re-contamination or historical (residual) contamination has impacted the stream bed and was threatening Ashtabula River. An emergency response in September 2007 prevented furthur migration . Containment and removal is now being conducted by Millennium Inorganic Chemicals Company under an UAO from EPA Region 5.An interceptor trench has been installed along the northern fence line of the property where contamination was observed. Delineation of extent of contamination and removal are ongoing.

Current Activities

Contaminated water is pumped into frac tanks and treated on site as necessary before discharge.

Excavation , sampling and disposal activities are back on track with the onset of good weather.

Stream has been diverted temporarily .

Confirmatory sampling and backfilling in the excavated areas of the flood plain is ongoing.

Planned Removal Actions
Continue deleneation ,removal and disposal of contaminated soil and sediment.
Continue backfilling and restoring excavated areas in the floodplain.
Continue a monitoring program for interceptor trenches.

Next Steps
Backfill and restore the stream bed after completion of excavation activities.

Key Issues
None

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
RST/START	$106,000.00	$81,000.00	$25,000.00	23.58%
Intramural Costs				
Total Site Costs	$106,000.00	$81,000.00	$25,000.00	23.58%

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

www.epaosc.org/millenniuminorganicchemicals

United States Environmental Protection Agency
Region V
POLLUTION REPORT

Date: Friday, January 04, 2008
From: Partap Lall, OSC

To:
Partap Lall, government
william messenger, epa region 5
john maritote, ers
david chung, epa
peter felitti, epa
joseph fredle, epa
beverly kush, oprs
jason el-zein, ers1
mick hans, public affairs
NRC Duty Officer, coast guard
terese vandonsel, epa

Subject: Initial
Fields Brook/ Millenium Chemicals Site Removal
state road, Ashtabula, OH
Latitude: 41.8928
Longitude: -80.7722

POLREP No.:	1	**Site #:**	0546
Reporting Period:	thru January 2,2008	**D.O. #:**	
Start Date:		**Response Authority:**	CERCLA
Mob Date:		**Response Type:**	Time-Critical
Completion Date:		**NPL Status:**	NPL
CERCLIS ID #:		**Incident Category:**	Removal Action
RCRIS ID #:		**Contract #**	PRP Removal

Site Description
Fields Brook Site is an NPL site where PCB contamination was found in September 2007 during the routine O&M work on site. The re-contamination or historical (residual) contamination has impacted the stream bed and was threatening Ashtabula River. An emergency response in September 2007 prevented furthur migration . Containment and removal is now being conducted by Millennium Inorganic Chemicals Company under an UAO from EPA Region 5.An interceptor trench has been installed along the northern fence line of the property where contamination was observed. Delineation of extent of contamination and removal are ongoing.

Current Activities
Under the UAO Millennium Inorganic Chemicals Company :

Has completed installation of intercepter trenches.

Contaminated water is routinely pumped into frac tanks and treated on site before discharge.

Stream has been diverted temporarily .

Contractors for Millennium, Demaximus , Inc and SunPro have completed geo-probe investigation to determine vertical and horizontal extent of contamination in the historic EU8 area (stream bed and flood plane).

Excavation and landfill disposal of contaminated soils and sediments is ongoing.

Planned Removal Actions
Continue removal and disposal of contaminated soil and sediment.
Continue a monitoring program for interceptor trenches.

Next Steps
Backfill and restore the stream bed after completion of excavation activities.

Key Issues
None

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
Intramural Costs				
Total Site Costs	$0.00	$0.00	$0.00	0.00%

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

www.epaosc.org/millenniuminorganicchemicals

Attachment 5

RTI International Metals, Inc.

RMI TITANIUM COMPANY

1000 WARREN AVENUE
NILES, OH 44446

November 30, 2004

Ms. Terese A. Van Donsel
United States Environmental Protection Agency
SR-6J
77 West Jackson Blvd.
Chicago, IL 60604 - 3590

Re: Implementation of Institutional Controls
U.S. EPA Docket No. V-W-98-C-446
Fields Brook Superfund Site – North Sewers Source Area
Ashtabula, Ohio

Dear Ms. Van Donsel:

Pursuant to your letter of May 24, 2004, on October 25 respondents Detrex Corporation, Occidental Chemical Corporation, and RMI Titanium Company put in place appropriate notices on the deeds for the impacted parcels. Enclosed is a copy of the instrument as recorded.

Please contact me with any questions.

Sincerely,

Richard L. Mason
Director - Environmental Affairs
PHONE: 330.544.7688
FAX: 330.544.1029
E-MAIL: rmason@rtiintl.com

Distribution (with enclosure)
Robert Currie, Esq.
Detrex Corporation
PO Box 5111
Southfield, MI 48086 - 5111

Joe Lonardo, Esq.
for Occidental Chemical Corporation
Vorys, Sater, Seymour & Pease
11th Floor
1828 L Street NW
Washington, DC 20036 - 5109

AFFIDAVIT OF FACTS RELATING TO TITLE TO REAL PROPERTY

The undersigned, **RMI TITANIUM COMPANY** ("Affiant"), being duly sworn, deposes and states:

1. That the undersigned is the Director Environmental Affairs of the Affiant and is a person having knowledge of the facts set out below.

2. That Affiant, Occidental Chemical Corporation and Detrex Corporation, pursuant to an order of the United States Environmental Protection Agency ("USEPA"), have undertaken certain remediation in respect of certain real property more fully identified on Exhibit A attached hereto and made a part hereof.

3. That as part of such remediation, an approximately 2,400 linear foot stretch of a sewer pipeline located within the western right of way of State Road has been grouted shut and sealed. The sealed portion of the sewer is graphically depicted on Exhibit B attached hereto and made a part hereof. The sewer received storm, sanitary, and process wastewater prior to being grouted shut and sealed.

4. That this Affidavit is being filed pursuant to USEPA's requirement that the public be notified of such work and made aware that no construction or other activity should be undertaken which would disrupt, disturb, interfere with or otherwise breach such grouted and sealed sewer pipe.

5. That the owners of the real property abutting the sealed sewer are aware of this filing.

FURTHER AFFIANT SAYETH NAUGHT.

RMI TITANIUM COMPANY

By: _____
Its: Director Environmental Affairs

Date: 16 September 2004

200400018685
Filed for Record in
ASHTABULA COUNTY, OHIO
JUDITH A. BARTA
10-25-2004 At 10:44 am.
AFFD/DEED 80.00
OR Book 315 Page 1769 - 1775

STATE OF OHIO)
) SS:
COUNTY OF ASHTABULA)

BEFORE ME, a Notary Public in and for said County and State, did personally appear **RMI TITANIUM COMPANY**, an Ohio corporation, by Richard L. Mason , its Director Environmental Affairs, who acknowledged to me that he did sign the foregoing instrument as such officer and that the same is his free act and deed, both individually and as such officer of said corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal at Ashtabula, Ohio, this 16 day of September , 2004.

_____
Notary Public
My Commission Expires: _____

CYNTHIA WILSON SLEIGH, Notary Public
State of Ohio
My Commission Expires, July 1, 2008

SOLICITORS, 07140, 00001, 100624740.1, Affidavit of Facts 8-30-04

COPY

EXHIBIT A

Legal Description

Parcel One: (known as PPN 03-014-00-030-00; 725 State Road, Township of Ashtabula, Ashtabula County, Ohio) (Prior Deed Reference: Volume 164, Page 2179 of Ashtabula County Records)

Situated in the Township of Ashtabula, County of Ashtabula and State of Ohio, and known as being a part of the Holmes Tract in said Ashtabula Township, and Bounded and described as follows:

Beginning at the center line of State Road (60 feet wide) at the intersection of said center line of State Road with the center line of East 6th Street (50 feet wide), formerly Martin Street; thence south 0° 29' 15" east along said center line of State Road a distance of 1294.00 feet to a point; thence south 89° 49' 00" west, a distance of 1569.75 feet to the common boundary line between the City of Ashtabula and the Township of Ashtabula and which common boundary line is also the west line of the said Holmes Tract; thence north 0° 28' 15" west along said common boundary line, a distance of 524.60 feet to an iron pin set in the northerly line of Parcel No. One of land conveyed by Robert S. Morrison, et al., to Harry A. Hachmeister by deed dated December 29, 1948 and recorded in Volume 405, Page 491 of Ashtabula County Records of Deeds; thence north 89° 43' 45" east along said northerly line of land so conveyed to Harry A. Hachmeister as aforesaid, a distance of 343.46 feet to the southwest corner of a five-acre parcel of land conveyed to John Cusano by deed dated March 4, 1933 and recorded in Volume 323, Page 151 of Ashtabula County Records of Deeds; thence along the westerly line of said land so conveyed to John Cusano, as aforesaid, north 0° 28' 15" west, a distance of 767.00 feet to the said center line of East 6th Street; thence north 89° 43' 45" east along said center line of East 6th Street, 1225.90 feet to the place of beginning and containing 40.5342 acres of land according to a survey by Candela & Logan, Ohio registered surveyors, dated September 1952, be the same more or less, but subject to all legal highways.

Parcel Two: (known as PPNs 05-502-90-022-00 and 03-014-00-029-00) (Prior Deed Reference: Volume 146, Page 0951 of Ashtabula County Records)

Situated partially in the City of Ashtabula, County of Ashtabula, State of Ohio, and known as being part of original Ashtabula Township Lots 6 and 7, and partially in the Township of Ashtabula, said portion known as being part of the Holmes Tract in said Township (being TI 3N R3W in the Connecticut Western Reserve) and being further bounded and described as follows:

Commencing at a 1" diameter iron pin found in a monument box at the intersection of the centerlines of East 6th Street and State Road (CH #25, Section L, 60' wide); thence S-00°29'51"E observed (S-00°29'15"E-Deed), along the centerline of State Road, a distance of 1294.00' deed & used to the southwest corner of lands deeded to Diamond Alkali in Volume 611, Page 205 of Ashtabula County Deed Records (currently taxed as Occidental Electrochemicals Corp.) and the principle place of beginning.

Thence S-00°29'51"E, continuing along the centerline of State Road, a distance of 150.18' observed to the northeast corner of lands deeded to SCM Chemicals, Inc. (currently taxed as ABC Chemicals, Inc.) in Volume 56, Page 3151 of the Ashtabula County Recorder's Official Records (hereinafter referred to as the A.C.R.O.R.).

Thence S-89°49'00"W (S-89°49'W-Deed), along SCM's north line and passing through a 5/8" diameter iron pin found at 30.56', and iron pins set at approximately 440.4', 828.0', and 1189.9', a total distance of 1569.51' observed (1569.38'-Deed) to a capped (sharp 7510) 5/8" diameter iron pin found in the east line of the City of Ashtabula.

Thence S-00°43'00"E (S-00°43'E-Deed), along the east line of the City of Ashtabula and passing through a capped (sharp 7510) 5/8" diameter iron pin found at approximately 533.1', a total distance of 993.19' measured (993.25'-Deed) to a 1" diameter iron pipe found in the northeast corner of Holmes Street (30' wide), as shown on R.C. Humphrey's Subdivision of a part of Lot 43 in the Scott Plat, as recorded at Volume 4, Page 20 of Ashtabula County Plat Records.

Thence N-89°16'30"W observed, along the north line of said Holmes Street and along the north line of Sublots 23, 22, 21, and 20, a distance of 196.80' measured to a 1" diameter iron pipe found in the southeast corner of lands deeded to the City of Ashtabula, as Parcel No. 3, in Volume 616, Page 210 of Ashtabula County Deed Records.

Thence N-00°43'33"W observed, along the east line of said lands of the City of Ashtabula, a distance of 337.05' to a 1" diameter iron pipe found at an angle point in said line.

Thence N89°32'09"W observed, along the north line of said lands of the City of Ashtabula and along the north line of lands deeded, as Parcel No. 2, to the City of Ashtabula in said Volume 616, Page 210 of Ashtabula County Deed Records, a distance of 511.86' measured to a 1" diameter iron pipe found at an angle point in said line.

Thence S-00°30'40"W observed, along the west line of said Parcel No. 2, a distance of 334.61' measured to a 3/4" diameter iron pipe found at the northwest corner of Sublot 10 in the above-mentioned R.C. Humphrey's Subdivision.

Thence N-89°16'30"W observed, along the north line of Sublots 9 and 8 in said Subdivision, a distance of 70.89' measured to an iron pin set in the east line of State Route 11 (width varies).

Thence N-89°16'30"W observed, continuing along the north line of Sublots 8 thru 2 of said R.C. Humphrey's Subdivision, a distance of 281.42' to the southeast corner of lands deeded to Nicholas Santill in Volume 85, Page 4153 of the A.C.R.O.R., said point being S-54°40'00"E 0.47' from a capped (G.D. Bohning Associates) 5/8" diameter iron pin found.

Thence N-04°16'48"W, along the west line of State Route 11, a distance of 156.22' to an iron pin set 140' left of Station 1495+00.

Thence N-05°00'52"W, continuing along the west line of State Route 11, a distance of 343.00' to an iron pin set 140' left of Station 1498+43.

Thence N-05°00'52"W, continuing along the west line of State Route 11, a distance of 49.00' to an iron pin set 140' left of Station 1498+93.

Thence N-04°08'15"W, continuing along the west line of State Route 11, a distance of 196.02' to an iron pin set 137' left of Station 1500+88.

Thence N-04°21'33"W, continuing along the west line of State Route 11, a distance of 612.04' to an iron pin set 130' left of Station 1507+00.

Thence N-04°15'02"W, continuing along the west line of State Route 11, a distance of 296.39' to an iron pin set in the south line of Sublot 141 of the Pierce and Jaques Plat as recorded in Volume 3, Page 23 of Ashtabula County Plat Records.

Thence N-89°40'58"E observed, along the south line of Sublots 141 thru 136 in said plat, a distance of 256.91' to an iron pin set in the east line of State Route 11.

Thence N-89°40'58"E observed, along the south line of Sublots 136 thru 118 inclusive, in said Pierce and Jaques Plat, a distance of 921.43' observed to a point in the west line of Ashtabula Township, being in the northwest corner of the above-mentioned Diamond Alkali Company, said point falling within a steel fence corner post.

Thence S-00°28'15"E deed and used, along the line between Ashtabula City and Ashtabula Township, being the west line of said Diamond Alkali Company, a distance of 524.41' observed (524.60'-Deed) to an angle point in said line, said point falling within a steel fence corner post.

Thence N-89°49'00"E deed & used, along Diamond Alkali Company's south line and passing through a capped (H&A Ltd) ½" diameter iron pin found at 1539.95', a total distance of 1569.87' observed (1569.75'-Deed) to the centerline of State Road and the principle place of beginning. Containing 44.197 acres of land of which 5.412 acres lie within the Township of Ashtabula and 38.785 acres lie within the City of Ashtabula.

It is intended herein to describe, as one, the residual of that parcel of land deeded to the CEICO Company, as Parcel No. 1, in Volume 487, Page 272 of Ashtabula County Deed Records (PP# 03-014-00-029-00), and part of that parcel of land deeded to the CEICO Company, as Parcel No. 2 in said Volume 487, Page 272 (part of PP# 05-502-90-016-00 and all of PP# 05-502-90-024-00), and that parcel of land deeded to the CEICO Company in Volume 494, Page 201 of Ashtabula County Deed Records (PP# 05-502-90-022-00 and PP# 05-502-90-023-00). Pursuant to a survey of the above described parcel in September and October 2000 by Charles E. Sharp, Ohio Professional Surveyor #7510, Ashtabula, Ohio. All iron pins set (5/8" diameter rebar, 30" in length) are identified by a plastic cap bearing the imprint "Sharp 7510". S 00°43'00"E (S 00°43'E-Deed) was used on that portion of the line between the City and Township of Ashtabula. Lying south of CEICO Company's Parcel No. 1, as described in Volume 56, Page 3151 of the Ashtabula County Recorder's Official Records, wherein ABC Chemical Inc.'s name change to SCM Chemicals, Inc. is recorded.

Parcel Three (A): (Prior Deed Reference: Volume 30, Page 7255 of Ashtabula County Records)

Situated in the Township of Ashtabula, County of Ashtabula, State of Ohio, and being part of the Holmes Tract;

Beginning at a point in the centerline of State Rd., 115' ft. northerly from the centerline of Middle Rd., as measured along the centerline of State Rd.;

thence N. 0° 39' W., along the centerline of State Rd., 492.47' ft. to an iron pin monument in an angle therein;

thence N. 0° 03' 30" W., along the centerline of State Rd., 298.60' ft. to a point in the southwest corner of land now owned by Detrex Chemical Industries, Inc.;

thence S. 87° 23' 30" E., along the southerly line of Detrex Chemical Industries, Inc., 30.03' ft. to an iron pin in the easterly line of State Rd.; thence in the same course, 1520.22' ft. to an iron pin;

thence S. 0° 17' 30" E., 397.85' ft. to an iron pin;

thence S. 11° 40' 45" W., 361.47' ft. to an iron pin;

thence S. 89° 27' W., parallel with the centerline of Middle Rd., 1401.06' ft. to an iron pin;

thence N. 0° 39' W., parallel with the centerline of State Rd., 45' ft. to an iron pin;

thence S. 89° 27' W., parallel with the centerline of Middle Rd., 40' ft. to an iron pin in the easterly line of State Rd.; thence in the same course, 30' ft. to the place of beginning and containing 27.829 acres of land.

Parcel Three (B): (Prior Deed Reference: Volume 30, Page 7255 of Ashtabula County Records)

Situated in the Township of Ashtabula, County Ashtabula, State of Ohio, and being part of Lots 7 & 8, Erie Tract;

Beginning at a point in the centerline of Middle Rd. at the easterly R/W Line of the Penn-Central R.R.;

thence N. 89° 27' E., along the centerline of Middle Rd., 5.07' ft. to a spike in an angle therein;

thence N. 88° 40' 45" E., along the centerline of Middle Rd., 1127.23' ft. to a point in an angle therein;

thence N. 88° 09' 45" E., along the centerline of Middle Rd., 454.46' ft. to a point in the westerly line of land now owned by the C.E.I. Co.;

thence S. 18° 27' 30" E., along the westerly line of C.E.I. Co., 20.87' ft. to an iron pin in the southerly line of Middle Rd.; thence in the same course, 187.80' ft. to an iron pin in an angle therein;

thence S. 0° 03' 30" E., along the westerly lien of the C.E.I. Co., 326.00' ft. to an iron pin in the northerly R/W line of the Penn-Central R.R.;

thence Southwesterly along the northerly R/W line of the Penn-Central R.R. by the following courses,

S. 69° 09' W., 107.88 ' ft. to an iron pin;

S. 0° 05' 30" W., 10.70' ft. to an iron pin;

S. 69° 09' W., 933.68' ft. to an iron pin;

N. 20° 51' W., 5.00' ft. to an iron pin;

S. 69° 09' W., 714.57' ft. to an iron pin;

S. 0° 30' E., 5.33' ft. to an iron pin;

S. 69° 09' W., 251.77' ft. to a concrete R.R. monument;

thence northeasterly along a curve in the easterly R/W line of the Penn-Central R.R., having an angle of 46° 41' 20", a radius of 758.28' ft., an arc distance of 617.90' ft., a chord bearing and distance of N. 22° 50' 40" E., 595.70' ft. to a point in the point of tangent;

thence N. 0° 30' W., along the easterly R/W line of the Penn-Central R.R., 640.36' ft. to an iron pin in the southerly line of Middle Rd., thence in the same course, 20' ft. to the place of beginning and containing 31.70 acres of land.

Parcel Three (C): (Prior Deed Reference: Volume 30, Page 7255 of Ashtabula County Records)

Situated in the Township of Ashtabula, County of Ashtabula, State of Ohio, and being part of Lots 5 & 6, Erie Tract;

Beginning at a point in the centerline of Middle Rd. at the southeast corner of land now owned by the General Tire & Rubber Co.;

thence N. 88° 40' 45" E., along the centerline of Middle Rd., 379.50' ft. to a point in an angle therein;

thence N. 88° 09' 45" E., along the centerline of Middle Rd., 454.46' ft. to a point in the westerly line of land now owned by the C.E.I. Co.;

thence N. 18° 27' 30" W., along the westerly line of the C.E.I. Co. land, 20.87' ft. to an iron pin in the northerly line of Middle Rd.; thence in the same course, 1127.57' ft. to an iron pin in a southeast corner of the General Tire & Rubber Co. Land.;

thence S. 87° 53" W., along a southerly line of the General Tire & Rubber Co. land, 95.80' ft. to an iron pin in the Lot Line between Lots 5 & 6, Erie Tract;

thence S. 0° 16' E., along the lot line between Lots 5 & 6, Erie Tract, 142.50' ft. to an iron pin monument;

thence S. 87° 14' W., along a southerly line of the General Rubber & Tire Co. land, 354.50' ft. to an iron pin monument;

thence S. 0° 15' 45" W., along an easterly line of the General Tire & Rubber Co. land, 893.63' ft. to an iron pin;

thence N. 89° 44' 15" W., along a southerly line of the General Tire & Rubber Co. land, 16.50' ft. to an iron pin;

thence S. 0° 15' 40"W., along an easterly line of the General Tire & Rubber Co. land, 46' ft. to an iron pin monument in the northerly line of Middle Rd., thence in the same course, 20' ft. to the place of beginning and containing 14.82 acres of land.

Parcel Three (D): (Prior Deed Reference: Volume 30, Page 7255 of Ashtabula County Records)

Situated in the Township of Ashtabula, County of Ashtabula, State of Ohio, and being part of the Holmes Tract;

Beginning at an iron pin in the Ashtabula City-Ashtabula Township Line at the northwest corner of land now owned by Reactive Metals Co.;

thence N. 0° 06' w., along the Ashtabula City-Ashtabula Township Line, 1270.77' ft. to an iron pin in an angle therein;

thence N. 0° 43' W., along the Ashtabula City-Ashtabula Township Line, 993.25' ft. to an iron pin in the southwest corner of land now owned by the C.E.I. Co.;

thence N. 89° 49' E., along the southerly of the C.E.I. Co., 1539.38' ft. to an iron pin the westerly line of State Rd.; thence in the same course, 30' ft. to a point in the centerline of State Rd.;

thence S. 0° 29' 15" E., along the centerline of State Rd., 310.40' ft. to a point in an angle therein;

thence S. 0° 03' 30" E., along the centerline of State Rd., 1105.17' ft. to a point;

thence S. 71° 00' 00" W., 31.72' ft. to an iron pin in the westerly line of State Rd.,; thence in the same course, 739.48' ft. to an iron pin;

thence S. 0° 18' 30 E., 239.09' ft. to an iron pin;

thence S. 89° 41' 30" W., 103.27' ft. to an iron pin;

thence S. 3° 07' E., 358.84' ft. to an iron pin;

thence S. 89° 40' W., along a northerly line of Reactive Metals Co., 746.79' ft. to the place of beginning and containing 68.30 acres of land.

Attachment b

Site Monitoring Report
Groundwater Sampling Performed October 2008

Fields Brook Landfill
Ashtabula, OH

Prepared For:
de maximis, inc.
450 Montbrook Lane
Knoxville, TN 37919

Prepared By:
O & M, Inc.
450 Montbrook Lane
Knoxville, TN 37919

January 2009

Site Monitoring Report
Groundwater Sampling Performed October 2008

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1. INTRODUCTION

The Fields Brook Landfill was constructed to contain contaminated soils and sediments resulting from the cleanup of the Fields Brook, its tributaries and the surrounding floodplain soils. These soils and sediments contain elevated levels of organic and inorganic contaminants including PCBs and radionuclides. The landfill base is constructed with a double-liner and low permeability clay base designed to protect the surrounding groundwater and environment. As part of the long-term maintenance of this landfill, monitoring of the groundwater surrounding the landfill is required. A groundwater monitoring program has been developed and approved by the Environmental Protection Agency. This Site Monitoring Report is submitted as part of that program.

The purpose of the groundwater monitoring program is to provide for early detection of leachate from the landfill if released into the groundwater. To achieve this objective, eight monitoring well locations have been selected: five monitoring wells to monitor the perimeter of the landfill, one monitoring well located upgradient to monitor upgradient conditions, and two monitoring wells located downgradient. The upgradient and downgradient wells are installed to bedrock in order to monitor the deep aquifer. The location of each well is shown in Figure 1.

2. METHOD

The Fields Brook groundwater monitoring wells were sampled during the week of October 28, 2008. All groundwater sampling was performed as required in the approved Fields Brook Superfund Site Quality Assurance Project Plan (QAPP). Static water level readings were recorded from each monitoring well prior to purging each well and are provided in Table 1. The standing water in each well was "purged", or pumped, from the well to ensure that the samples collected were representative of the formation water. This is achieved by purging at least three well volumes of water from the well. Also while purging, the pump flow rate is controlled at the minimum rate possible in order to minimize entrainment of solids in the sample, and to minimize disturbance (volatilization or oxidation) of the sample.

The required purge volumes (three well volumes) were calculated as follows:

1. The volume of water in each well was calculated by measuring the depth of the static water level and the depth to the bottom of the well from a predetermined measuring point (i.e., top of inner riser)

2. Based on these measurements and the diameter of the well, the volume of the standing water was calculated using the following formula:

$$\textit{Well Volume (gallons)} = 3.14 * d^2/4 * h * 7.48\ \textit{gallons/ft}^3$$

where:

d = diameter of the well (in feet)
h = height of standing water (in feet)

3. *Purge Volume = Well Volume x 3*

As allowed for in the approved project QAPP, the procedures for well purging were dependent on the hydraulic characteristics of the water formation in which the well is placed. Low-yielding wells (those that are incapable of yielding three casing volumes in a timely manner—approximately 2 hours) were evacuated, then allowed to recharge. The following observations were made during purging of these wells:

- Well FB-01 ran dry during purging activities on Day 2. Samples were collected from FB-01 after allowing it time to recharge overnight.
- Well RMI-4D ran dry during purging activities on Day 3. Approximately 13 gallons of water were purged from this well. Samples were collected from RMI-4D after allowing it time to recharge overnight.

For higher yielding wells (those that readily yield three casing volumes), samples were collected following evacuation of three well volumes. For all wells, groundwater purging and sampling was performed at a low enough flow rate to ensure that turbulent flow did not occur within the well. The initial sample following purging was measured for specific conductance, turbidity, pH, and temperature. These results were recorded in the field book and are provided on Table 2.

All sample bottles were preserved as required, placed in re-sealable plastic bags and placed in coolers with bagged ice. Samples for standard chemical analysis were sent via overnight express courier to CompuChem Environmental Laboratory of Cary, North Carolina. Samples for radiochemical analysis were sent via overnight express courier to General Engineering Laboratories of Charleston, South Carolina.

3. RESULTS

All groundwater samples were submitted for analysis for the project-specific contaminants of concern (COCs), gross alpha and gross beta. COCs include:

- trichloroethene,
- tetrachloroethene,
- 1,1,2,2 – tetrachloroethane,
- hexachlorobutadiene,
- benzo(a)pyrene,
- hexachlorobenzene,
- PCBs,
- arsenic,
- beryllium, and
- radium (226 and 228)

The analytical results from these analyses are provided in Table 3. All data packages were verified for completeness. Verification documentation is provided in Appendix A.

4. OBSERVATIONS

The following are the constituents that were detected in this event:

- A trace concentration of trichloroethene was detected in well FB03 (0.11 J). The "J" indicates that trichloroethene was detected above the method detection limit, but below the reporting limit. Trace concentrations of trichloroethene were detected in this well in baseline events and this concentration is not an increase over the baseline concentrations.

- Arsenic was detected in wells FB02 and FB07 at concentrations similar to baseline events.

- Radiochemical concentrations were similar to those observed in the baseline events.

- The semi-volatiles that are reported, benzo(a)pyrene and hexachlorobenzene were not present above their respective detection limits.

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