



**ADDENDUM**

**Lower Toluene Tank – Limited Site Investigation**

**Data Gap Completion for SVOC and Lead  
July 2005**

**Plum Brook Ordnance Works  
Sandusky, Ohio**

**Prepared for  
US Army Corps of Engineers  
Huntington District  
502 Eighth Street  
Huntington, West Virginia 25701**

**Prepared by  
Streamborn Environmental Services, Inc.  
38 Mary Place  
Germantown, Ohio 45327**

**July 2006**

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## ADDENDUM

### Lower Toluene Tank – Limited Site Investigation

#### Data Gap Completion for SVOC and Lead July 2005

#### Plum Brook Ordnance Works Sandusky, Ohio

### 1 Introduction

Located near Sandusky Ohio, the former Plum Brook Ordnance Works (PBOW) was operated from 1941 to 1945 by the Department of Defense (DOD) as a manufacturing plant for trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Contamination detected at the installation by several studies has been related to past activities and is being addressed by the DOD under the Defense Environmental Restoration Program (DERP), Formerly Used Defense Sites (FUDS).

The potential for contamination of the tank area was identified in an Inventory Project Request (INPR) (Huntington District U.S. Army Corps of Engineers, Huntington District, 1998). A limited Site Investigation (SI) of the Lower Toluene Tank Area (LTTA) was conducted in 1999 and the final report was issued in July 2000. During the 1999 investigation, field sampling activities, a visual survey, and chemical analyses were performed to evaluate the environmental media and site conditions in the Lower Toluene Tank Area (LTTA). Results of the laboratory analyses were then compared to risk-based, media-specific screening criteria. United States Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs) were used for the screening criteria. This project was one of several limited SI projects simultaneously undertaken by the US Army Corps of Engineers (USACE) executed by the Louisville District (CELRL) under the direction of the Huntington District (CELRH).

The Draft Final Report for the LTTA SI was submitted for review on September 9, 1999 by the USACE Louisville District to Ohio EPA (OEPA). OEPA provided comments to USACE in a letter dated December 8, 1999. As part of the comments, the agency indicated semivolatile compounds (SVOCs) and lead (Pb) should have been included in the sampling strategy and analytical parameters. The specific comment is as follows:

*"4. General comment: The Target Parameters for this investigation should have included analysis for Lead and Semivolatile Organic Compounds (SVOCs).*

*Response: The reviewer's point is valid and will be taken into consideration during the next phase of work performed at the site. The primary focus for this limited site investigation was to determine if the toluene stored within the tanks had adversely impacted the site through spills and leaks. The recommendation section of the final report will be edited to reflect that further investigation is required by OEPA DERR to address the Lower Toluene Tank Area."*

In July 2005, U.S. Army Corps of Engineers (USACE) Huntington District (LRH) conducted surface soil sampling in the Lower Toluene Tank Area to specifically address the comment in the December 8, 1999 letter from Ohio EPA.

This report presents only the findings from the field effort to complete the data gaps identified by OEPA in the 1999 SI, and is being presented as an addendum to the SI. The following sections of the July 2000 report, including Site Description, Climate, Topography, Geology, Hydrogeology and Previous Investigations were not revised as a result of the data gap completion and should be considered consistent with current site conditions.

The remainder of this report details the Site Investigations Activities, Analytical Results, Variances and Non-conformances, Summary and Conclusions, and Recommendations.

## **2 Site Investigation Activities – Data Gap**

Based on information presented in the Limited Site Investigation conducted by USACE Louisville District, a general familiarity with the Lower Toluene Tank Area, and guidance from Ohio EPA, the sample locations were identified.

The 1999 LSI conducted by USACE Louisville District indicated there were two toluene tanks at this location. The tanks, designated as Tank 645 (northern tank) and Tank 655 (southern tank) were decommissioned in 1945. Tank 655 was relocated and installed near the former Plum Brook Reactor site.

### **2.1 Visual Survey**

Currently, the site is overgrown and downed trees obstruct access to parts of the LTTA. USACE LRH maintains access to the groundwater monitoring wells in the LTTA and as a result, accessing the area around Tank 645 was easily accomplished. Since Tank 655 was relocated to the reactor site, field personnel were unable to determine the footprint area of the tank; hence, no surface soil samples were collected in this area.

Prior to the field activities, USACE consulted Ohio EPA regarding the comment recommending the SVOC and lead sampling in the LTTA. Mr. Ron Nabors (OEPA) advised USACE LRH to collect one lead (Pb) sample from the base of the tanks. The objective of sampling for lead was to determine the impact of tank maintenance activities (painting) impacted lead concentrations in the soil along the tank perimeter. OEPA requested only one grab sample be collected at the base of the tank and subsequently analyzed for lead. No sample was collected from the area of Tank 655 due to the overgrowth of vegetation, and the speculation that relocation-related excavations may have impacted the soil around the location of the former toluene tank. One grab sample was collected from the base of Tank 645 and subsequently analyzed in the laboratory for Pb.

A visual observation of the toluene off-loading area was difficult to locate due to excessive vegetation within the ditch line adjacent to the former railroad sidling area. Based on historic photos and diagrams provided in the LSI conducted by USACE LRL and physical examination of the shallow ditch, the valve box used to unload toluene from railcars was located. Attempting to collect the samples within a close proximity to the valve pit proved difficult due to the presence of what appeared to be an asphalt-type driveway or paved area covered by accumulated debris and surface soil. The sampling was relocated to approximately 2 feet off

the edge of the paved area. The latitude and longitude of the surface soil sampling location was determined using a Garmin e-trex Legend C Navigator gps unit. The latitude and longitude were 41.3635 and 82.7013 (+/- 20 ft.), respectively. The three surface soil samples were composited into one sample and analyzed in the laboratory for SVOC content.

## 2.2 Soil Sampling

Dedicated stainless steel spoons were used to collect the surface soil samples from the LTТА locations (the perimeter of Tank 645 and the off-loading valve box area). The surface soil samples were collected from a depth of 0.5" to 6.0". Appendix A presents an aerial photo depicting the general sample location.

At the perimeter of Tank 645, a single grab sample was collected from the area at the perimeter of Tank 645 and placed in a pre-labeled 4-ounce amber jar. The sample identification was placed on the label, and tape was placed over the label to prevent demarcation of the label or the identification number. The jar was secured in a plastic bag and wrapped with packing material (bubble wrap) to prevent breakage. The sample was stored on ice in a cooler for overnight shipment by Federal Express.

At the off-loading valve box area, three grab samples were composited in a "zip-lock"-type plastic bag. The composited soil was thoroughly mixed and placed into a 4-ounce amber jar. The sample identification was placed on the label, and tape was placed over the label to prevent demarcation of the label or the identification number. The jar was secured in a plastic bag and wrapped with packing material (bubble wrap) to prevent breakage. The sample was stored on ice in a cooler for overnight shipment by Federal Express.

## 3 Analytical Results

The analytical results for the samples collected in the Lower Toluene Tank Area are presented below. The complete laboratory report is provided in Appendix B.

Sample Identification	Sample Location	Parameter	Analytical Result, mg/Kg <sup>1</sup>	PRG Value mg/Kg
PBOW-SS-LTTA01-01	Tank 645 Area	Lead (Pb)	29.6	400
PBOW-SS-LTTA02-01	Valve Pit adjacent to ditch	SVOC	Reported SVOC concentrations exceeding PRG are bolded.	
		<i>Anthracene</i>	2.80	22000
		<b><i>Benzo(a)anthracene</i></b>	<b>12.7</b>	<b>0.62</b>
		<b><i>Benzo(a)pyrene</i></b>	<b>10.8</b>	<b>0.062</b>
		<b><i>Benzo(b)fluoranthene</i></b>	<b>9.62</b>	<b>0.62</b>
		<i>Benzo(k)fluoranthene</i>	4.49	6.2
		<i>Chrysene</i>	11.1	62.0
		<b><i>Dibenzo(a,h)anthracene</i></b>	<b>1.73</b>	<b>0.062</b>
		<i>Flourene</i>	1.32	2700
		<b><i>Indeno(1,2,3-cd)pyrene</i></b>	<b>5.07</b>	<b>0.62</b>
		<i>Pyrene</i>	18.6	2300

The laboratory report provides the complete list of semi-volatile organic compound analytes and concentrations. The table above lists the only SVOCs with a reported concentration, and is listed in the List of PRG analytes. The other SVOCs reported in the laboratory data were not listed in the Region 9 Preliminary Remediation Goal (PRG).

#### **4 Variance/Non-Conformance**

For the purpose of this investigation, variances are defined as necessary changes or modifications to the planned activities as specified by the Quality Assurance Project Plan (QAPP), or Field Sampling Plan (FSP). Variances do not significantly affect the quality of the data or process being modified. However, nonconformances are defined as malfunctions, deficiencies, or deviations that may render the quality of information or data unacceptable or indeterminate. There were no nonconformances during this site investigation.

The only variance that occurred during this investigation was a modification to the number of samples collected from around Tank 645. The Sampling and Analysis Plan (SAP) stated that 4 samples would be collected from the perimeter of the base of the tank. OEPA recommended the sample be collected from a single-point location. The modification was implemented into the sampling activity.

#### **5 Summary and Conclusions**

The purpose of this site investigation of the lower toluene tank area was to determine the presence of lead and semi-volatile organic compounds resulting from the former DOD activities. The data gathering effort was conducted as an addendum to the Limited Site Investigation conducted by USACE Louisville District and in response to comments from Ohio EPA. The LSI report prepared by USACE Louisville District was reviewed and soil samples were collected and analyzed to assess the surface soil for the presence of lead and SVOC concentrations.

In addition to the Summary and Conclusions presented in the LSI, the following conclusions are a result of the field activities discussed in this report.

- During the LSI conducted by Louisville District, no soil sampling for SVOCs or lead were conducted.
- USACE Louisville findings indicated the Lower Toluene Tank Area was not negatively impacted by toluene handling practices in the LTTA.
- In the 1999/2000 LSI, USACE Louisville recommended coordination with federal and state regulatory authorities to proceed toward a No Further Action (NFA) decision document for the lower toluene tank area.
- During the LSI report review process, Ohio EPA recommended collecting and analyzing surface soil samples for Lead in the area of Tank 645, and SVOCs in the valve pit area along the shallow ditch on the east side of the LTTA.
- During the preparation of the Project Closeout Report and review of all report documentation and comments, USACE Huntington District became aware of OEPA's requirement for lead and SVOC sampling.
- In July 2005, USACE mobilized into the field to conduct surface soil sampling in the LTTA. One grab sample was collected from the base of Tank 645 and analyzed for lead. Three multiple grab samples were collected, thoroughly composited and analyzed for SVOCs. Surface soil samples were collected from a depth of 0.5"-6.0".

- The laboratory results indicated the level of lead adjacent to Tank 645 was well below the PRG. Laboratory results for SVOC indicated several compounds exceed the residential PRG levels.

## **6 Recommendations**

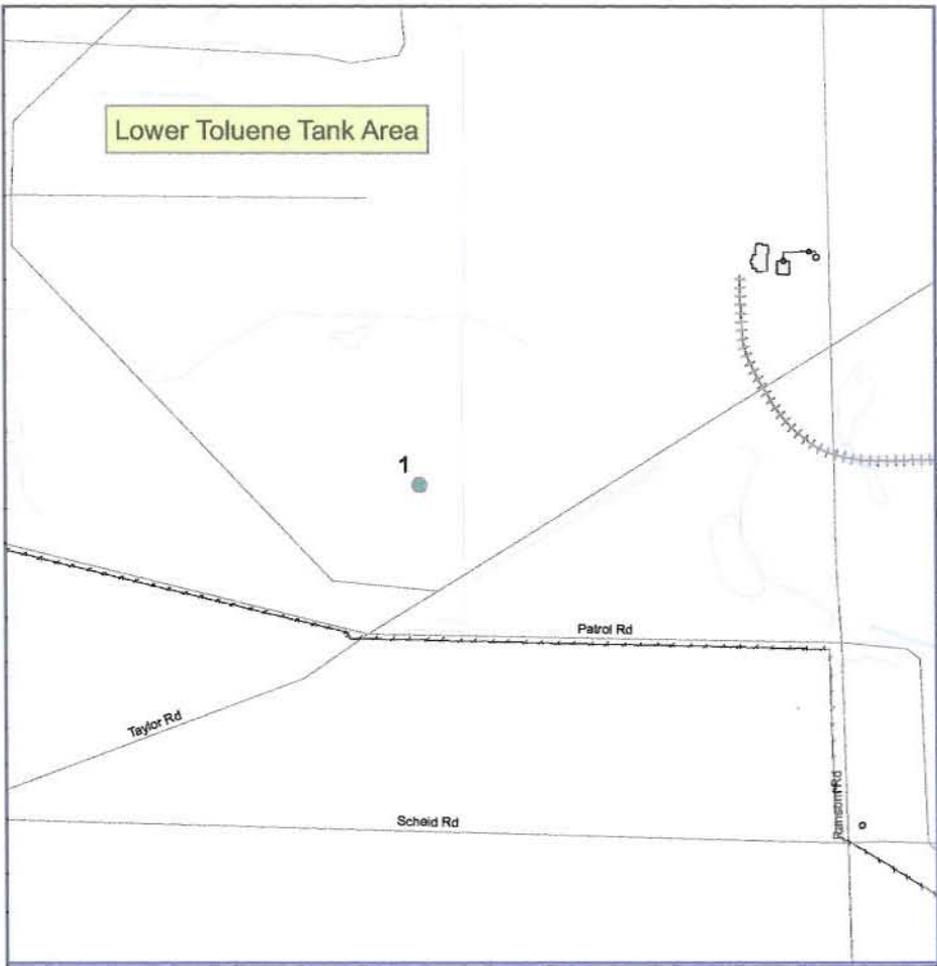
Guidance was sought from OEPA in developing the recommendations for the Lower Toluene Tank Area. The OEPA reviewed the LSI conducted in 1999, including the comments driving this addendum investigation. OEPA notified the USACE Huntington District of the agency's decision concerning the LTТА in a letter dated July 5, 2006. A copy of the letter is provided as Appendix E. Based on the OEPA's review, No Further Action is required in this area. Therefore, the Lower Toluene Tank Area is being recommended for closure and requires No Further Action.

## **7 References**

U.S. Army Corps of Engineers (USACE), Louisville District, *Limited Site Investigation – Final Report for the former Plum Brook Ordnance Works Lower Toluene Tank Area, Sandusky Ohio, Project Number G05OH001824, 2000.*

**APPENDIX A**

**General Sample Location in the LTTA**

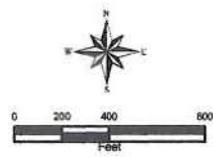


**Legend**

Grab Sample Area

● LTTA

Notes: Data mapped in Ohio Stateplane North NAD83 map units are feet.



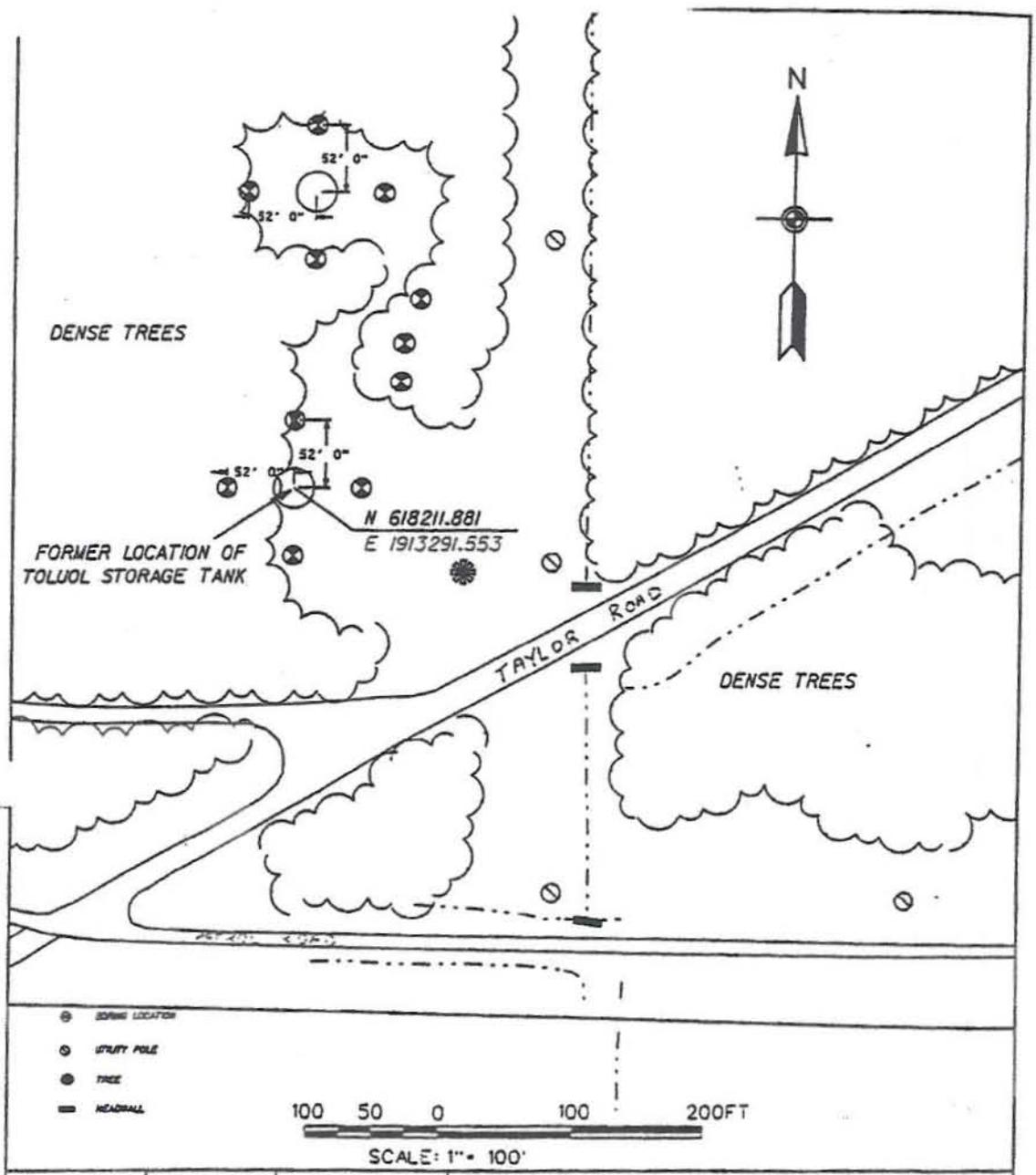
**JE JACOBS**

**Grab Samples at Lower Toluene Tank Area**

Plant Brook Ordnance Works  
Spartanburg, SC

ISSUE NO: D-0507/000001/000001  
Issued: 10/20/2010  
LTIA 7.2 (Rev. 0)

Figure



Design By:	Drawn By:	Checked By:	 US Army Corps of Engineers	PLUM BROOK STATION SANDUSKY, OHIO LIMITED SITE INVESTIGATION FY 99	PROPOSED SAMPLE LOCATIONS LOWER TOLUENE TANKS
Reviewed By:	Approved By:				
Date: 10 MAY 99	Scale: 1" = 100'	Drawing Code:	Sheet Ref. No.	FIGURE 3	

5/10/99  
 Plot Date

**APPENDIX B**

**Laboratory Data**

*Ms. Helen Owens*  
*Streamborn Environmental*  
*Services*

**Project ID: PBOW - Ohio**

REI #: 0507978

-Level II Data Package-

# Index

- *Case Narrative*
- *Analytical Results*
- *Chain-of-Custody*
- *Level II QC  
Summary*

# *Streamborn Environmental Services*

REIC Work Order: 0507978

## **Case Narrative**

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**CLIENT:** STREAMBORN ENVIRONMENTAL SE  
**Project:** PBOW  
**Lab Order:** 0507978

**CASE NARRATIVE**

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Samples were analyzed using the methods stated in the analytical report without modification unless otherwise noted.

Analytical methods contained in this report referencing Standard Methods are taken from the 18th Edition.

All samples analyzed on an "as-received" basis unless otherwise noted in the analytical report.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives, however it should be noted that the matrix spike duplicate %Recovery for Method 8270C (phenol-d5) exceeded REIC's established QC acceptance criteria. No other problems or anomalies were noted during analyses.

The Laboratory Director or his designee, as verified by the signature contained in the analytical report, has authorized the release of the data contained in this hard copy data package.

In compliance with federal guidelines and standard operating procedures, all reports, including raw data and supporting quality control, will be disposed of after three years unless otherwise arranged by the client via written notification or contract requirement.

---

**CLIENT:** STREAMBORN ENVIRONMENTAL SE  
**Project:** PBOW  
**Lab Order:** 0507978

**Work Order Sample Summary**

---

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Tag Number</b>	<b>Collection Date</b>	<b>Date Received</b>
0507978-01A	PBOW.SS.LTTA01-01		7/19/2005	7/21/2005
0507978-02A	PBOW.SS.LTTA02.01		7/18/2005	7/21/2005
0507978-03A	PBOW.05.SS.TNTACC.01		7/20/2005	7/21/2005
0507978-04A	PBOW.05.SS.TNTBSR.01		7/20/2005	7/21/2005
0507978-05A	PBOW.05.SS.COLAVE.01		7/20/2005	7/21/2005

**Lab Order:** 0507978  
**Client:** STREAMBORN ENVIRONMENTAL SERVICE  
**Project:** PBOW

**DATES REPORT**

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0507978-01A	PBOW.SS.LTTA01-01	7/19/2005	Soil	ICP METALS, TOTAL IN SOIL		7/22/2005	7/25/2005
				PERCENT MOISTURE			7/25/2005
0507978-02A	PBOW.SS.LTTA02.01	7/18/2005		PERCENT MOISTURE			8/2/2005
				SEMIVOLATILE ORGANICS		7/20/2005	7/25/2005
				SEMIVOLATILE ORGANICS		7/20/2005	7/22/2005
0507978-03A	PBOW.05.SS.TNTACC.01	7/20/2005		PERCENT MOISTURE			8/2/2005
				SEMIVOLATILE ORGANICS		7/20/2005	7/22/2005
0507978-04A	PBOW.05.SS.TNTBSR.01			PERCENT MOISTURE			8/2/2005
				SEMIVOLATILE ORGANICS		7/20/2005	7/22/2005
0507978-05A	PBOW.05.SS.COLAVE.01			PERCENT MOISTURE			8/2/2005
				SEMIVOLATILE ORGANICS		7/20/2005	7/22/2005

# *Streamborn Environmental Services*

REIC Work Order: 0507978

## **Analytical Results**



RESEARCH ENVIRONMENTAL & INDUSTRIAL CONSULTANTS, INC.

Improving the environment, one client at a time...

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Post Office Box 286  
Beaver, WV 25813  
800.999.0105  
304.255.2500 • 304.255.2572 (fax)  
website: www.reiclabs.com

Member:

American Chemical  
Society

Association of Official  
Analytical Chemists

Petroleum Marketers  
Association

Rural Water  
Association

Mining & Reclamation  
Association

American  
Water Works  
Association

The Solid Waste  
Association of  
North America

West Virginia  
Manufacturers  
Association

Association of  
West Virginia  
Solid Waste  
Authorities

West Virginia  
Oil Marketers &  
Grocers Association

August 04, 2005

Ms Helen Owens  
STREAMBORN ENVIRONMENTAL SERVICE  
724 S MIAMI STREET  
WEST MILTON, OH 45383

TEL: (937) 698-5090

FAX

RE: PBOW

Dear Ms Helen Owens:

Order No.: 0507978

REI Consultants Inc. received 5 sample(s) on 7/21/2005 for the analyses presented in the following report.

If you have any questions regarding these results, please do not hesitate to call.

Sincerely,

Grant Wilton  
Project Manager

**REI Consultants Inc.**

Date: 04-Aug-05

<b>CLIENT:</b>	STREAMBORN ENVIRONMENTAL SERVI	<b>Lab Order:</b>	0507978
<b>Client Sample ID:</b>	PBOW.SS.LTTA01-01	<b>Lab ID:</b>	0507978-01A
<b>Project:</b>	PBOW	<b>Collection Date:</b>	7/19/2005
<b>Site ID:</b>	PBOW OHIO	<b>Matrix:</b>	SOIL

Analyses	Result	Units	MDL	PQL	Qual	Date Analyzed	Analyst
<b>PERCENT MOISTURE</b>							
Percent Moisture	7.68	wt%	NA	0.01		07/25/05 9:00 AM	DSA
<b>TOTAL METALS BY ICP</b>							
Lead	29.6	mg/Kg	NA	5.00		07/25/05 10:39 AM	JD

**Key:**

- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compounds

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level or Regulatory Level
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Sample extraction/analysis holding time exceeded
- J Analyte detected below PQL
- S Spike Recovery outside accepted recovery limits

**REI Consultants Inc.**

Date: 04-Aug-05

**CLIENT:** STREAMBORN ENVIRONMENTAL SERVI      **Lab Order:** 0507978  
**Client Sample ID:** PBOW.SS.LTTA02.01      **Lab ID:** 0507978-02A  
**Project:** PBOW      **Collection Date:** 7/18/2005  
**Site ID:** PBOW OHIO      **Matrix:** SOIL

**Analyses**      **Result**      **Units**      **MDL**      **PQL**      **Qual Date Analyzed**      **Analyst**

**PERCENT MOISTURE**      **SM2540 B**  
 Percent Moisture      11      wt%      NA      0.5      08/02/05 12:00 AM      CDS

**SEMIVOLATILE ORGANIC COMPOUNDS**      **SW8270C**

Acenaphthene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Acenaphthylene	1.55	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Anthracene	2.80	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Benzidine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Benzo(a)anthracene	12.7	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
Benzo(a)pyrene	10.8	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
Benzo(b)fluoranthene	9.62	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
Benzo(g,h,i)perylene	4.70	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Benzo(k)fluoranthene	4.49	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Bis(2-chloroethoxy)methane	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Bis(2-chloroethyl)ether	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Bis(2-chloroisopropyl)ether	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Bis(2-ethylhexyl)phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
4-Bromophenyl phenyl ether	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Butyl benzyl phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
4-Chloro-3-methylphenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2-Chloronaphthalene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2-Chlorophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
4-Chlorophenyl phenyl ether	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Chrysene	11.1	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
o-Cresol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
m,p-Cresol	ND	mg/Kg	NA	0.664	07/22/05 5:18 PM	CLS
Dibenzo(a,h)anthracene	1.73	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Di-n-butyl phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
1,2-Dichlorobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
1,3-Dichlorobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
1,4-Dichlorobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
3,3'-Dichlorobenzidine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4-Dichlorophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Diethyl phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Dimethyl phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4-Dimethylphenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
4,6-Dinitro-2-methylphenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4-Dinitrophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4-Dinitrotoluene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS

**Key:**  
 MCL. Maximum Contaminant Level  
 MDL. Minimum Detection Limit  
 NA. Not Applicable  
 ND. Not Detected at the PQL or MDL.  
 PQL. Practical Quantitation Limit  
 TIC. Tentatively Identified Compounds

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level or Regulatory Level  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded  
 J Analyte detected below PQL.  
 S Spike Recovery outside accepted recovery limits

**REI Consultants Inc.**

Date: 04-Aug-05

**CLIENT:** STREAMBORN ENVIRONMENTAL SERVI      **Lab Order:** 0507978  
**Client Sample ID:** PBOW.SS.LTTA02.01      **Lab ID:** 0507978-02A  
**Project:** PBOW      **Collection Date:** 7/18/2005  
**Site ID:** PBOW OHIO      **Matrix:** SOIL

Analyses	Result	Units	MDL	PQL	Qual Date Analyzed	Analyst
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>			<b>SW8270C</b>			
2,6-Dinitrotoluene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Di-n-octyl phthalate	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
1,2-Diphenylhydrazine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Fluoranthene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Fluorene	1.32	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Hexachlorobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Hexachlorobutadiene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Hexachlorocyclopentadiene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Hexachloroethane	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Indeno(1,2,3-cd)pyrene	5.07	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Isophorone	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Naphthalene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Nitrobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2-Nitrophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
4-Nitrophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
N-Nitrosodimethylamine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
N-Nitrosodiphenylamine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
N-Nitrosodi-n-propylamine	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Pentachlorophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Phenanthrene	10.5	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
Phenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Pyrene	18.6	mg/Kg	NA	3.32	07/25/05 12:56 PM	CLS
1,2,4-Trichlorobenzene	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4,5-Trichlorophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
2,4,6-Trichlorophenol	ND	mg/Kg	NA	0.332	07/22/05 5:18 PM	CLS
Surr: 2-Fluorophenol	56	%REC	NA	25-121	07/22/05 5:18 PM	CLS
Surr: Phenol-d5	84	%REC	NA	24-113	07/22/05 5:18 PM	CLS
Surr: 2,4,6-Tribromophenol	79	%REC	NA	19-122	07/22/05 5:18 PM	CLS
Surr: Nitrobenzene-d5	72	%REC	NA	23-120	07/22/05 5:18 PM	CLS
Surr: 2-Fluorobiphenyl	61	%REC	NA	30-115	07/22/05 5:18 PM	CLS
Surr: 4-Terphenyl-d14	93	%REC	NA	18-137	07/22/05 5:18 PM	CLS

**Key:**  
 MCL Maximum Contaminant Level  
 MDL Minimum Detection Limit  
 NA Not Applicable  
 ND Not Detected at the PQL or MDL  
 PQL Practical Quantitation Limit  
 TIC Tentatively Identified Compounds

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level or Regulatory Level  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded  
 J Analyte detected below PQL  
 S Spike Recovery outside accepted recovery limits

**REI Consultants Inc.**

Date: 04-Aug-05

CLIENT: STREAMBORN ENVIRONMENTAL SERVI      Lab Order: 0507978  
 Client Sample ID: PBOW.05.SS.TNTACC.01      Lab ID: 0507978-03A  
 Project: PBOW      Collection Date: 7/20/2005  
 Site ID: PBOW OHIO      Matrix: SOIL

Analyses	Result	Units	MDL	PQL	Qual Date Analyzed	Analyst
<b>PERCENT MOISTURE</b>			<b>SM2540 B</b>			
Percent Moisture	11	wt%	NA	0.5	08/02/05 12:00 AM	CDS
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>			<b>SW8270C</b>			
Acenaphthene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Acenaphthylene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Anthracene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Benzo(a)anthracene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Benzo(a)pyrene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Benzo(b)fluoranthene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Benzo(g,h,i)perylene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Benzo(k)fluoranthene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Chrysene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Dibenzo(a,h)anthracene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Fluoranthene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Fluorene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Indeno(1,2,3-cd)pyrene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Naphthalene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Phenanthrene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Pyrene	ND	mg/Kg	NA	0.331	07/22/05 4:49 PM	CLS
Surr: Nitrobenzene-d5	76	%REC	NA	23-120	07/22/05 4:49 PM	CLS
Surr: 2-Fluorobiphenyl	68	%REC	NA	30-115	07/22/05 4:49 PM	CLS
Surr: 4-Terphenyl-d14	91	%REC	NA	18-137	07/22/05 4:49 PM	CLS

**Key:**  
 MCL Maximum Contaminant Level  
 MDL Minimum Detection Limit  
 NA Not Applicable  
 ND Not Detected at the PQL or MDL  
 PQL Practical Quantitation Limit  
 TIC Tentatively Identified Compounds

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level or Regulatory Level  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded  
 J Analyte detected below PQL  
 S Spike Recovery outside accepted recovery limits

**REI Consultants Inc.**

Date: 04-Aug-05

**CLIENT:** STREAMBORN ENVIRONMENTAL SERVI    **Lab Order:** 0507978  
**Client Sample ID:** PBOW.05.SS.TNTBSR.01    **Lab ID:** 0507978-04A  
**Project:** PBOW    **Collection Date:** 7/20/2005  
**Site ID:** PBOW OHIO    **Matrix:** SOIL

Analyses	Result	Units	MDL	PQL	Qual Date Analyzed	Analyst
<b>PERCENT MOISTURE</b>			<b>SM2540 B</b>			
Percent Moisture	18	wt%	NA	0.5	08/02/05 12:00 AM	CDS
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>			<b>SW8270C</b>			
Acenaphthene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Acenaphthylene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Anthracene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Benzo(a)anthracene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Benzo(a)pyrene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Benzo(b)fluoranthene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Benzo(g,h,i)perylene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Benzo(k)fluoranthene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Chrysene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Dibenzo(a,h)anthracene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Fluoranthene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Fluorene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Indeno(1,2,3-cd)pyrene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Naphthalene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Phenanthrene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Pyrene	ND	mg/Kg	NA	0.333	07/22/05 2:55 PM	CLS
Surr: Nitrobenzene-d5	78	%REC	NA	23-120	07/22/05 2:55 PM	CLS
Surr: 2-Fluorobiphenyl	70	%REC	NA	30-115	07/22/05 2:55 PM	CLS
Surr: 4-Terphenyl-d14	90	%REC	NA	18-137	07/22/05 2:55 PM	CLS

**Key:**  
 MCL Maximum Contaminant Level  
 MDL Minimum Detection Limit  
 NA Not Applicable  
 ND Not Detected at the PQL or MDL  
 PQL Practical Quantitation Limit  
 TIC Tentatively Identified Compounds

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level or Regulatory Level  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded  
 J Analyte detected below PQL  
 S Spike Recovery outside accepted recovery limits

**REI Consultants Inc.**

Date: 04-Aug-05

CLIENT: STREAMBORN ENVIRONMENTAL SERVI Lab Order: 0507978  
 Client Sample ID: PBOW.05.SS.COLAVE.01 Lab ID: 0507978-05A  
 Project: PBOW Collection Date: 7/20/2005  
 Site ID: PBOW OHIO Matrix: SOIL

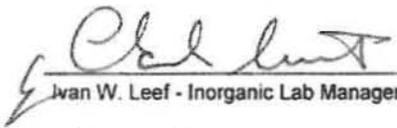
Analyses	Result	Units	MDL	PQL	Qual Date Analyzed	Analyst
<b>PERCENT MOISTURE</b>			<b>SM2540 B</b>			
Percent Moisture	18	wt%	NA	0.5	08/02/05 12:00 AM	CDS
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>			<b>SW8270C</b>			
Acenaphthene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Acenaphthylene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Anthracene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Benzo(a)anthracene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Benzo(a)pyrene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Benzo(b)fluoranthene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Benzo(g,h,i)perylene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Benzo(k)fluoranthene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Chrysene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Dibenzo(a,h)anthracene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Fluoranthene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Fluorene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Indeno(1,2,3-cd)pyrene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Naphthalene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Phenanthrene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Pyrene	ND	mg/Kg	NA	0.332	07/22/05 4:21 PM	CLS
Surr: Nitrobenzene-d5	74	%REC	NA	23-120	07/22/05 4:21 PM	CLS
Surr: 2-Fluorobiphenyl	65	%REC	NA	30-115	07/22/05 4:21 PM	CLS
Surr: 4-Terphenyl-d14	87	%REC	NA	18-137	07/22/05 4:21 PM	CLS

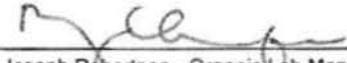
**Key:**  
 MCL Maximum Contaminant Level  
 MDL Minimum Detection Limit  
 NA Not Applicable  
 ND Not Detected at the PQL or MDL  
 PQL Practical Quantitation Limit  
 TIC Tentatively Identified Compounds

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level or Regulatory Level  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded  
 J Analyte detected below PQL  
 S Spike Recovery outside accepted recovery limits

CLIENT: STREAMBORN ENVIRONMENTAL SERVIC Lab Order: 0507978  
 Project: PBOW  
 Site ID: PBOW OHIO

Data Review

Approved:  8-4-05  
 Ivan W. Leef - Inorganic Lab Manager Date

Approved:  8-4-05  
 Joseph Robertson - Organic Lab Manager Date

**Key:**

- MCL Maximum Contaminant Level
- MDL Minimum Detection Limit
- NA Not Applicable
- ND Not Detected at the PQL or MDL
- PQL Practical Quantitation Limit
- TIC Tentatively Identified Compounds

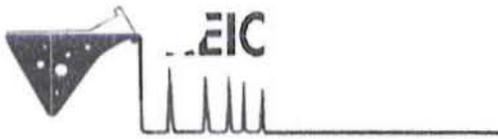
**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level or Regulatory Level
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Sample extraction/analysis holding time exceeded
- J Analyte detected below PQL
- S Spike Recovery outside accepted recovery limits

# *Streamborn Environmental Services*

REIC Work Order: 0507978

## **Chain-of-Custody**



REI Consultants, Inc.  
 225 Industrial Park Rd.  
 P.O. Box 286, Beaver, WV 25813  
 Phone: 304-255-2500 or 800-999-0105  
 FAX: 304-255-2572  
 e-mail: rlabs@reiclabs.com

CHAIN OF CUSTODY RECORD NO. 171 34

CLIENT: Streamborn Env. Services CONTACT PERSON: Helen Owens  
 ADDRESS: 724 S. miami st. TELEPHONE #: 9376985090 / 9374782322 (cell)  
 CITY/STATE/ZIP: West Milton, OH 45383 FAX #: \_\_\_\_\_  
 BILL TO: Streamborn Env. Services E-MAIL ADDRESS: howens1@wob.rr.com  
 CITY/STATE/ZIP: 4110 Withrow Rd. SITE ID & STATE: PBOW-Ohio  
 PURCHASE ORDER # Hamilton, OH 45011 PROJECT ID: PBOW  
 QUOTE # \_\_\_\_\_ SAMPLER: Ashley Owens

SAMPLE LOG AND ANALYSIS REQUEST	TURNAROUND TIME REQUIREMENTS		PRESERVATIVES		PRESERVATIVE CODES												COMMENTS						
	REGULAR:	*RUSH:	0 No Preservative	NOTE PRESERVATIVES →	0	0	0																
SAMPLE ID	NO. & TYPE OF CONTAINERS	SAMPLING DATE / TIME	MATRIX	SAMPLE COMP / GRAB	ANALYSIS REQUESTED & METHOD	LEAD	SYOC	PAH															
PBOW.05.SS.LTIA φ1-φ1	1	7/18/05 0950	soil	Comp	X																		
PBOW.05.SS.LTIA φ2.01	1	7/18/05 1130	soil	Comp		X																	
PBOW.05.SS INTACC φ1	1	7/20/05 0825	soil	Comp			X																
PBOW.05.SS INTBSR.01	1	7/20/05 0930	soil	Comp			X																
PBOW.05.SS Col Ave. 01	1	7/20/05 1015	soil	comp			X																
Relinquished by: (Signature) <u>Ashley Owens</u> Date/Time <u>7/26/05 1700</u>					Received by: (Signature) _____ Date/Time _____					Relinquished by: (Signature) _____ Date/Time _____					Received by: (Signature) _____ Date/Time _____								
Relinquished by: (Signature) _____ Date/Time _____					Received by: (Signature) _____ Date/Time <u>7-21-05 1630</u>					Temperature Upon Arrival <u>3.0</u> °C					<input type="checkbox"/> FAX Results <input type="checkbox"/> Email Results								

# *Streamborn Environmental Services*

REIC Work Order: 0507978

## **Level II QC Summary**

## **Total Metals: SW6010B**

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Level II QC Summary

**CLIENT:** STREAMBORN ENVIRONMENTAL SE  
**Work Order:** 0507978  
**Project:** PBOW

**ANALYTICAL QC SUMMARY REPORT**

**TestCode: 6010\_S**

Sample ID:	SampType:	TestCode:	Units:	Prep Date:	RunNo:						
MB-30830	MBLK	6010_S	mg/Kg	7/22/2006	107386						
Client ID: ZZZZZ	Batch ID: 30830	TestNo: SW6010B	(SW3050B)	Analysis Date: 7/25/2006	SeqNo: 1403010						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.00									

Sample ID:	SampType:	TestCode:	Units:	Prep Date:	RunNo:						
0507978-01A MS	MS	6010_S	mg/Kg	7/22/2006	107386						
Client ID: PBOW.SS.LTTA01-0	Batch ID: 30830	TestNo: SW6010B	(SW3050B)	Analysis Date: 7/25/2006	SeqNo: 1403016						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	58.2	5.00	25	29.56	114	75	125				

Sample ID:	SampType:	TestCode:	Units:	Prep Date:	RunNo:						
0507978-01A DUP	DUP	6010_S	mg/Kg	7/22/2006	107386						
Client ID: PBOW.SS.LTTA01-0	Batch ID: 30830	TestNo: SW6010B	(SW3050B)	Analysis Date: 7/25/2006	SeqNo: 1403014						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	30.4	5.00						29.56	2.75	20	

**Qualifiers:** B Analyte detected in the associated Method Blank  
 J Analyte detected below PQL  
 PQL Practical Quantitation Limit  
 E Value above quantitation range  
 MDL Minimum Detection Limit  
 R RPD outside accepted recovery limits  
 H Sample extraction/analysis holding time exceeded  
 ND Not Detected at the PQL or MDL  
 S Spike Recovery outside accepted recovery limits

# **Semivolatile Organic Compounds: SW8270C**

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Level II QC Summary

CLIENT: STREAMBORN ENVIRONMENTAL SE  
 Work Order: 0507978  
 Project: PBOW

## ANALYTICAL QC SUMMARY REPORT

TestCode: 8270\_S

Sample ID: MB-30791	SampType: MBLK	TestCode: 8270_S	Units: mg/Kg	Prep Date: 7/20/2005	RunNo: 107416						
Client ID: ZZZZZ	Batch ID: 30791	TestNo:	(SW3550A)	Analysis Date: 7/22/2005	SeqNo: 1417551						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	0.333									
Acenaphthylene	ND	0.333									
Anthracene	ND	0.333									
Benzidine	ND	0.333									
Benzo(a)anthracene	ND	0.333									
Benzo(a)pyrene	ND	0.333									
Benzo(b)fluoranthene	ND	0.333									
Benzo(g,h,i)perylene	ND	0.333									
Benzo(k)fluoranthene	ND	0.333									
Bis(2-chloroethoxy)methane	ND	0.333									
Bis(2-chloroethyl)ether	ND	0.333									
Bis(2-chloroisopropyl)ether	ND	0.333									
Bis(2-ethylhexyl)phthalate	ND	0.333									
4-Bromophenyl phenyl ether	ND	0.333									
Butyl benzyl phthalate	ND	0.333									
4-Chloro-3-methylphenol	ND	0.333									
2-Chloronaphthalene	ND	0.333									
2-Chlorophenol	ND	0.333									
4-Chlorophenyl phenyl ether	ND	0.333									
Chrysene	ND	0.333									
o-Cresol	ND	0.333									
m,p-Cresol	ND	0.666									
Dibenzo(a,h)anthracene	ND	0.333									
Di-n-butyl phthalate	ND	0.333									
1,2-Dichlorobenzene	ND	0.333									
1,3-Dichlorobenzene	ND	0.333									
1,4-Dichlorobenzene	ND	0.333									
3,3'-Dichlorobenzidine	ND	0.333									
2,4-Dichlorophenol	ND	0.333									

Qualifiers: B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded

**CLIENT:** STREAMBORN ENVIRONMENTAL SE  
**Work Order:** 0507978  
**Project:** PBOW

## ANALYTICAL QC SUMMARY REPORT

**TestCode:** 8270\_S

Sample ID: <b>MB-30791</b>	SampType: <b>MBLK</b>	TestCode: <b>8270_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>7/20/2005</b>	RunNo: <b>107416</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>30791</b>	TestNo:	<b>(SW3550A)</b>	Analysis Date: <b>7/22/2005</b>	SeqNo: <b>1417551</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diethyl phthalate	ND	0.333									
Dimethyl phthalate	ND	0.333									
2,4-Dimethylphenol	ND	0.333									
4,6-Dinitro-2-methylphenol	ND	0.333									
2,4-Dinitrophenol	ND	0.333									
2,4-Dinitrotoluene	ND	0.333									
2,6-Dinitrotoluene	ND	0.333									
Di-n-octyl phthalate	ND	0.333									
1,2-Diphenylhydrazine	ND	0.333									
Fluoranthene	ND	0.333									
Fluorene	ND	0.333									
Hexachlorobenzene	ND	0.333									
Hexachlorobutadiene	ND	0.333									
Hexachlorocyclopentadiene	ND	0.333									
Hexachloroethane	ND	0.333									
Indeno(1,2,3-cd)pyrene	ND	0.333									
Isophorone	ND	0.333									
Naphthalene	ND	0.333									
Nitrobenzene	ND	0.333									
2-Nitrophenol	ND	0.333									
4-Nitrophenol	ND	0.333									
N-Nitrosodimethylamine	ND	0.333									
N-Nitrosodiphenylamine	ND	0.333									
N-Nitrosodi-n-propylamine	ND	0.333									
Pentachlorophenol	ND	0.333									
Phenanthrene	ND	0.333									
Phenol	ND	0.333									
Pyrene	ND	0.333									
1,2,4-Trichlorobenzene	ND	0.333									
2,4,5-Trichlorophenol	ND	0.333									
2,4,6-Trichlorophenol	ND	0.333									

**Qualifiers:**  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded

**CLIENT:** STREAMBORN ENVIRONMENTAL SE  
**Work Order:** 0507978  
**Project:** PBOW

## ANALYTICAL QC SUMMARY REPORT

**TestCode:** 8270\_S

Sample ID: <b>MB-30791</b>	SampType: <b>MBLK</b>	TestCode: <b>8270_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>7/20/2006</b>	RunNo: <b>107416</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>30791</b>	TestNo:	( <b>SW3550A</b> )	Analysis Date: <b>7/22/2006</b>	SeqNo: <b>1417551</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	4.70	NA	6.67	0	70.5	25	121				
Surr: Phenol-d5	6.60	NA	6.67	0	98.9	24	113				
Surr: 2,4,6-Tribromophenol	5.87	NA	6.67	0	88.0	19	122				
Surr: Nitrobenzene-d5	2.97	NA	3.33	0	89.3	23	120				
Surr: 2-Fluorobiphenyl	2.82	NA	3.33	0	84.6	30	115				
Surr: 4-Terphenyl-d14	3.50	NA	3.33	0	105	18	137				

**Qualifiers:**  
 B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded

CLIENT: STREAMBORN ENVIRONMENTAL SE  
 Work Order: 0507978  
 Project: PBOW

## ANALYTICAL QC SUMMARY REPORT

TestCode: 8270\_S

Sample ID: 0507978-04A MS	SampType: MS	TestCode: 8270_S	Units: mg/Kg	Prep Date: 7/20/2005	RunNo: 107416						
Client ID: PBOW.05.SS.TNTBS	Batch ID: 30791	TestNo: SW8270C	(SW3550A)	Analysis Date: 7/22/2005	SeqNo: 1403360						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	1.48	0.333	1.668	0	88.9	47	145				
4-Chloro-3-methylphenol	3.89	0.333	3.326	0	117	22	147				
2-Chlorophenol	2.92	0.333	3.326	0	87.7	23	134				
2,4-Dinitrotoluene	1.54	0.333	1.668	0	92.2	39	139				
Pyrene	1.48	0.333	1.668	0	88.9	52	115				
Surr: 2-Fluorophenol	5.08	NA	6.661	0	76.2	25	121				
Surr: Phenol-d5	7.50	NA	6.661	0	113	24	113				
Surr: 2,4,6-Tribromophenol	6.09	NA	6.661	0	91.4	19	122				
Surr: Nitrobenzene-d5	3.07	NA	3.326	0	92.4	23	120				
Surr: 2-Fluorobiphenyl	2.57	NA	3.326	0	77.4	30	115				
Surr: 4-Terphenyl-d14	3.20	NA	3.326	0	96.1	18	137				

Sample ID: 0507978-04A MSD	SampType: MSD	TestCode: 8270_S	Units: mg/Kg	Prep Date: 7/20/2005	RunNo: 107416						
Client ID: PBOW.05.SS.TNTBS	Batch ID: 30791	TestNo: SW8270C	(SW3550A)	Analysis Date: 7/22/2005	SeqNo: 1403361						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	1.43	0.331	1.661	0	85.8	47	145	1.483	4.01	30	
4-Chloro-3-methylphenol	3.77	0.331	3.312	0	114	22	147	3.892	3.25	30	
2-Chlorophenol	2.84	0.331	3.312	0	85.9	23	134	2.917	2.52	30	
2,4-Dinitrotoluene	1.44	0.331	1.661	0	86.9	39	139	1.538	6.37	30	
Pyrene	1.43	0.331	1.661	0	86.0	52	115	1.483	3.73	30	
Surr: 2-Fluorophenol	4.94	NA	6.635	0	74.4	25	121	0	0	0	
Surr: Phenol-d5	7.54	NA	6.635	0	114	24	113	0	0	0	S
Surr: 2,4,6-Tribromophenol	6.08	NA	6.635	0	91.7	19	122	0	0	0	
Surr: Nitrobenzene-d5	2.99	NA	3.312	0	90.3	23	120	0	0	0	
Surr: 2-Fluorobiphenyl	2.49	NA	3.312	0	75.2	30	115	0	0	0	
Surr: 4-Terphenyl-d14	3.07	NA	3.312	0	92.8	18	137	0	0	0	

Qualifiers: B Analyte detected in the associated Method Blank  
 E Value above quantitation range  
 H Sample extraction/analysis holding time exceeded

REI Consultants Inc.

Date: 11-Aug-05

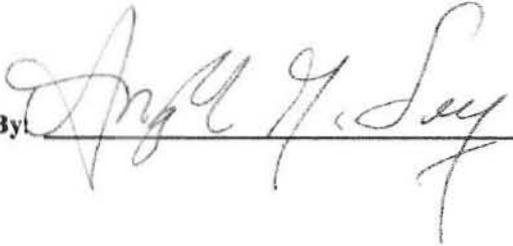
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CLIENT: STREAMBORN ENVIRONMENTAL SE  
Work Order: 0507978  
Project: PBOW

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**QC SUMMARY REPORT**

Approved By: \_\_\_\_\_



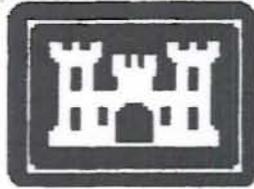
Date: \_\_\_\_\_

8.11.05

**APPENDIX C**

**Final Report  
Limited Site Investigation - Lower Toluene Tank Area**

**Plum Brook Ordnance Works  
Sandusky, Ohio**



**U.S. Army Corps  
of Engineers  
Louisville District**

**Defense Environmental Restoration Program  
For  
Formerly Used Defense Sites**

**Limited Site Investigation**

**Final Report**

for  
the former

**Plum Brook Ordnance Works  
Lower Toluene Tank Area**

**Sandusky, Ohio  
Project Number G05OH001824**

**July 2000**

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G05OH001824\_03.10\_0001



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## **1.0 INTRODUCTION**

Located near Sandusky Ohio, the former Plum Brook Ordnance Works (PBOW) was operated from 1941 to 1945 by the Department of Defense (DOD) as a manufacturing plant for trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Contamination detected at the installation by several studies has been related to past activities and is being addressed by the DOD under the Defense Environmental Restoration Program (DERP), Formerly Used Defense Sites (FUDS).

A limited Site Investigation (SI) of the lower toluene storage tanks was conducted and is reported herein. The potential for contamination of the tank area was identified in an Inventory Project Request (INPR) (Huntington District U.S. Army Corps of Engineers USACE, 1998). The purpose of this limited Site Investigation (SI) was to evaluate the potential for contamination of the former tank area that may have resulted from past Department of Defense (DOD) activities. The Reference sections of this report identifies the guidance documents and information used to complete this investigation. Historical information was reviewed to identify the environmental media and locations most likely affected. Field sampling, a visual survey, and chemical analyses were performed to evaluate the environmental media and site conditions. Results of the laboratory analyses were then compared to risk-based, media specific screening criteria. United States Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs) were used for the screening criteria.

This project is one of several limited SI projects simultaneously undertaken by the US Army Corps of Engineers to be executed by the Louisville District (CELRL) under the direction of the Huntington District (CELRH).

The sampling and chemical laboratory analyses were performed in accordance with the Quality Assurance Project Plan (QAPP) prepared by the U. S. Army Corps of Engineers, Louisville District, dated June 1999.

### **1.1 Site Description/History**

#### **1.1.1 Installation**

Land for the original site was acquired by the Department of War in 1938 and consisted of approximately 9,010 acres of land. In the early 1940s, the U.S. Army contracted with Trojan Powder Company to manufacture 2,4,6-TNT, dinitrotoluene and pentolite at PBOW. Production began on December 16, 1941 and continued through late 1945, ceasing two weeks after V-J Day ( September 2, 1945). After operations ceased, the area was turned over to the Army Ordnance Department and renamed Plum Brook Depot and used for ammunition storage.

PBOW was placed in standby status from 1945 to 1946. During this time, decontamination and decommissioning (D&D) procedures were performed on many structures associated with the manufacturing process. D&D included the removal and relocation of all explosives to burning grounds for destruction by open burning. Where possible, remaining structures and buildings were burned in place. Drain lines and steam lines were flushed and dismantled.

In December 1945, custody of PBOW was transferred from Trojan Powder Company to U.S. Army Ordnance Department, with the U.S. Army Corps of Engineers assuming custodial responsibilities from January 1 through June 30 1946. In August 1946, PBOW was transferred to the War Assets Administration.

In 1956 the National Advisory Committee for Aeronautics (NACA) began leasing sections of PBOW from the War Assets Administration. An agreement was made in 1956 to lease 500 acres in the northern portion of PBOW to construct and operate the Plum Brook Reactor Facility (PBRF). In 1958 NACA changed its name to National Aeronautics and Space Administration (NASA). By 1963, approximately 6,400 acres of PBOW had been acquired by NASA for various aerospace research activities. An additional 2,000 acres were acquired to serve as a buffer zone between the facility and the adjacent community. Research and test activities were conducted by NASA throughout the 1960s and have continued until today.

NASA declared approximately 2,150 acres as excess in 1978. Forty-six acres of the excessed property is used by the Perkins Township Board of Education as a bus transportation center. Much of the remaining excess property was reclaimed as farmland. NASA also excessed Parcel #59 to the General Services Administration (GSA) for subsequent disposal.

The PBS site currently lies in an area that is primarily rural and agricultural with a low population density. The NASA Lewis Research Center occupies a majority of the former ordnance works. The Department of the Army maintains a reserve center on the westernmost portion of the facility. The remainder of the former installation is in private ownership with the vast majority being cultivated. A tract on the northern boundary is owned by the Perkins Board of Education and is utilized as a bus maintenance facility. A land use map (dated 1980/1983) and an historic land ownership map (dated 1865) of the PBOW vicinity is included in Appendix A.

### 1.1.2 Site Specific

During the period that PBOW was operational, DOD constructed and utilized six storage tanks that served as bulk storage for toluene used in the production of TNT. PBOW had three TNT production areas A, B, and C. Each production area was supported by two aboveground storage tanks (AST) used for bulk toluene storage. Each tank was

approximately 30 feet in diameter, 41 feet high, constructed of steel, and had a capacity of 200,000 gallons. Each tank rested on a concrete foundation surrounded by a 1-foot wide by 1-foot high concrete containment berm. The berm emptied into a 3-foot square drain valve pit. The pump for each tank is located at ground level near the drain valve pit. Historical photographs show large earthen berms around each tank, which were approximately 55 feet from the center of the tank. More recent historical photographs do not show an earthen berm around the tanks. It has not been ascertained if these berms were removed by DOD, NASA, or naturally eroded away. The lower toluene tanks supported "TNT Area C" during PBOW operations. The tanks were numbered 645 (northern tank) and 655 (southern tank). The tanks were installed in 1941, and were in service until 1945. According to the Records Review Report (Dames & Moore, 1995), no mention of any releases from the toluene tanks, while DOD used them was found. Toluene was transported to and from the tank area by railroad. The tanks were decommissioned in 1945 by pumping out their contents, draining transfer lines, and opening top and bottom flanges for ventilation.

Based on topographical quadrangles (dated 1959 & 1969), aerial photographs, and the visual site survey (section 3.1, herein), the site has essentially remained unchanged since the tanks were decommissioned in 1945. Exceptions to this are that the site has become overgrown and Tank 655 has been removed. Tank 655 was moved and installed near the Plum Brook Reactor Facility by NASA. Figures 1-4 & 1-5 are aerial photographs taken of the area in 1997 & 1950, respectively. Appendix B provides historical topographic quadrangles dated 1959 and 1969.

Environmental Information and Imaging Services (ERIIS) performed a database search of the PBOW vicinity. The data base search included those sites within close proximity to the PBOW that are currently listed under the following database records:

- National Priorities List (NPL)
- Resource Conservation and Recovery Information System- TSD's: Subject to Corrective Action (RCRIS\_CA)
- Resource Conservation and Recovery Information System- Non-Corrective Action TSD Facilities (RCRIS\_TS)
- Comprehensive Environmental Response, Compensation and liability Information System (CERCLIS)
- No Further Remedial Action Planned Sites (NFRAP)
- Resource conservation and Recovery Information System-Large Quantity Generators (RCRIS\_LG)
- Resource conservation and Recovery Information System-Small Quantity Generators (RCRIS\_SG)
- Emergency Response Notification System (ERNS)
- Ohio Master Sites List (HWS)
- Ohio Leaking Underground Storage Tank Report (LRST)
- Ohio Solid Waste Facility List (SWF)
- Ohio Underground Storage Tank Report (RST)

A description of each of these records is presented in Appendix I. Within the radii on the ERIIS figure in Appendix I, the search revealed 25 LRST sites, 18 RST sites, 3 SWF sites, 5 RCRIS\_SG sites, 1 RCRIS\_TS site, 1 NFRAP site, and 3 HWS sites. Of these sites, 6 LRST sites, 9 RST sites, 1 RCRIS\_SG site, 1 RCRIS\_TS site, 1 NFRAP site and 1 HWS site are located on the PBOW installation and the remainder are located outside the installation boundary. Information concerning each of these listed facilities and their location is included in Appendix I. Based on the proximity of these sites and/or their status, the potential for any of these listed facilities to negatively impact the lower toluene tank site is minimal.

## **1.2 Climate**

The climate for Erie County is continental with cold and cloudy winters and warm humid summers. The county's first freezing temperature is typically in October, and its last freezing temperature is typically in April. Average annual precipitation for Sandusky from 1961 to 1990 was 34.05 inches. Within that time period, February had the lowest monthly rainfall average with 1.65 inches, whereas July had the highest monthly rainfall average of 3.70 inches. The weather changes every few days as cold fronts move through the region. Wind is from the southwest 55 percent of the time (MK1994: DM, 1997).

## **1.3 Topography**

The lower toluene storage tank area is located primarily on a flat grassland area at an elevation of approximately 680 feet mean sea level (msl). Based on review of historical topographic quadrangles (USGS, 1959, 1969), and current survey data, the surface elevation of the tank area has not changed significantly over the years. A copy of these topographic quadrangles can be found in Appendix B. The tank area is located north of the Taylor Road and Patrol Road intersection, and is southeast of "TNT Area C". Mature trees and vegetation surround the remaining tank. There are no buildings within the area. Some abandoned single-track railroad lines are located to the east of the tank area. Precipitation runoff from the tank area accumulates in a nearby surface depression or pond west of the site, or flows northward to a tributary of Pipe Creek by means of a drainage ditch. The surface depression was identified in an Inventory Project Request (INPR) prepared by CELRH (USACE, 1998) for the lower toluene tank area. Recent aerial photographs show a darkened area west of the tank area that is located in approximately the same location depicted in historical topographical quadrangles but doesn't appear to be surface water. It is assumed that this feature could be a seasonal drainage effect and not a body of water.

## **1.4 Geology**

Two formations of the Devonian Age underlay the lower toluene tank area. The lower and oldest formation is the Delaware Limestone. It is characterized as a hard, dense, finely crystalline limestone and dolomite. Dissolution of this unit has produced solution

channels along bedding planes and joints, and even produced caverns in some areas. The unit is typically buff colored and usually is described as fossiliferous. Overlaying the Delaware Limestone is the Olentangy Formation. This formation is made up of two members, the Plum Brook Shale and the overlying Prout Limestone. The Plum Brook Shale member should be encountered at the tank area. The Plum Brook Shale is interpreted to consist of approximately 35 feet of bluish gray, soft, fossiliferous shale containing thin layers of dark, hard, fossiliferous limestone. The Olentangy formation is the first natural boundary beneath the tank area at an approximate depth of 10 feet below ground surface (IT, 1999).

The overburden at the tank area is predominately composed of glacial till, outwash, or lacustrine (lake) deposits. The overburden at the lower tank area is approximately 10 feet thick (IT, 1999). Morrison Knudsen installed two monitoring wells, MK-MW-14 (installed north of removed Tank 655) and MK-MW-15 (installed north of Tank 645). The boring logs of these two wells described the lithology of the overburden unit as brown silty sand with traces of clay and some organics, until bedrock is encountered at depths of 11.5 feet (MK-MW-14) and 9 feet (MK-MW-15).

### **1.5 Hydrogeology**

No groundwater was encountered at the time of the field investigation to the boring termination depth of 4 feet. Based on a review of the site-wide groundwater study (IT, 1999), groundwater is encountered in the overburden soils underlying the tank area. This study reported four water level readings in the Morrison Knudsen wells from August 1997 to May 1998. The depths measured ranged between 4.62 feet bags to 8.8 feet bags.

Based on a review of the 1986 Groundwater Resources of Erie County found in Appendix C, the tank area is in a hydrogeologic region that seldom exceeds 3 gallons per minute from deeper bedrock groundwater sources. Limited quantities of groundwater are obtained from thin, discontinuous sand and gravel deposits interbedded in fine, sandy clay or from the underlying shale. Drilling deeper than 30 feet into the shale is not recommended. Occasional gas or salt noted in the eastern half of the county. Larger yields may be obtained in western Huron and Oxford townships and southeastern Perkins township. Wells may encounter water-bearing limestone beneath as much as 60 feet of impervious shale.

## **2.0 PREVIOUS INVESTIGATIONS**

In 1993 Morrison Knudsen performed an installation wide site investigation. Two monitoring wells were installed at the lower toluene tank area. Soil samples were obtained from the borings at depths of 2 feet. After the wells were developed ground water samples were obtained. Both matrices, water and soil, were analyzed for volatiles, semivolatiles, explosives, and metals. The results of these analyses revealed no contamination in the soil or the groundwater. These wells were then included in the site

wide groundwater study performed by IT Corporation. They were analyzed again in 1997 and 1998 for the same parameters and revealed no contamination.

Dames & Moore reported a "Records Review" of the PBOW in 1997, which included the lower toluene tanks site. According to this report there was no documentation of any releases from the lower toluene tanks.

### **3.0 SITE INVESTIGATION ACTIVITIES**

The U.S. Army Corps of Engineers, Louisville District, prepared a detailed Quality Assurance Project Plan (QAPP) for this limited Site Investigation (SI) of the lower toluene tank area (USACE, 1999). This document was used in completing the associated field activities. Field activities were conducted from 7 June 1999 through 11 June 1999.

#### **3.1 Visual Survey**

On 8 June 1999 a visual survey was performed on the lower toluene tank area. Photographs taken during the visual survey can be found in Appendix D. The following observations of current site conditions were documented. Figure 3-1 displays the tank area with the physical features documented below.

- The remaining tank (# 645) was identified. The tank appeared to be in good condition. No significant structural damage of the tank was observed. Small amounts of rust were observed at various locations on the tank. The square drain valve pit located on the northern side of the tank was located. A tree has grown through the center of the drain valve pit. No external or above ground piping was located within close proximity of the tank. A valve was located on the eastern side of the tank approximately 2 feet above the base. It is assumed that this valve was used to fill the tank.
- The concrete berm for tank # 655 was located by conducting limited brush removal and light excavation. The entire circumference of the concrete berm was still intact. The concrete square drain valve pit was located on the southern side of the concrete berm.
- Both monitoring wells MK-MW-14 and MK-MW-15 were located.
- Thick vegetation and mature trees surround the tank area. On the eastern boundary of the tank area numerous mature trees have been downed and their debris is still present. It was later revealed, that NASA, in protecting the power lines running along the eastern side of the tank area, cut down these trees and left the debris in place.

- Abandoned railroad tracks running north and south were located east of the tank area.
- One drainage ditch running north and south was located east of the tank area and west of the railroad tracks. This drainage ditch contained water and was flowing in a northerly direction. Two additional drainage ditches and associated culverts were located to the south and south west of the tank area. Neither ditch contained water. These two ditches eventually converged south of the tank area. The ditch formed from the adjoining ditches ends or could not be traced south east of the tanks.
- Two large concrete chunks/debris were located approximately 85 feet to the east of the former tank #655 location.
- In a heavy forested area approximately 65 feet to the west of the former tank #655 location the possible location of the surface depression was observed and documented. There was no water present in the depression; however, the trunks of trees in this area revealed watermarks about 2 feet above the ground surface.
- The pump and associated piping (east of the tanks) leading to the tanks could not be located. Trees and debris hindered access to the approximate pump location.

### **3.2 Soil Boring and Soil Sampling**

A total of 10 borings were advanced during the field investigation. The locations of the borings are displayed in Figure 3-2. Four borings were placed around each tank approximately 40 feet to the north, south, east, and west. One additional boring was placed on the eastern side of tank #645, near what is believed to be the fill valve location. Another boring was placed within the center of the concrete berm of the former tank #655 location.

All borings were advanced using a stainless-steel hand auger. Soil samplings from each boring were screened at one-foot intervals with a photoionization detector. Continuous disturbed soil samples were collected at two different depths (0-2 feet and 3-4 feet) following decontamination and sampling procedures documented in the QAPP dated May 1999. Samples were placed in the appropriate containers, labeled, and preserved on ice. At the field base station the samples were processed and packaged for shipment. A chain of custody record was generated and custody seals were placed on the sample coolers. The samples were shipped overnight to Quanterra Laboratory located in North Canton, Ohio for chemical analyses. All soil samples were analyzed for Benzene, Toluene, Ethylbenzene, and Xylene (BTEX). Two soil samples were additionally analyzed for pH, Total Organic Carbon (TOC), and Sieve analysis. These two samples were chosen to aid in assessing the geotechnical characteristics of the soils encountered at the site.

Logs were completed for all borings during the field investigation. The field team leader completed the boring logs. The logs were used to document lithology description, depth of boring, date of boring, equipment used, sample collection, and field screening results.

A sketch showing the approximate location of the boring in relation to known site features is also presented in each boring log.

Soil was classified in accordance with the Unified Soil Classification System (USCS). Soil boring logs are presented in Appendix E. The soil samples collected for this investigation are summarized in Table 3-1 below.

### 3.3 Field Screening

Soil samples from each boring were screened using headspace analysis as stated in the QAPP (USACE,1999), at one-foot intervals with a photoionization detector (PID). The PID was used to help determine which samples would be collected for laboratory analyses. PID screening results are recorded on the boring logs given in Appendix E. All of the headspace screening results were low.

**TABLE 3-1 Samples Collected for SI investigation**

Sample Identification	Date Collected	Analyses
PBOW99SB01-1'	9 June 1999	BTEX
PBOW99SB02-1'	9 June 1999	BTEX
PBOW99SB02-3'9"	9 June 1999	BTEX
PBOW99SB03-1'	9 June 1999	BTEX, pH, TOC, Sieve
PBOW99SB03-3'5"	9 June 1999	BTEX
PBOW99SB04-1'4"	9 June 1999	BTEX
PBOW99SB04-4'2"	9 June 1999	BTEX
PBOW99SB05-1'	9 June 1999	BTEX
PBOW99SB05-4'	9 June 1999	BTEX
PBOW99SB06-1'	9 June 1999	BTEX
PBOW99SB06-2'9"	9 June 1999	BTEX, pH, TOC, Sieve
PBOW99SB06-4'	9 June 1999	BTEX
PBOW99SB07-1'	9 June 1999	BTEX
PBOW99SB07-1' DUP	9 June 1999	BTEX
PBOW99SB07-4'	9 June 1999	BTEX
PBOW99SB08-1'	9 June 1999	BTEX
PBOW99SB08-3'10"	9 June 1999	BTEX
PBOW99SB09-1'	9 June 1999	BTEX
PBOW99SB10-1'	9 June 1999	BTEX
PBOW99SB10-2'6"	9 June 1999	BTEX
TRIP BLANK	9 June 1999	BTEX

### 3.4 Surveying

Eight of the ten boring locations were surveyed to the nearest 0.01 foot and referenced to the Ohio State Plane Coordinate System. These eight borings were located approximately 40 feet north, south, east, and west around each tank. Table 3-2 displays the Ohio State Plane Coordinates (Northing, Easting) and surface elevations of the boring locations. Soil borings PBOW99SB09 and PBOW99SB10 were not surveyed.

**Table 3-2 Coordinates and Surface Elevations of Boring Locations**

Boring Number	Northing	Easting	Ground Surface Elevation (msl)*
PBOW99SB-01	618493.63	1913295.92	679.0 ft
PBOW99SB-02	618433.58	1913360.41	680.0 ft
PBOW99SB-03	618381.29	1913309.91	679.4 ft
PBOW99SB-04	618444.35	1913248.63	679.3 ft
PBOW99SB-05	618263.62	1913294.42	679.3 ft
PBOW99SB-06	618201.67	1913354.77	679.6 ft
PBOW99SB-07	618151.69	1913305.24	679.2 ft
PBOW99SB-08	618202.22	1913244.19	679.0 ft

\* = (msl) mean sea level

### 4.0 ANALYTICAL RESULTS

Twenty soil samples and one matrix spike/matrix spike duplicate sample were collected from the lower toluene tank area and submitted for laboratory analyses. These samples were analyzed for BTEX. The analytical report from the laboratory is located in Appendix F. The analytical results are summarized below.

#### 4.1 BTEX Analysis

BTEX analyses were performed in accordance with guidelines in the United States Environmental Protection Agency (USEPA) document entitled *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods (SW-846)* method 8021B (USEPA, 1996). Toluene was not detected in any of the samples collected, as shown in tables 4-1. Xylene (total) was detected in 5 of the 20 samples. However, none of the xylene concentrations exceeded the media specific-screening criteria (USEPA Region 9 preliminary remediation goals (PRGs)). A comparison of the BTEX analysis and USEPA Region 9 PRGs is presented in table 4-1.

## 5.0 GEOTECHNICAL CHARACTERISTIC ANALYSIS

Of the 20 samples collected at the lower toluene tank area, two samples were selected for geotechnical characteristic analysis. Selections of these samples were based on field observations of encountering differences in strata within the borings placed in the tank area. The analyses included grain size, hydrometer, pH and total organic carbon (TOC). Grain size and hydrometer were performed per American Society for Testing and Materials (ASTM) method D-422. USEPA SW-846 test method 9045C was used to analyze pH. *Standard Methods of Chemical Analysis, 6<sup>th</sup> Edition, D. Van Nostrand Co.* (SMCA) Walkley- Black test method was used to analyze for total organic carbon. Although pH and TOC are chemical analyses, they have been included in this section to aid in assessing the physical and geotechnical characteristics of the soils encountered at the tank area. The results of these analyses can be found in Appendix G.

The lithology encountered at the tank area was visually classified by the field team leader using the Unified Soil Classification System. All of the soils encountered in the borings were classified in the field as (SM) Silty Sand. There were some differences in color and moisture contents. This classification was confirmed with the laboratory sieve and hydrometer analyses and was consistent with the anticipated lithology from the information reviewed prior to field activities. The pH of these samples ranged between 5.2 and 6.3. The Total Organic Carbon (TOC) results for these samples ranged from 8330 to 14000 mg/kg.

## 6.0 VARIANCES/NONCONFORMANCES

For the purpose of this investigation, variances are defined as necessary changes or modifications to the planned activities as specified by the Quality Assurance Project Plan (QAPP), or Field Sampling Plan (FSP). Variances do not significantly affect the quality of the data or process being modified. However, nonconformances are defined as malfunctions, deficiencies, or deviations that may render the quality of information or data unacceptable or indeterminate. There were no nonconformances during this site investigation. The variances during this site investigation (SI) are listed in Appendix H.

## 7.0 SUMMARY AND CONCLUSIONS

The purpose of this site investigation of the lower toluene tank area was to gather data necessary to evaluate the site for contamination due to past DOD activities. The referenced information was reviewed and soil samples were analyzed to assess the environmental media at the site. Activities included document research, a visual site survey, soil sample collection, PID screening and chemical laboratory analysis.

- The lower toluene tank site is located within the PBS. PBS is a large NASA testing facility surrounded by residential and commercial development. The lower toluene tank site is currently not used and overgrown. Access to the site is limited.
- At the time of DOD occupancy, the lower toluene tanks site housed two large ASTs that were decommissioned in 1945. Since DOD occupancy, it appears the site has essentially remained unchanged with the exception that one of the tanks has been moved and the site has become overgrown.
- Ten soil borings to depths ranging from about one foot to four feet were advanced in the area. Soil samples were field screened at one-foot intervals using a PID. The field screening revealed no indications of contamination.
- Twenty soil samples were collected for laboratory BTEX analysis. Toluene was not detected in any of the soil samples. Xylene (total) was found in five of the samples; however, the levels detected were well below the screening criteria (USEPA Region 9 PRGs).
- Previous studies included the installation and testing of the two groundwater monitoring wells in the lower toluene tank area. Multiple samples previously tested from these wells revealed no contamination.
- This SI has revealed no evidence of releases to the site during or after DOD use.

## **8.0 RECOMMENDATIONS**

Based on the results of this SI, operation & decommissioning of the lower toluene tank area has not negatively impacted the environment in regards to toluene. Therefore, the U.S. Army Corps of Engineers, Louisville District recommends coordination with federal and state regulatory authorities to proceed toward a No Further Action (NFA) decision document for the lower toluene tank area. It should be noted that the intent of this recommendation is to proactively obtain input from regulatory authorities so that the proper steps can be taken to proceed toward a NFA decision document. Should it be determined, based on input from regulatory authorities, additional information and data is required the U.S. Army Corps of Engineers will provide the required information and/or data so that the NFA decision document can be implemented.

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# TABLES

**Table 4-1 LOWER TOLUENE TANKS BTEX ANALYSIS**

Sample ID		PBOW99SB01-1'	PBOW99SB02-1'	PBOW99SB02-3' 9"	PBOW99SB03-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
<b>BTEX</b>					
Parameter	Units *PRG				
Benzene	ug/kg 3.0E+01	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Ethylbenzene	ug/kg 1.3E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Toluene	ug/kg 1.2E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Xylenes (total)	ug/kg 1.9E+05	2.9	ND(1.1)	ND(1.2)	ND(1.2)
<hr/>					
Sample ID		PBOW99SB03-3' 5"	PBOW99SB04-1' 4"	PBOW99SB04-4' 2"	PBOW99SB05-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
<b>BTEX</b>					
Parameter	Units *PRG				
Benzene	ug/kg 3.0E+01	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Ethylbenzene	ug/kg 1.3E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Toluene	ug/kg 1.2E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Xylenes (total)	ug/kg 1.9E+05	ND(1.2)	ND(1.1)	ND(1.2)	4.7
<hr/>					
Sample ID		PBOW99SB05-4'	PBOW99SB06-1'	PBOW99SB06-2' 9"	PBOW99SB06-4'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
<b>BTEX</b>					
Parameter	Units *PRG				
Benzene	ug/kg 3.0E+01	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Ethylbenzene	ug/kg 1.3E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Toluene	ug/kg 1.2E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Xylenes (total)	ug/kg 1.9E+05	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)

\*PRG = USEPA Region 9 Preliminary Remediation Goals Migration to Groundwater DAF20 (Dilution Attenuation Factor 20)

ND = Non-Detect

( ) = Reporting Limit

**Table 4-1 LOWER TOLUENE TANKS BTEX ANALYSIS**

Sample ID		PBOW99SB07-1'	PBOW99SB07-1'(DUP)	PBOW99SB07-4'	PBOW99SBO8-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
<b>BTEX</b>					
Parameter	Units *PRG				
Benzene	ug/kg 3.0E+01	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Ethylbenzene	ug/kg 1.3E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Toluene	ug/kg 1.2E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Xylenes (total)	ug/kg 1.9E+05	1.2	ND(1.1)	ND(1.2)	ND(1.1)
Sample ID		PBOW99SB08-3' 10"	PBOW99SB09-1'	PBOW99SB10-1'	PBOW99SB10-2' 6"
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
<b>BTEX</b>					
Parameter	Units PRG				
Benzene	ug/kg 3.0E+01	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Ethylbenzene	ug/kg 1.3E+04	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Toluene	ug/kg 1.2E+04	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Xylenes (total)	ug/kg 1.9E+05	ND(1.2)	5.0	1.3	ND(1.1)

\*PRG = USEPA Region 9 Preliminary Remediation Goals Migration to Groundwater DAF20 (Dilution Attenuation Factor 20)

ND = Non-Detect

( ) = Reporting Limit

## Figures



Design By: Drawn By: WDB Checked By:



VICINITY LOCATION PLAN  
 PLUM BROOK ORDNANCE WORKS  
 SANDUSKY, OHIO

Reviewed By: Approved By:

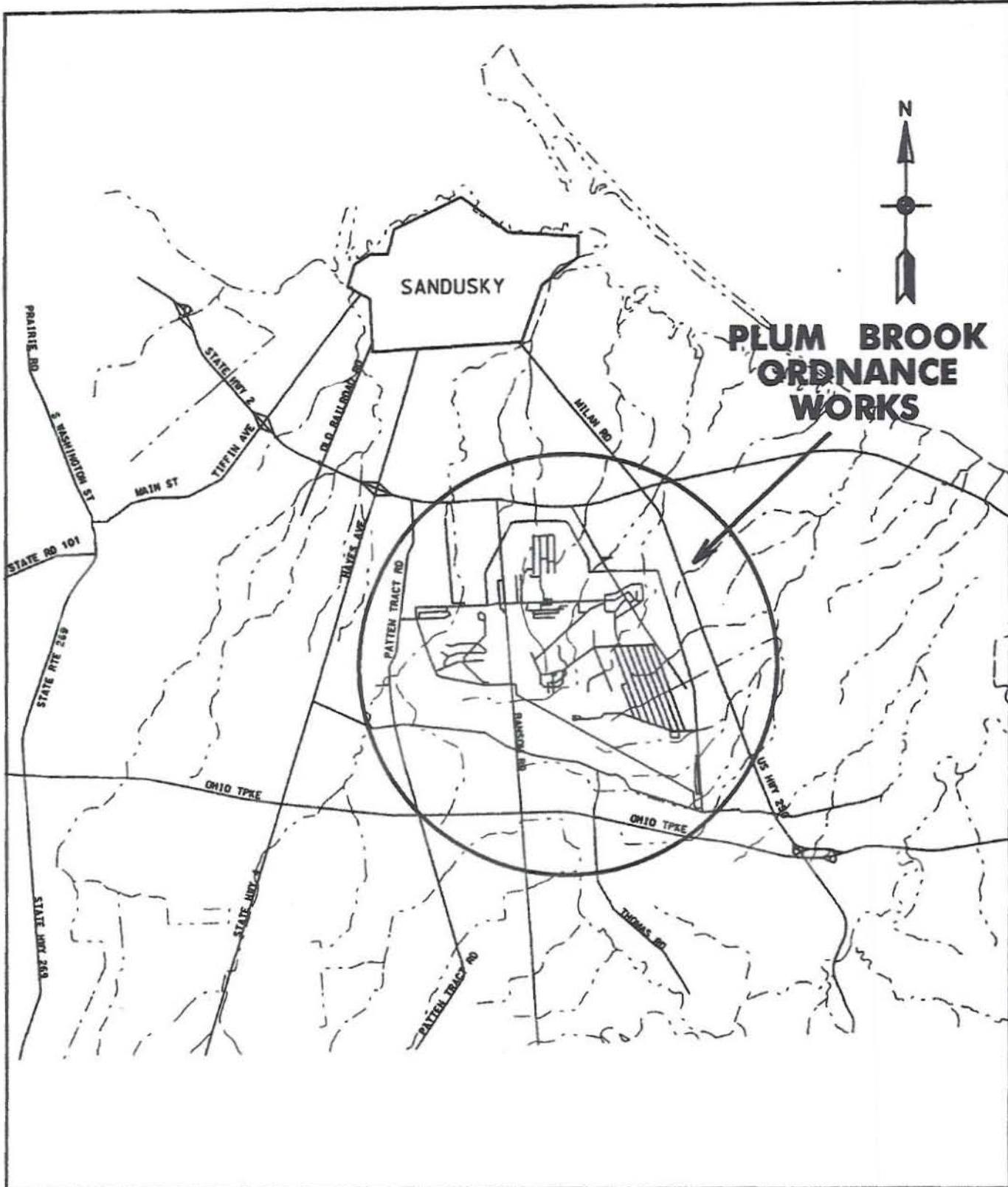
Date:  
 AUG 1999

Scale:  
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Drawing Code:

Sheet Ref. No.

FIGURE 1-1



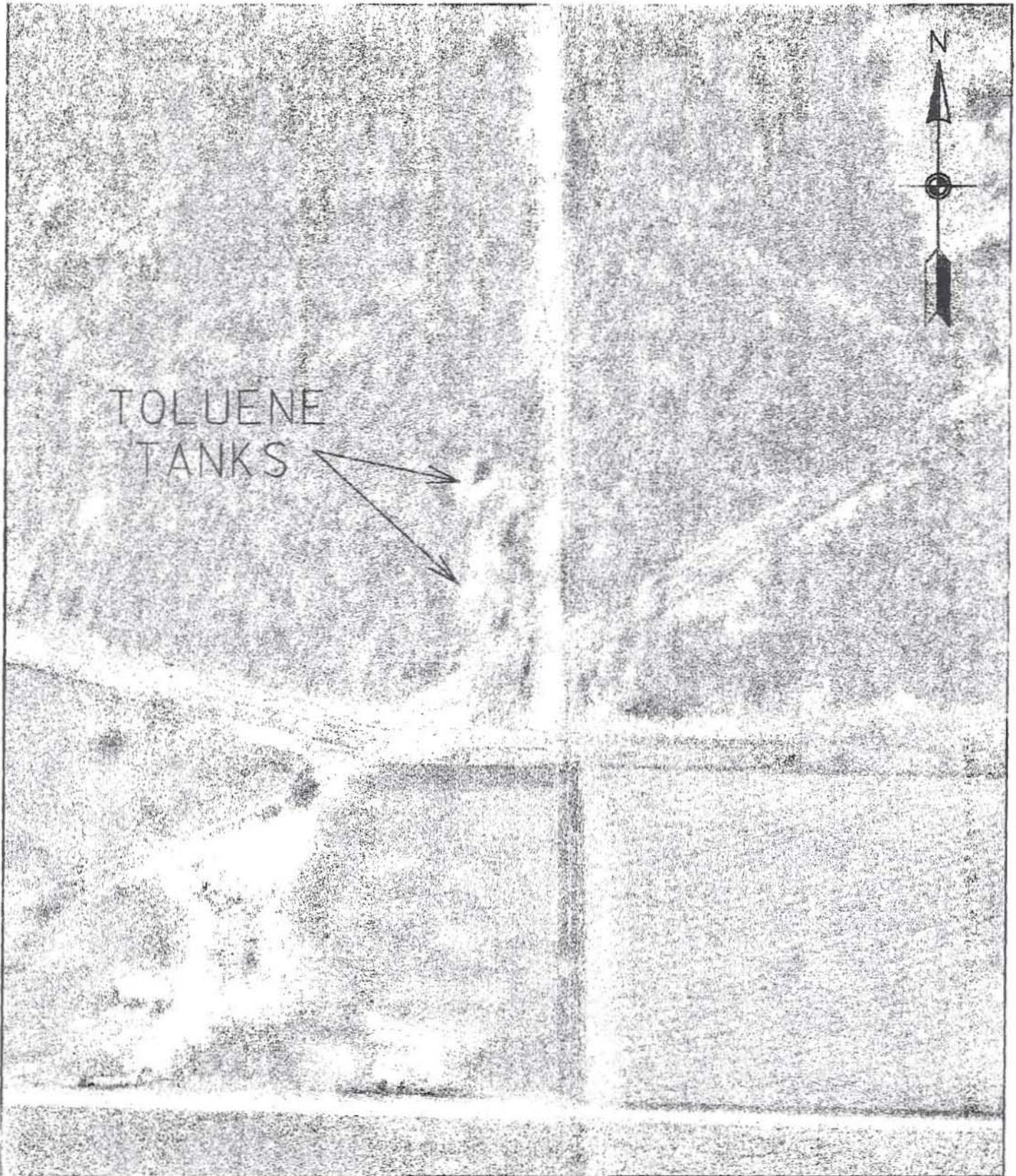
Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	<b>PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO</b>	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: NONE	Drawing Code:	Sheet Ref. No.	FIGURE 1-2	



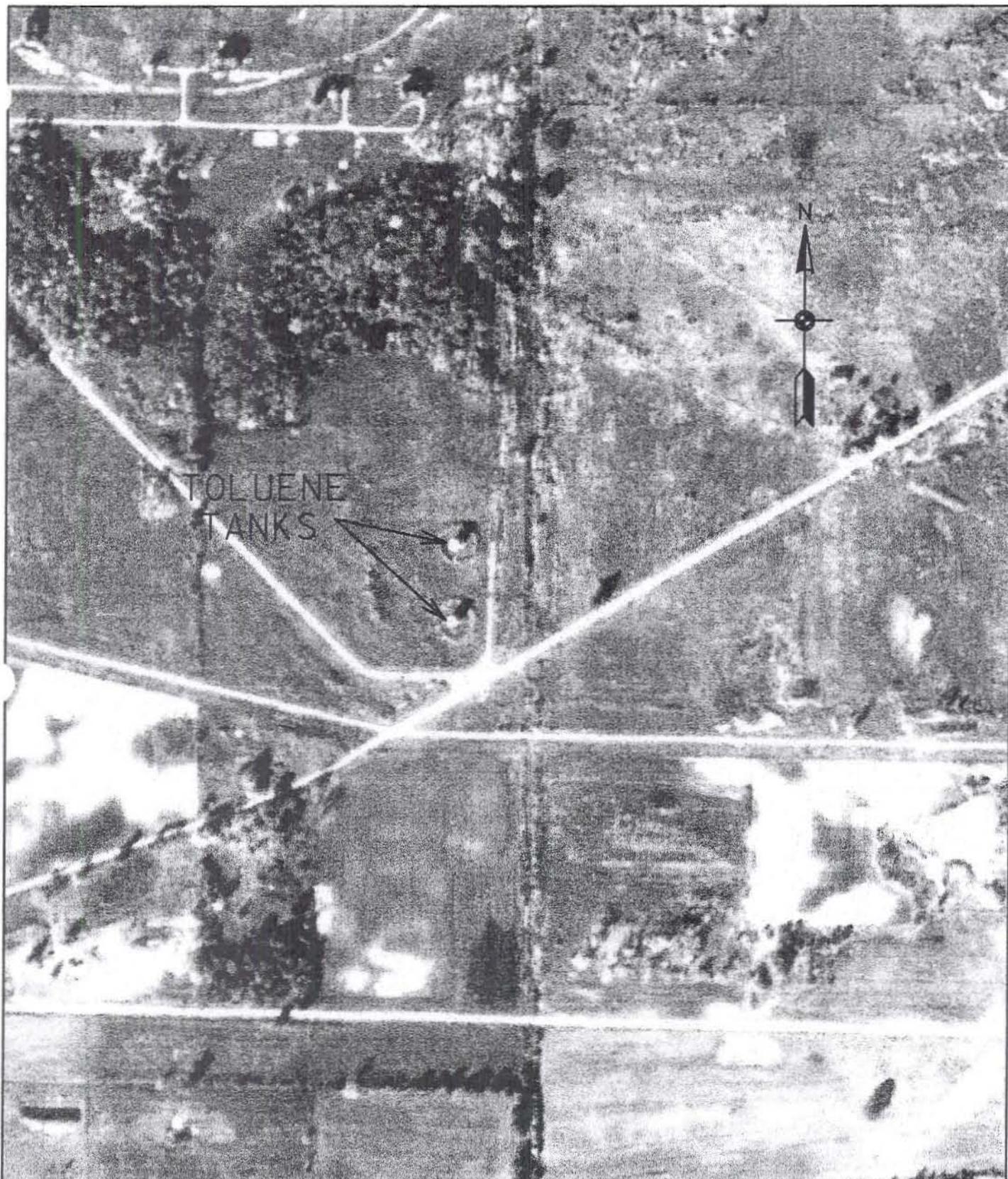
**TOLUENE TANKS**



Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	SITE LOCATION PLAN TOLUENE TANKS PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: NONE	Drawing Code:	Sheet Ref. No.	FIGURE 1-3	



Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	LOWER TOLUENE TANKS FROM c. 1997 AERIAL PHOTOGRAPH PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: 1" = 300'	Drawing Code:	Sheet Ref. No.	FIGURE 1-4	



Design By: Drawn By: WDB Checked By:



LOWER TOLUENE TANKS  
 FROM c. 1950 AERIAL PHOTOGRAPH  
 PLUM BROOK ORDNANCE WORKS  
 SANDUSKY, OHIO

Reviewed By: Approved By:

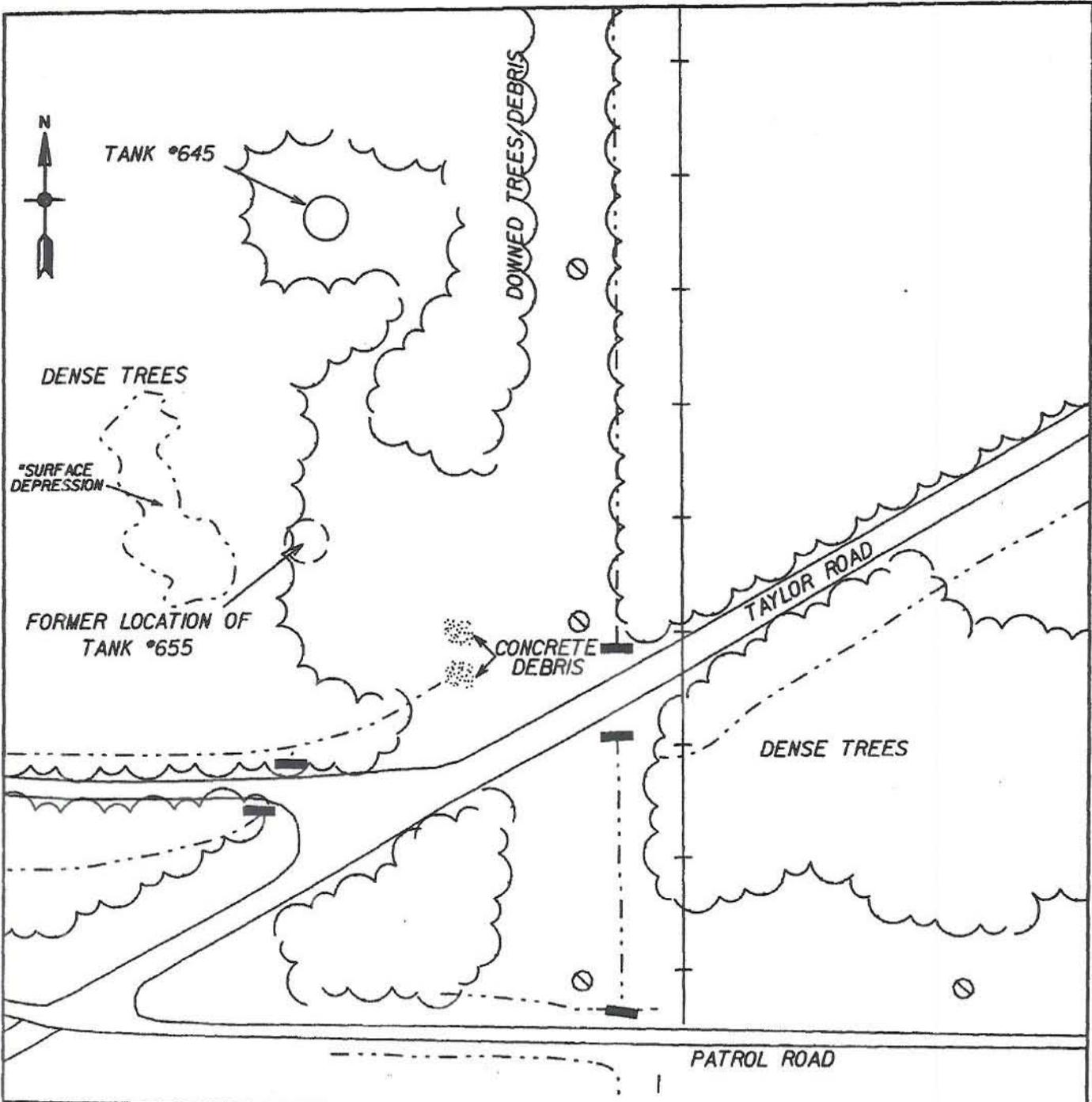
Date:  
 AUG 1999

Scale:  
 1" = 400'

Drawing Code:

Sheet Ref. No.

FIGURE 1-5

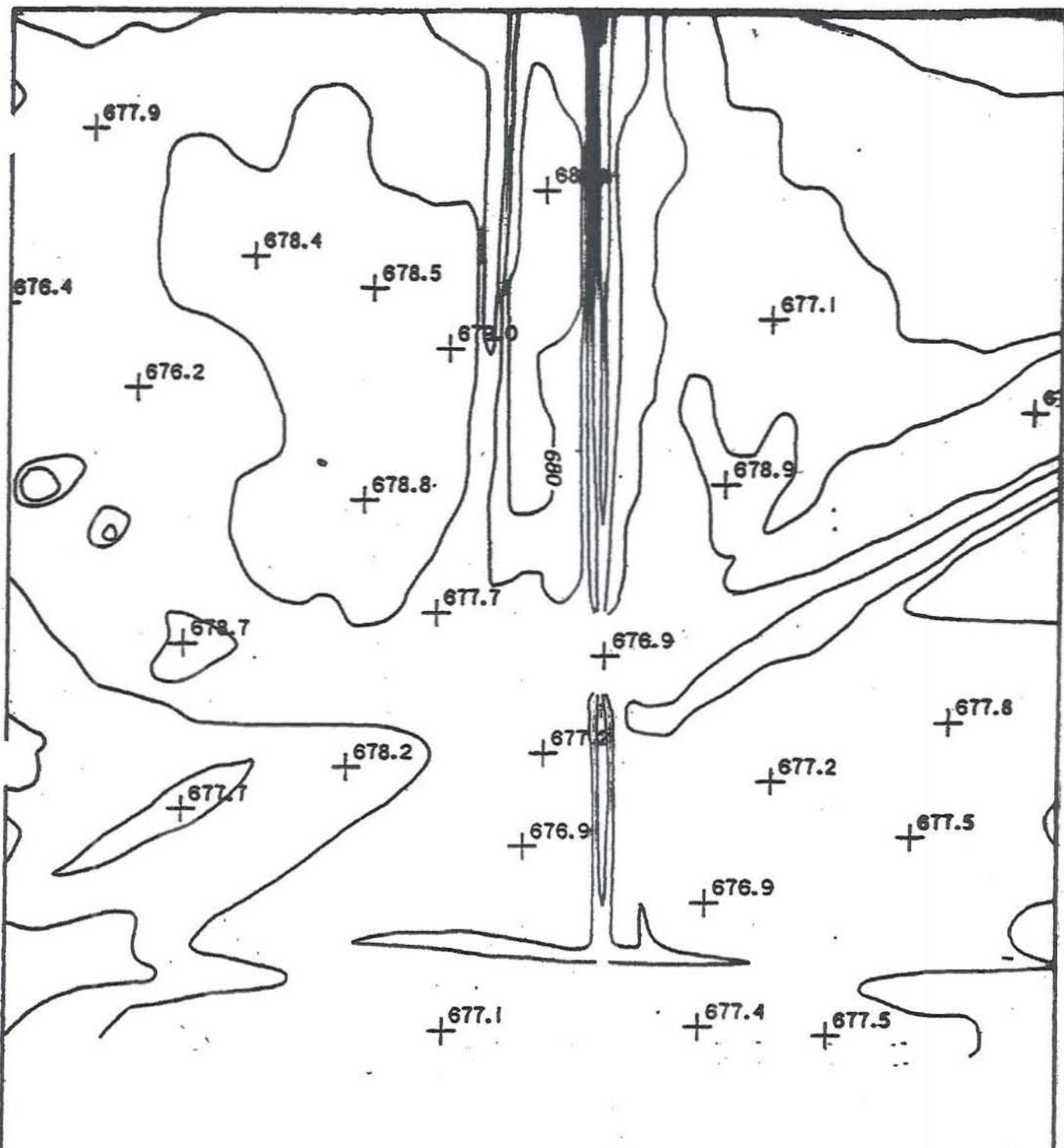


- ⊙ SAMPLE LOCATION
- ⊙ UTILITY POLE
- WATER SURFACE DEPICTED FROM 97 AERIAL PHOTOGRAPHY
- ▬ MEADWALL

100 50 0 100 200FT

SCALE: 1" = 100'

Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	VISUAL SURVEY FEATURES LOWER TOLUENE TANKS PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: 1" = 100'	Drawing Code:	Sheet Ref. No.	FIGURE 3-1	



2 ft. CONTOURS

Design By: Drawn By: Checked By:



U.S. Army Corps  
of Engineers

Reviewed By: Approved By:

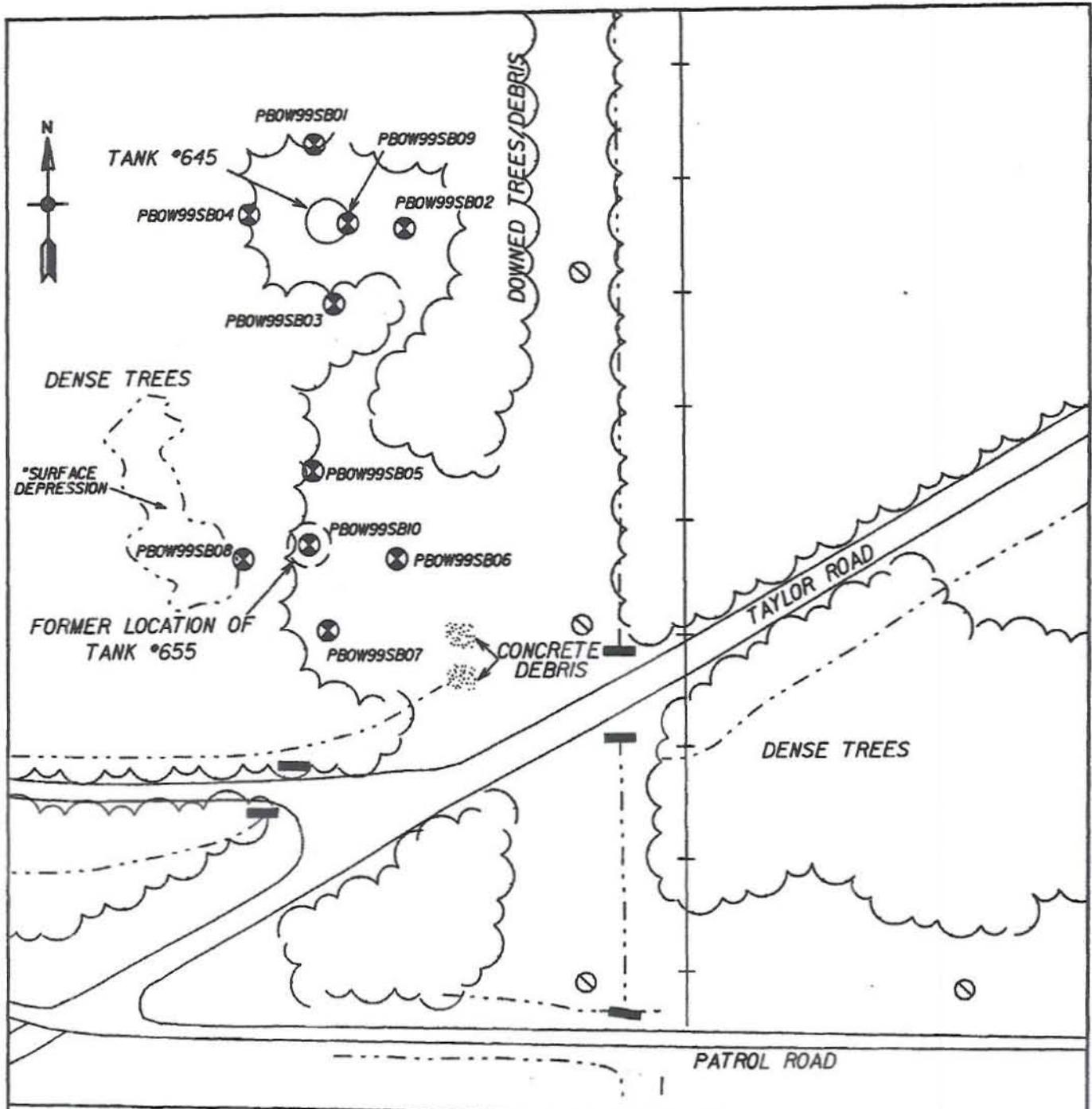
Date:

Scale:

Drawing Code:

Sheet Ref. No.

FIGURE 3-2a



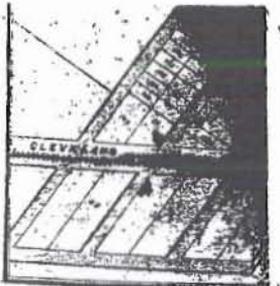
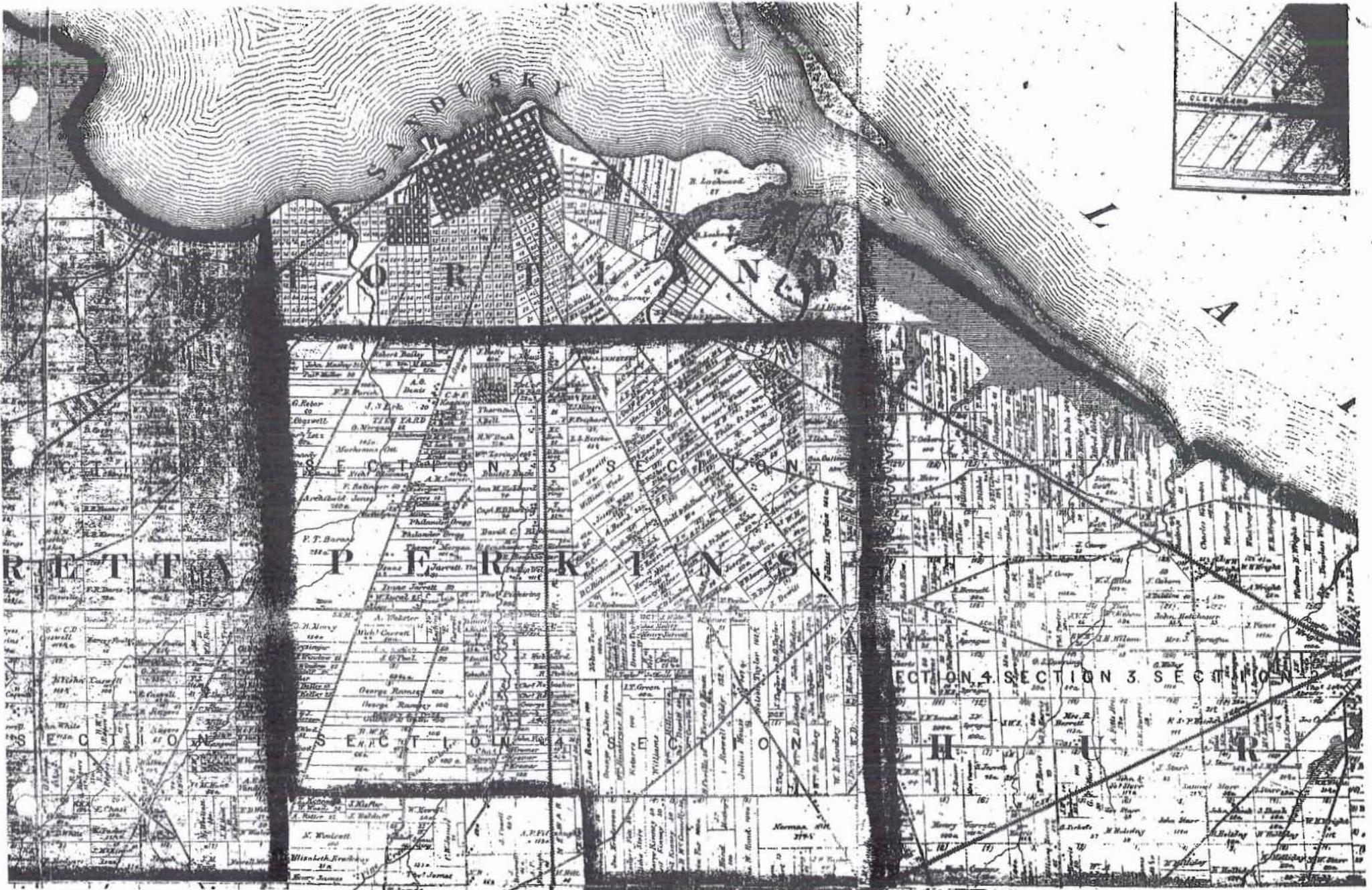
- ⊙ SAMPLE LOCATION
- ⊖ UTILITY POLE
- WATER SURFACE DEPICTED FROM 97 AERIAL PHOTOGRAPHY
- ▬ HEADWALL



SCALE: 1" = 100'

Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	SAMPLE LOCATON PLAN LOWER TOLUENE TANKS PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: 1" = 100'	Drawing Code:	Sheet Ref. No.:	FIGURE 3-2	

**Appendix A - Land Use Map / Historic  
Ownership Map**



RET TIA

P E R K I N S

SECTION 4 SECTION 3 SECTION 2

E C I O N

S E C T I O N

H U R

# LAND USE AND LAND COVER

## 1 URBAN OR BUILT-UP LAND

- 11 Residential
- 12 Commercial and Services
- 13 Industrial
- 14 Transportation, Communications and Utilities
- 15 Industrial and Commercial Complexes
- 16 Mixed Urban or Built-up Land
- 17 Other Urban or Built-up Land

## 2 AGRICULTURAL LAND

- 21 Cropland and Pasture
- 22 Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticultural Areas
- 23 Confined Feeding Operations
- 24 Other Agricultural Land

## 3 RANGELAND

- 31 Herbaceous Rangeland
- 32 Shrub and Brush Rangeland
- 33 Mixed Rangeland

## 4 FOREST LAND

- 41 Deciduous Forest Land
- 42 Evergreen Forest Land
- 43 Mixed Forest Land

## 5 WATER

- 51 Streams and Canals
- 52 Lakes
- 53 Reservoirs
- 54 Bays and Estuaries

## 6 WETLAND

- 61 Forested Wetland
- 62 Nonforested Wetland

## 7 BARREN LAND

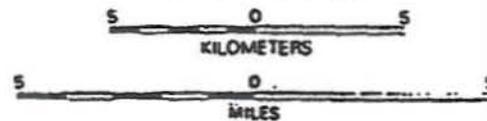
- 71 Dry Salt Flats
- 72 Beaches
- 73 Sandy Areas Other than Beaches
- 74 Bare Exposed Rock
- 75 Strip Mines, Quarries, and Gravel Pits
- 76 Transitional Areas
- 77 Mixed Barren Land

## 8 TUNDRA

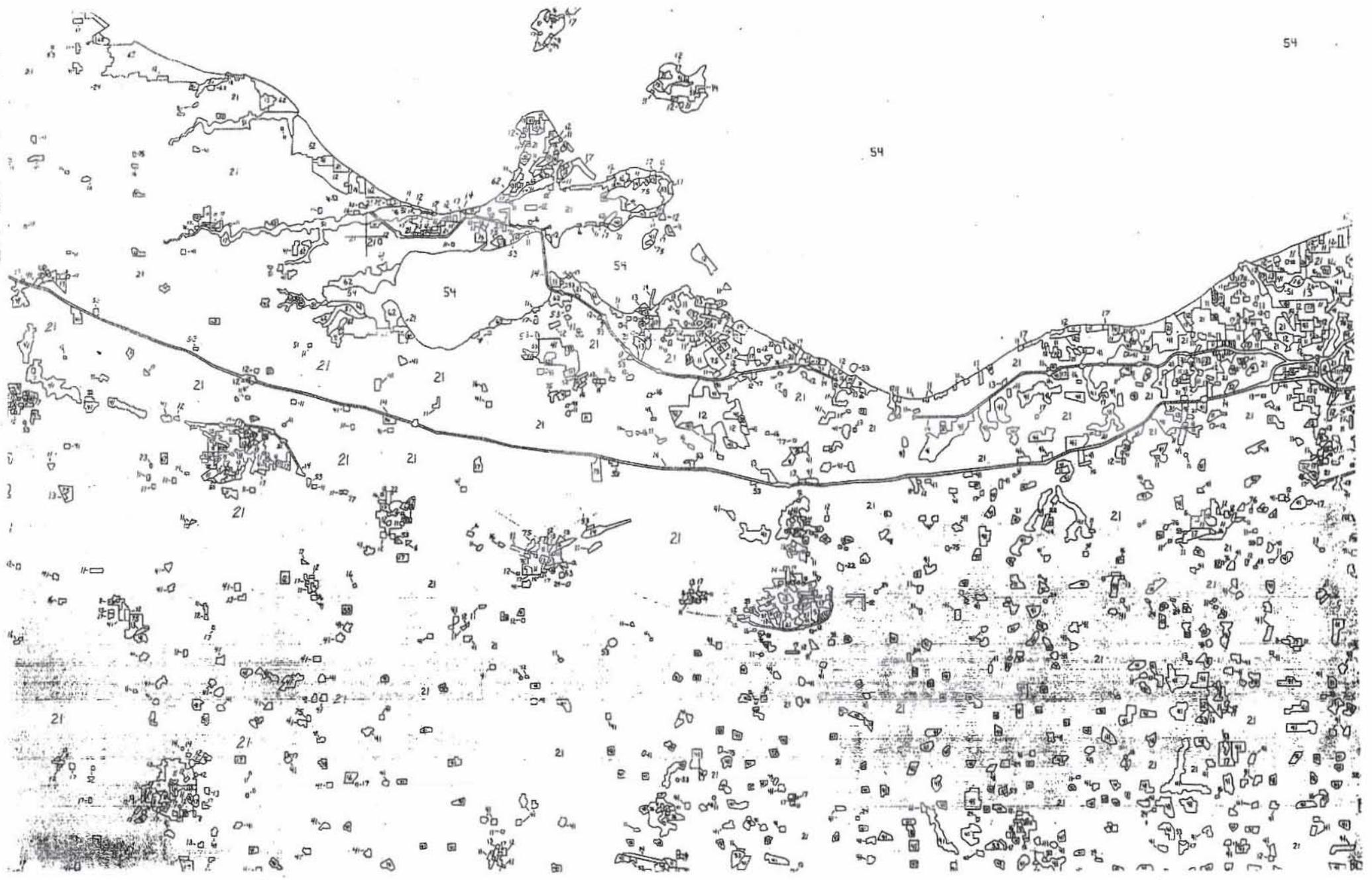
- 81 Shrub and Brush Tundra
- 82 Herbaceous Tundra
- 83 Bare Ground Tundra
- 84 Wet Tundra
- 85 Mixed Tundra

For definitions of Level I and Level II categories see U.S. Geological Survey Professional Paper 964, *A Land Use and Land Cover Classification System for Use With Remote Sensor Data*, 1976, by Anerson, J. R., E. E. Hardy, J. T. Roach, and R. E. Witmer. Minimum mapping units are: 4 hectares (10 acres) for Level II categories 11-17, 23-24, 51-54, 75, and urban occurrences of 76; and 16 hectares (40 acres) for all other Level II categories.

SCALE 1:250 000



Land use and land cover information compiled from source materials dated 1980 and 1983



**Appendix B - Historic Topographical Maps  
1959/1969**





MARGARETTA

PORTLAND

St. John's Ch.

0 N

(SANDUSKY)

190000 FEET

H U R O

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

LEWIS RESEARCH CENTER

Bloomington

O X F O R D

M I L A

1968

Appendix C - Groundwater Resources, Erie  
County, 1986

## LEGEND

AREAS IN WHICH YIELDS OF 100 TO 500 GALLONS PER MINUTE MAY BE DEVELOPED.

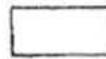
 Yields of more than 500 gallons per minute have been developed at depths of less than 200 feet in cavernous limestone and dolomite. Domestic supplies are generally obtained at depths of around 100 feet.

Hydrogen sulfide, in varying amounts, may be encountered in the bedrock.

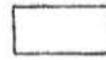
 Areas in which there is a potential concentration of contamination due to the underground disposal of storm wastes from Bellevue.

 Municipal and industrial water supplies are available from wells drilled into permeable sand and gravel deposits in ancient buried valley.

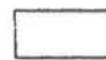
AREAS IN WHICH YIELDS OF 25 TO 100 GALLONS PER MINUTE MAY BE DEVELOPED.

 Buried valley containing more than 150 feet of unconsolidated deposits. Much of the valley fill consists of clay and fine sand. Extensive test drilling may be needed to locate coarse materials capable of supplying larger yields to drilled wells.

AREAS IN WHICH YIELDS OF 5 TO 25 GALLONS PER MINUTE MAY BE DEVELOPED.

 Yields of 15, or less, gallons per minute are developed from wells drilled into the limestone. Hydrogen sulfide may be present in varying amounts.

AREAS IN WHICH YIELDS OF 3 TO 10 GALLONS PER MINUTE MAY BE DEVELOPED.

 Ground water obtained from the Berea sandstone. Although this formation covers a larger area than shown, its thickness and recharge potential limit productivity to isolated zones.

AREAS IN WHICH YIELDS SELDOM EXCEED 3 GALLONS PER MINUTE

 Limited quantities of ground water are obtained from thin, discontinuous sand and gravel deposits interbedded in fine, sandy clay or from the underlying shale. Drilling deeper than 30 feet into the shale is not recommended. Occasional gas or salt noted in the eastern half of the county.

Larger yields may be obtained in western Huron and Oxford townships and southeastern Perkins Township. Wells may encounter water-bearing limestone beneath as much as 80 feet of impervious shale.

 Thick deposits (as much as 90 feet) of clay, sand and gravel cover the shale bedrock. Where permeable sands and gravels are present, adequate domestic supplies are obtained.

The ground-water characteristics of Erie County have been mapped regionally, based upon interpretations of 2100 water well records and the area's geology and hydrology. Well log data on the map were selected as typical for the areas shown.

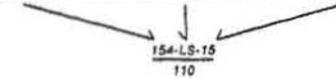
Information regarding specific sites may be obtained from the Division of Water.

## Chemical Analysis Table

Well site	A	B	C	D	E	F
Depth (ft.)	168	60	146	100	69	30
Aquifer	LS	LS	SG	SS	Sh	Sh
Iron (Fe)	0.33	0.02	1.3	0.92	1.1	0.39
Calcium (Ca)	536.	130.	82.	86.	8.2	4.0
Sodium (Na)	6.5	29.	30.	21.	479.	100.
Chloride (Cl)	12.0	49.	0.6	10.	134.	10.
Fluoride (F)	1.0	0.3	0.43	0.2	0.8	0.2
Sulfate (SO <sub>4</sub> )	1224.	232.	68.	72.	188.	16.0
Hydrogen Sulfide (H <sub>2</sub> S)	0.5	—	—	—	Trace	Trace
Hardness as CaCO <sub>3</sub>	1537.	472.	282.	301.	32.0	14.0
Dissolved Solids	2150.	630.	—	328.	1230.	267.
pH	7.3	6.9	7.5	6.8	8.0	6.7

Chemical Constituents as Mg/l

Depth (ft.) - Water-bearing Formation - Yield (gpm)



Depth to Bedrock (ft.)

● Domestic Well

⊙ Municipal—  
Industrial Well

**A** Chemical Analyses

### Formations

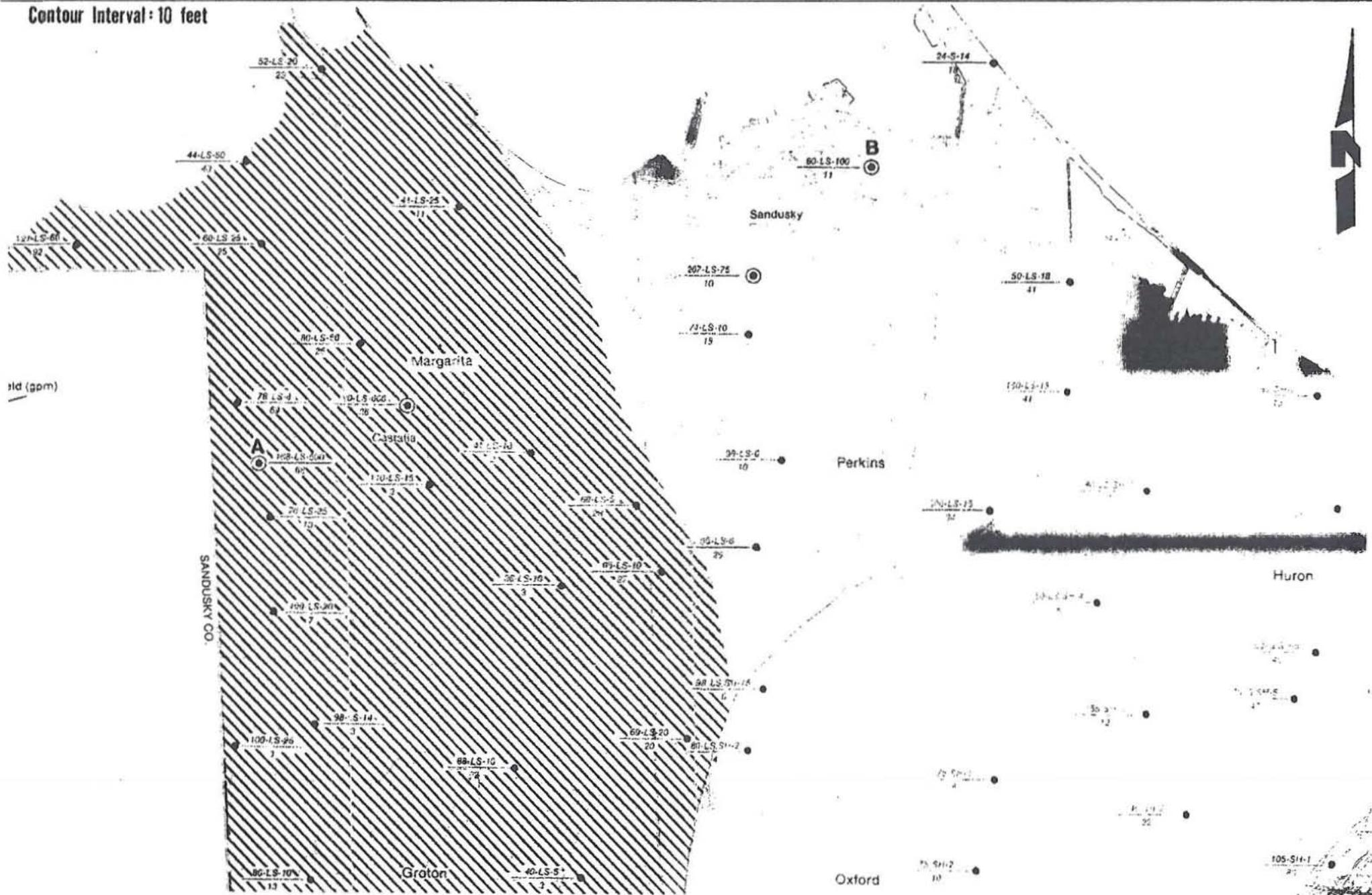
SS - Sandstone

SH - Shale

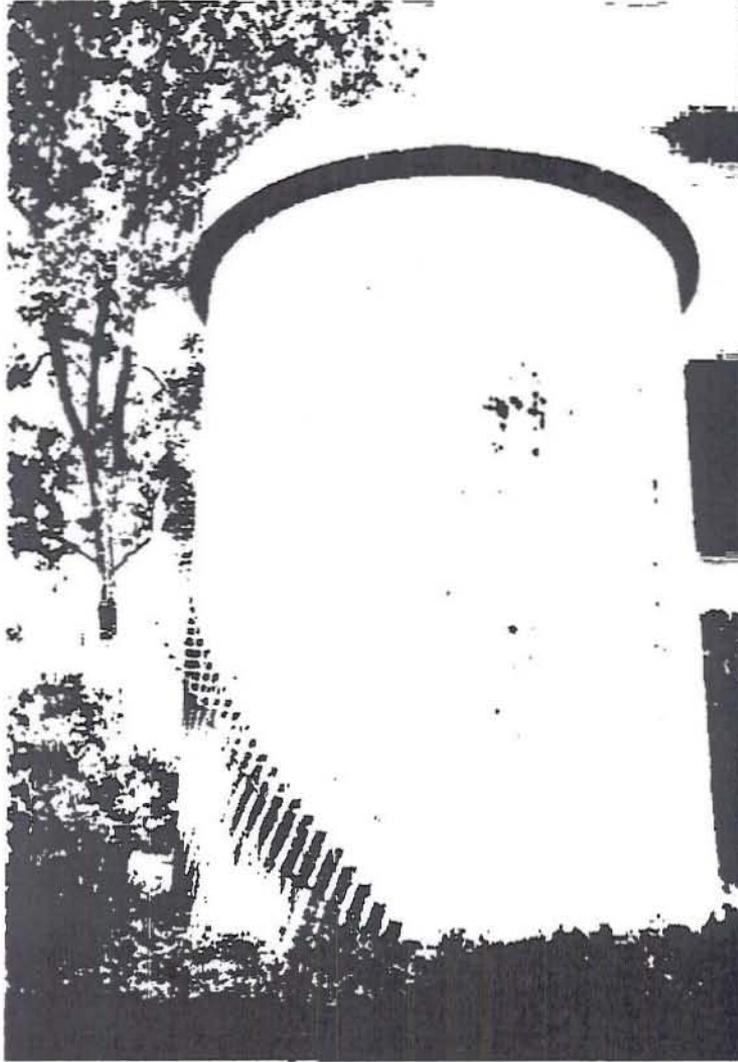
LS - Limestone

SG - Sand and Gravel

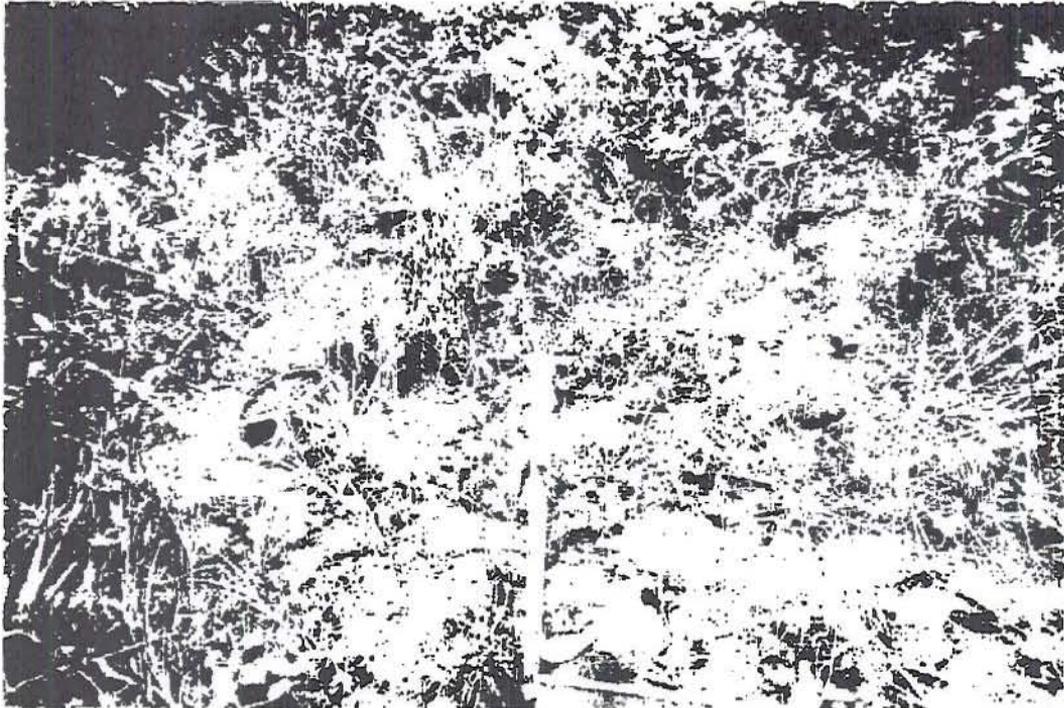
Contour Interval: 10 feet



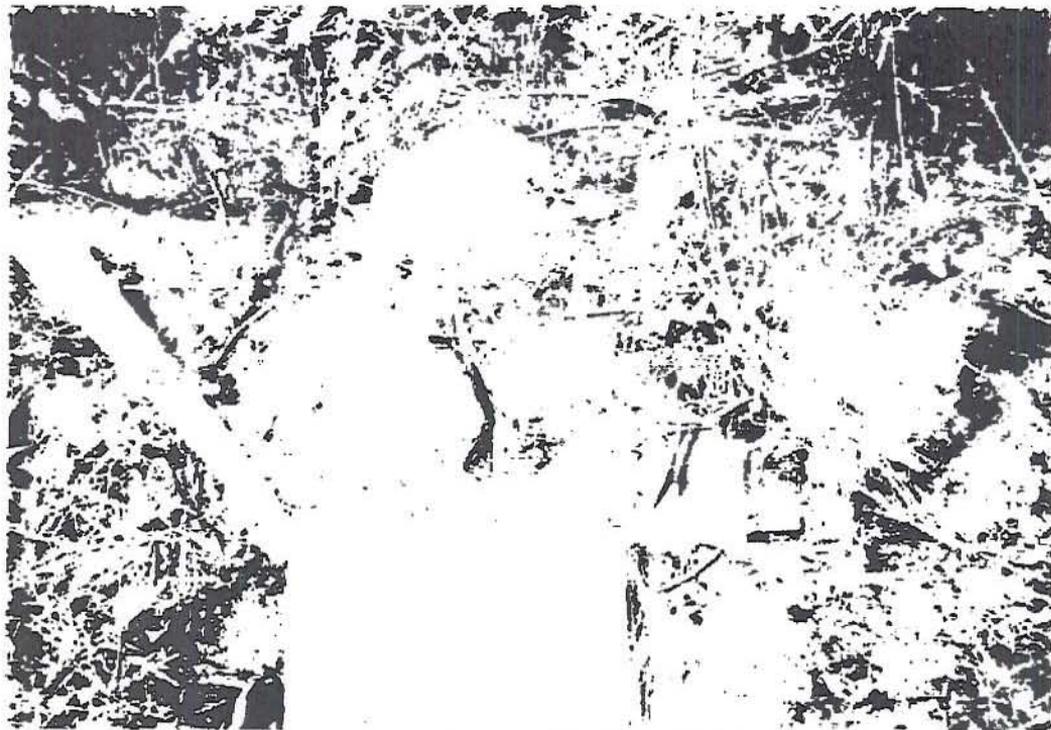
## Appendix D - Visual Survey Photographs



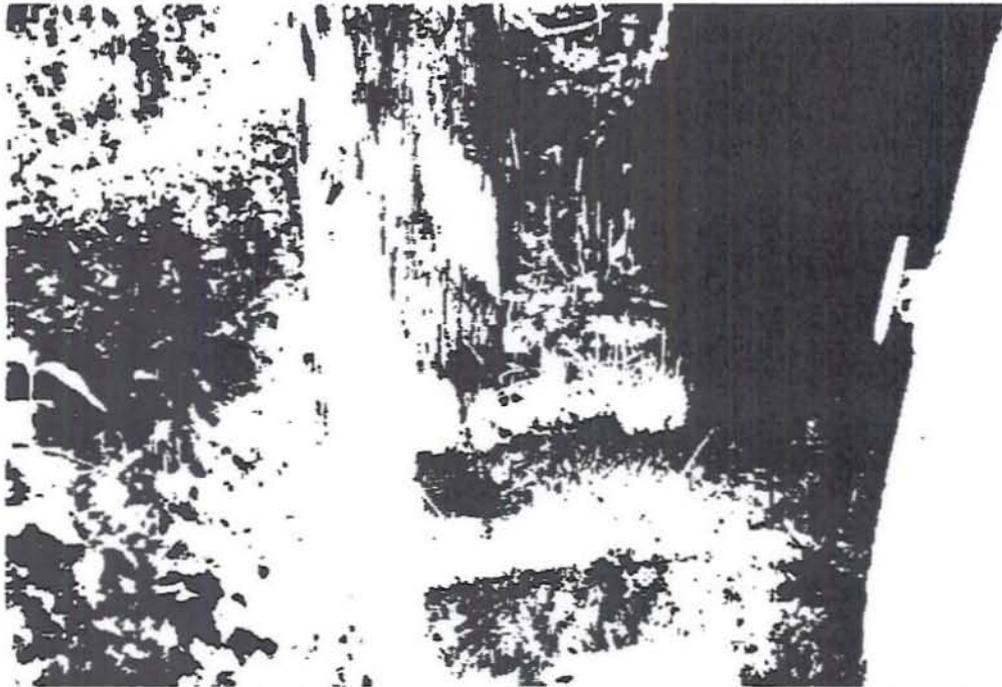
Looking east at existing Tank #645



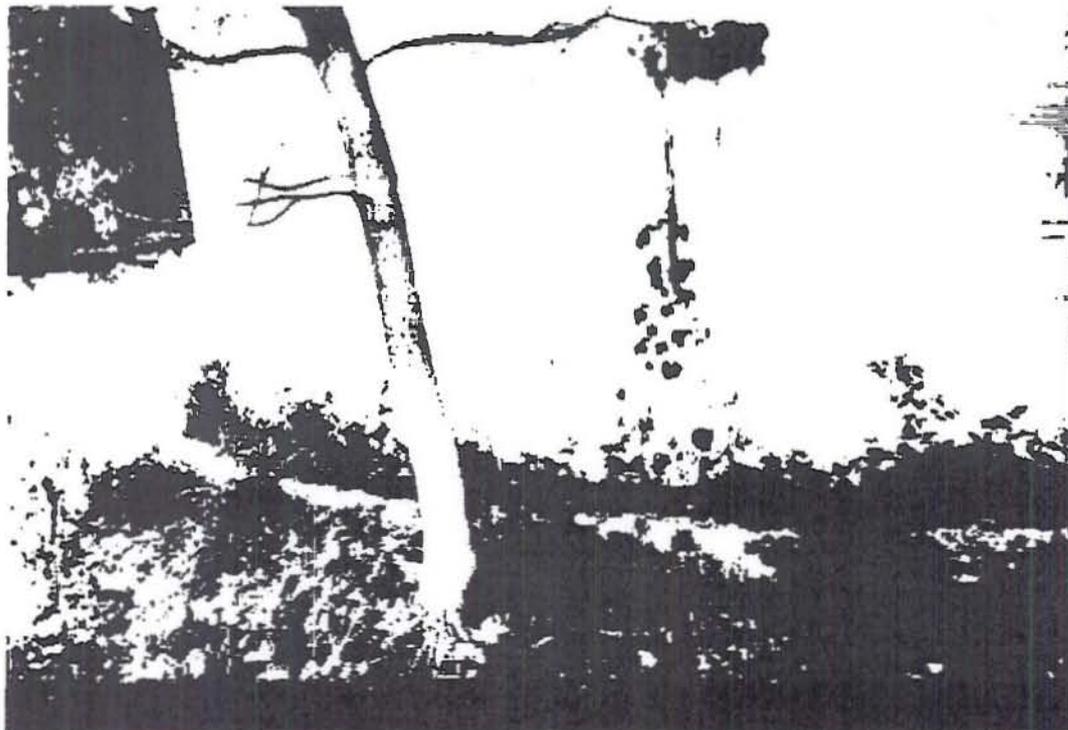
Concrete square drain valve pit former Tank #655 location.



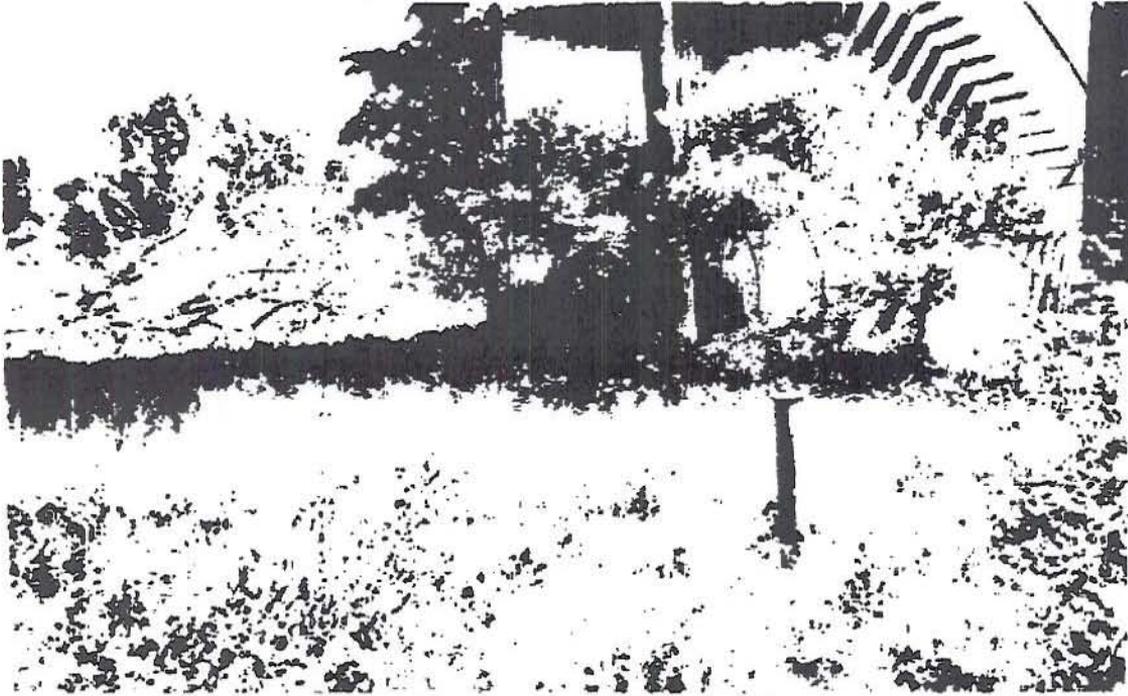
Concrete berm former Tank #655 location.



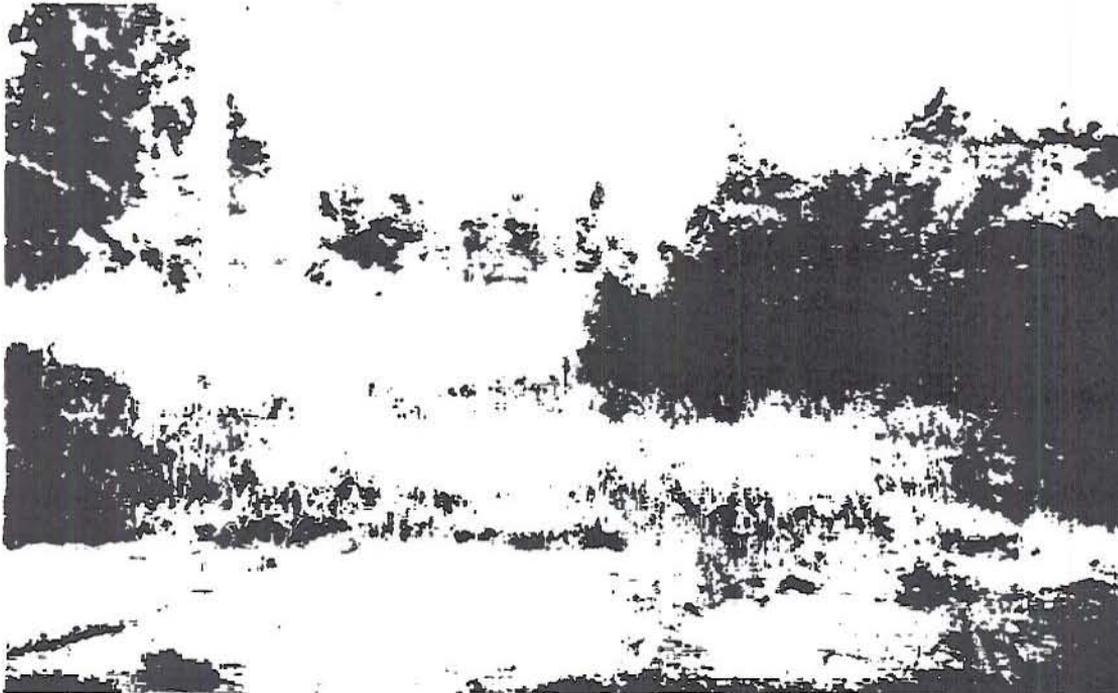
Tank #645 - Looking east at concrete square drain valve pit.  
(Tree growing through center)



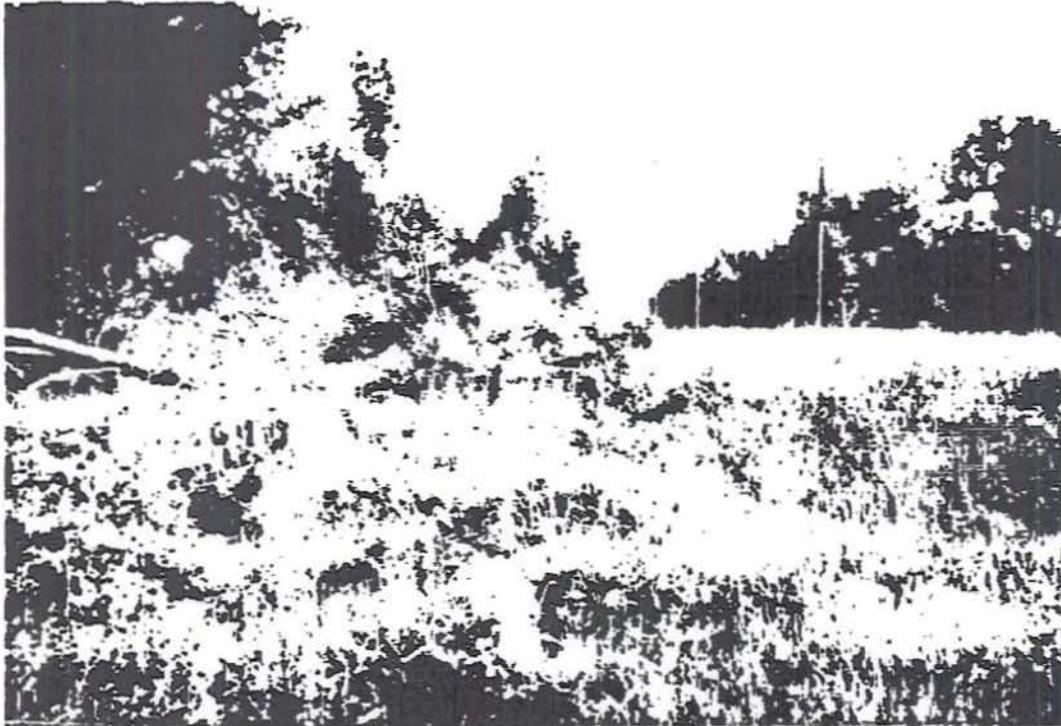
Tank #645 - Looking west at fill valve.  
(Location of soil boring SB-09)



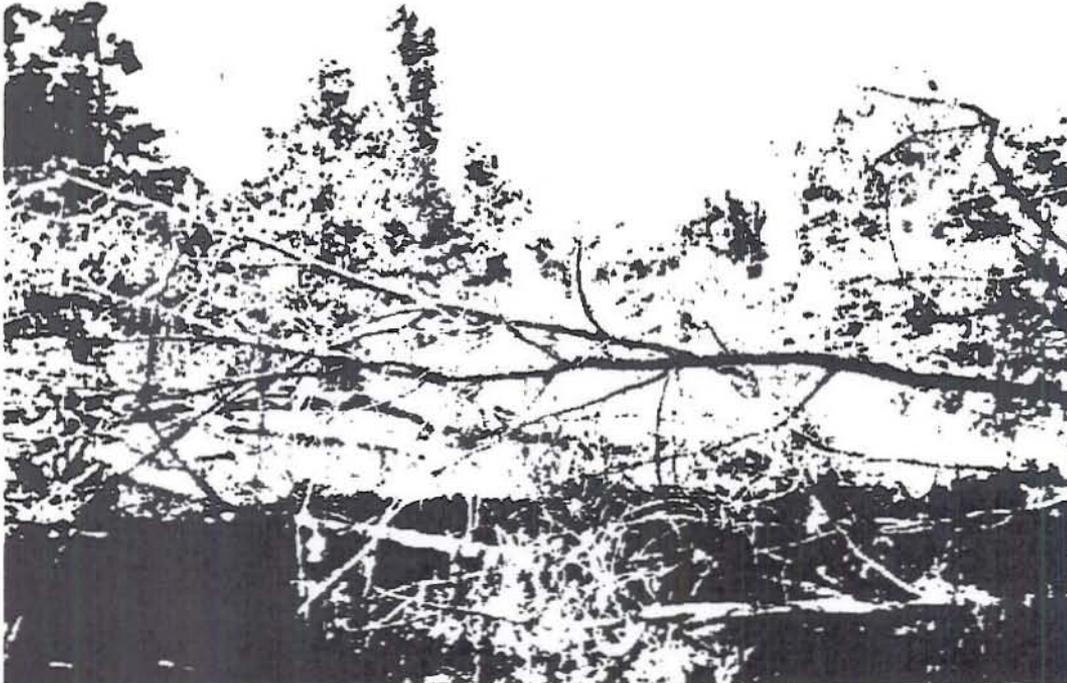
Looking south at Tank #645  
Downed trees left side of picture  
Monitoring well MK-MW-15 in foreground



Looking north from Taylor Road  
Abandoned railroad Tracks bottom right  
Tank # 645 and downed trees top left



Looking north from Taylor Road  
Concrete chunks and downed tree debris



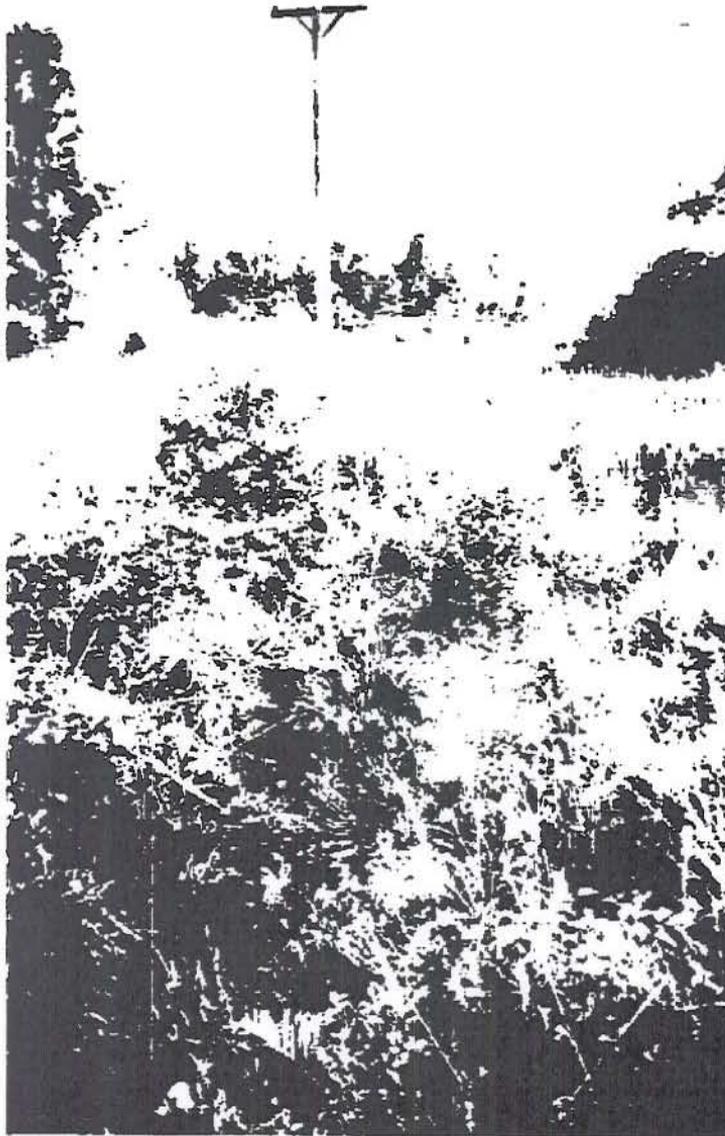
Looking east from Tank #645. Downed trees and debris.



Additional drainage ditch and culvert south of tank area.



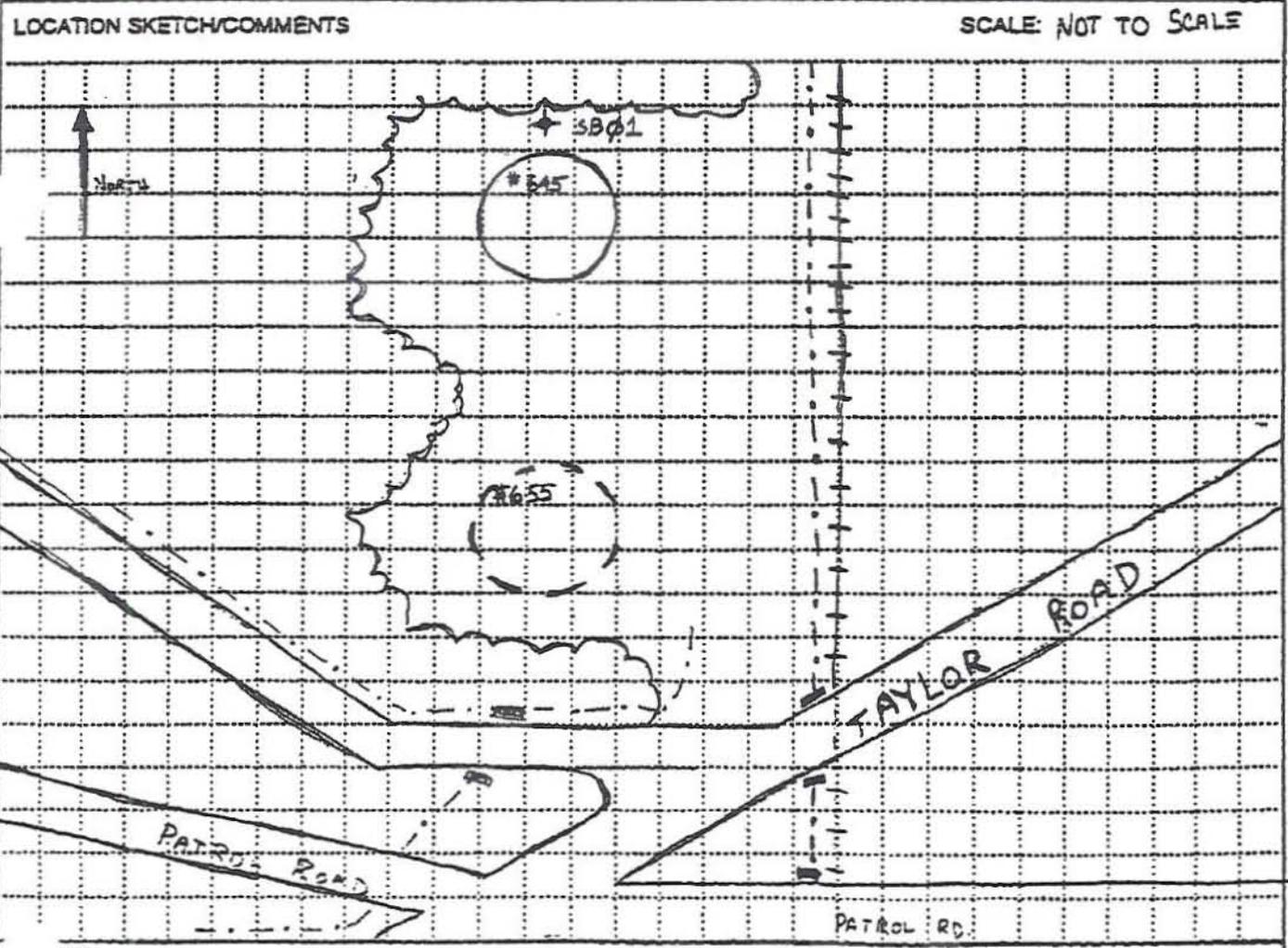
Additional drainage ditch and culvert south of tank area.



Looking north at drainage ditch running north/south in parallel with railroad tracks. Ditch runs under Taylor Road.

## Appendix E - Boring Logs

<b>HTRW DRILLING LOG</b>		DISTRICT <b>CELRL (LOUISVILLE)</b>		HOLE NUMBER <b>SB01</b>	
COMPANY NAME <b>N/A</b>		2 DRILL SUBCONTRACTOR <b>N/A</b>		SHEET <b>1</b> SHEETS <b>2</b>	
PROJECT <b>LOWER TOLUENE TANKS - PBOW</b>			LOCATION <b>SANDUSKY OH</b>		
5. NAME OF DRILLER <b>DARRELL R. DAVIS</b>			6. MANUFACTURER'S DESIGNATION OF DRILL <b>HAND AUGER</b>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <b>3/4" STAINLESS STEEL</b>		8. HOLE LOCATION <b>APPROX. 40' NORTH OF EXISTING TANK</b>			
		9. SURFACE ELEVATION			
		10. DATE STARTED <b>6-9-99</b>		11. DATE COMPLETED <b>6-9-99</b>	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED <b>N/A</b>			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>N/A</b>			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>N/A</b>			
18. GEOTECHNICAL SAMPLES		DISTURBED <b>X</b>		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC <b>-</b>	METALS <b>-</b>	OTHER (SPECIFY) <b>BTEX</b>	OTHER (SPECIFY)
					21. TOTAL CORE RECOVERY
22. DISPOSITION OF HOLE		BACKFILLED <b>X</b>	MONITORING WELL	OTHER (SPECIFY)	
				23. SIGNATURE OF INSPECTOR	



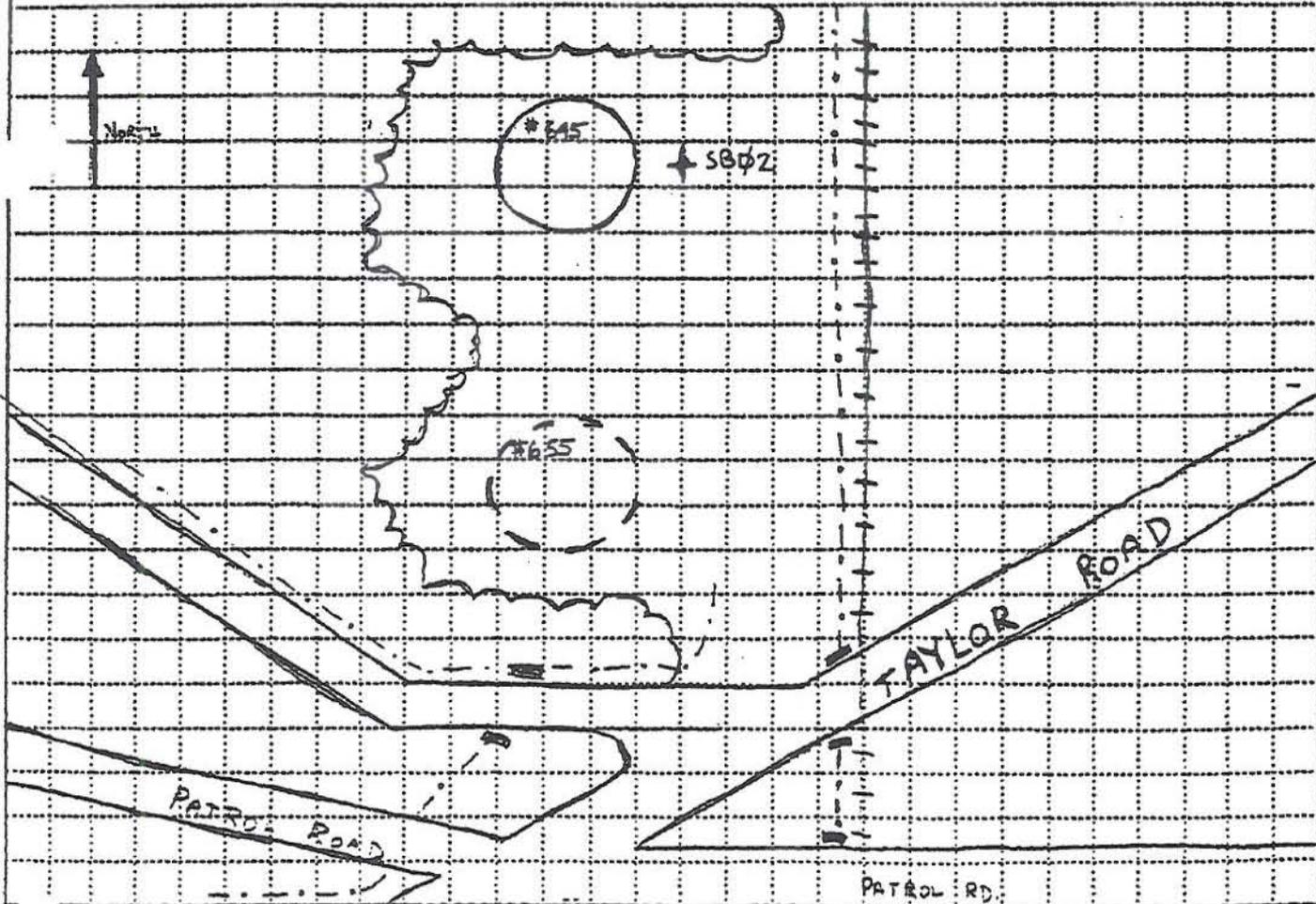
ECT <b>LOWER TOLUENE TANKS</b>	HOLE NO. <b>SB01</b>
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HTRW DRILLING LOG (CONTINUATION SHEET)						HOLE NUMBER SBØ1	
PROJECT LOWER TOLUENE TANKS				INSPECTOR		SHEET SHEETS 2 OF 2	
ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		TOP SOIL VEGETATION					
	1'	BROWN, MOIST, SILTY SAND, DENSE	PID=10.7		BTex		MOISTURE INCREASES WITH DEPTH
	2'	SM	PID=10.5				
	3'	LIGHT ORANGE/BROWN, SILTY SAND DENSE	PID=7.6				
	4'	SM	PID=10.9				
		TERMINATION @ 4'3"					

<b>HTRW DRILLING LOG</b>		DISTRICT <b>CELRL (LOUISVILLE)</b>		HOLE NUMBER <b>SB02</b>	
1. COMPANY NAME <i>N/A</i>		2. DRILL SUBCONTRACTOR <i>N/A</i>		SHEET SHEETS <i>1 OF 2</i>	
3. OBJECT <b>LOWER TOLUENE TANKS - PBOW</b>			4. LOCATION <b>SANDUSKY, OH</b>		
5. NAME OF DRILLER <b>DARRELL R. DAVIS</b>			6. MANUFACTURER'S DESIGNATION OF DRILL <b>HAND AUGER</b>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <b>3/4" STAINLESS STEEL</b>		8. HOLE LOCATION <b>APPROXIM 40' EAST OF EXISTING TANK</b>			
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED <i>N/A</i>			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>N/A</i>			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <i>N/A</i>			
18. GEOTECHNICAL SAMPLES		DISTURBED <input checked="" type="checkbox"/>		UNDISTURBED	
19. SAMPLES FOR CHEMICAL ANALYSIS		VOC <input checked="" type="checkbox"/>		METALS <input checked="" type="checkbox"/>	
20. DEPOSITION OF HOLE		BACKFILLED <input checked="" type="checkbox"/>		MONITORING WELL <input checked="" type="checkbox"/>	
				OTHER (SPECIFY) <b>RTEX</b>	
				OTHER (SPECIFY)	
				OTHER (SPECIFY)	
				21. TOTAL CORE RECOVERY	
				22. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



OBJECT  
**LOWER TOL. TANKS**

HOLE NO. **SB02**

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB02

ECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET

2 OF 2

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		TOP SOIL - VEGETATION					
	1	BROWN, MOIST, SILTY SAND, DENSE	PI=20.5		BTEX		
	2	SM	PI=19.7				
	3		PI=18.5				
	4	TERMINATION @ 3'9"	PI=19.7		BTEX		

PROJECT

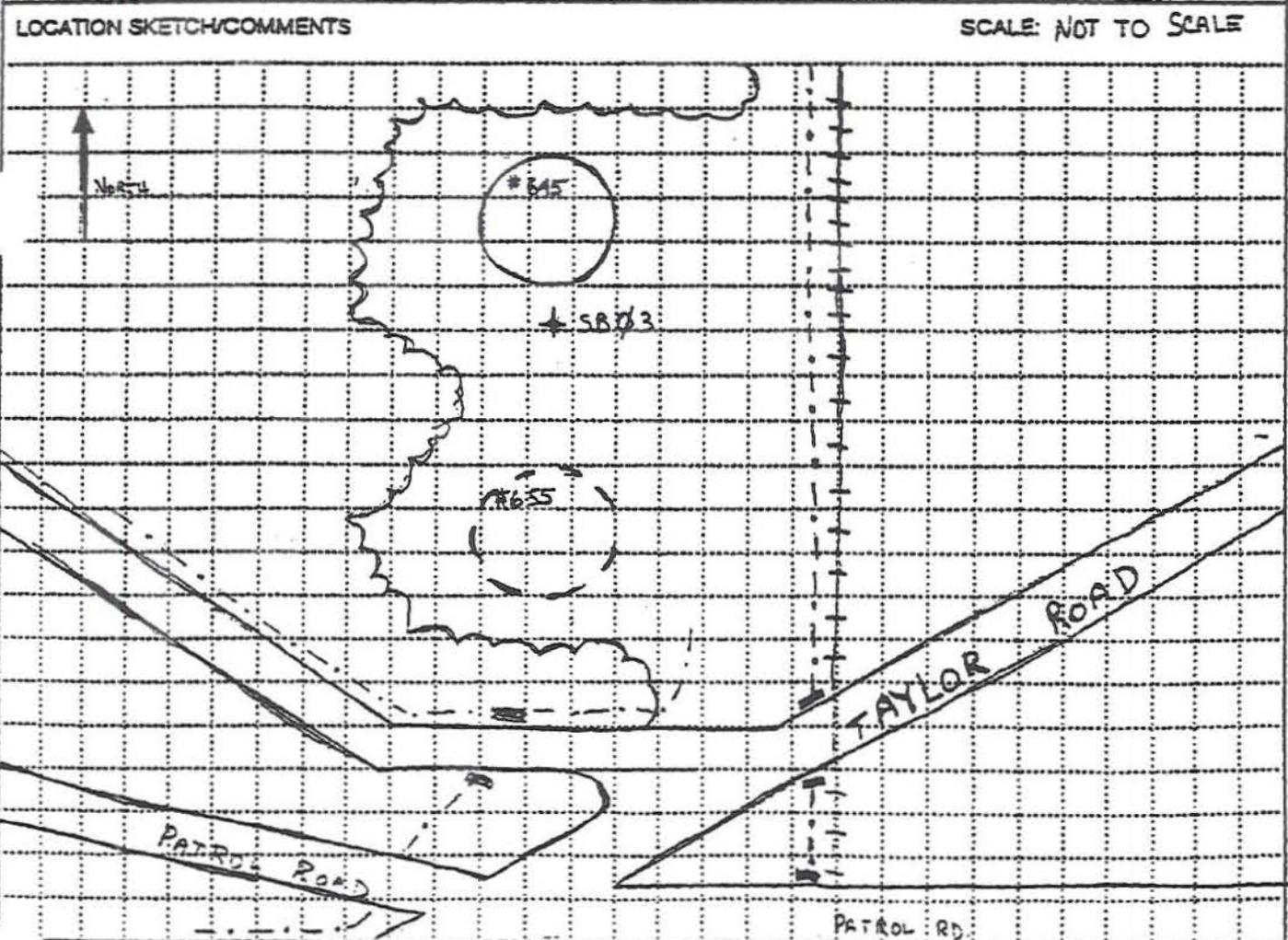
LOWER TOLUENE TANKS

HOLE NO.

SB02

<b>HTRW DRILLING LOG</b>		DISTRICT CELRL (LOUISVILLE)	HOLE NUMBER SB03
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A	SHEET SHEETS 1 OF 2
PROJECT LOWER TOLUENE TANKS - PBOW		4. LOCATION SANDUSKY, OH	
3. NAME OF DRILLER DARRELL R. DAVIS		5. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		6. HOLE LOCATION APPROXIM 40' SOUTH OF EXISTING TANK	
		8. SURFACE ELEVATION	
		10. DATE STARTED 6-9-99	11. DATE COMPLETED 6-9-99
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED N/A	
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A	
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED X	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC -	METALS -	OTHER (SPECIFY) BTEX	OTHER (SPECIFY)	OTHER (SPECIFY)
22. DISPOSITION OF HOLE	BACKFILLED X	MONITORING WELL	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY	
			22. SIGNATURE OF INSPECTOR		



JECT LOWER TOL TANKS	HOLE NO. SB03
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# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
SB03

PROJECT  
LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS  
2 OF 2

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		TOP SOIL THICK VEGETATION					
	1	LIGHT BROWN, DRY, SILTY SAND, DENSE	PID=10.9	GCOTECH	3TEX		
	2	SM ORANGE STREAKS, LIGHT BROWN, DRY, SILTY SAND, DENSE	PID=6.9				
	3	SM	PID=2.6		3TEX		
	4	TERMINATION @ 3'5"	PID=3.7				

T

HOLE NO.

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)			HOLE NUMBER SB04	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A			SHEET SHEETS 1 OF 2	
PROJECT LOWER TOLUENE TANKS - PBOW				4. LOCATION SANDUSKY, OH		
5. NAME OF DRILLER DARRELL R. DAVIS				6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROXIM 40' WEST OF EXISTING TANK				
		9. SURFACE ELEVATION				
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99		
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A				
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A				
14. TOTAL DEPTH OF HOLE		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A				
16. GEOTECHNICAL SAMPLES		DISTURBED X	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -	METALS -	OTHER (SPECIFY) BTEX	OTHER (SPECIFY)	OTHER (SPECIFY)
						21. TOTAL CORE RECOVERY
22. DISPOSITION OF HOLE X		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS				SCALE: NOT TO SCALE		
ECT LOWER TOLUENE TANKS				HOLE NO. SB04		

HTRW DRILLING LOG (CONTINUATION SHEET)						HOLE NUMBER 5804	
JECT LOWER TOLUENE TANK				INSPECTOR		SHEET SHEETS 2 OF 2	
ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN, DRY, SILTY SAND	PID= 7.3		BTEX		
	2	SM ORANGE STREAKS/LIGHT BROWN, MOIST, SILTY SAND, DENSE	PID= 11.7				
	3	SM MORE ORANGE STREAKS/BROWN, WET, SILTY SAND, DENSE	PD= 2.3				
	4	SM TERMINATION @ 4'2"	PID= 4.0		BTEX		

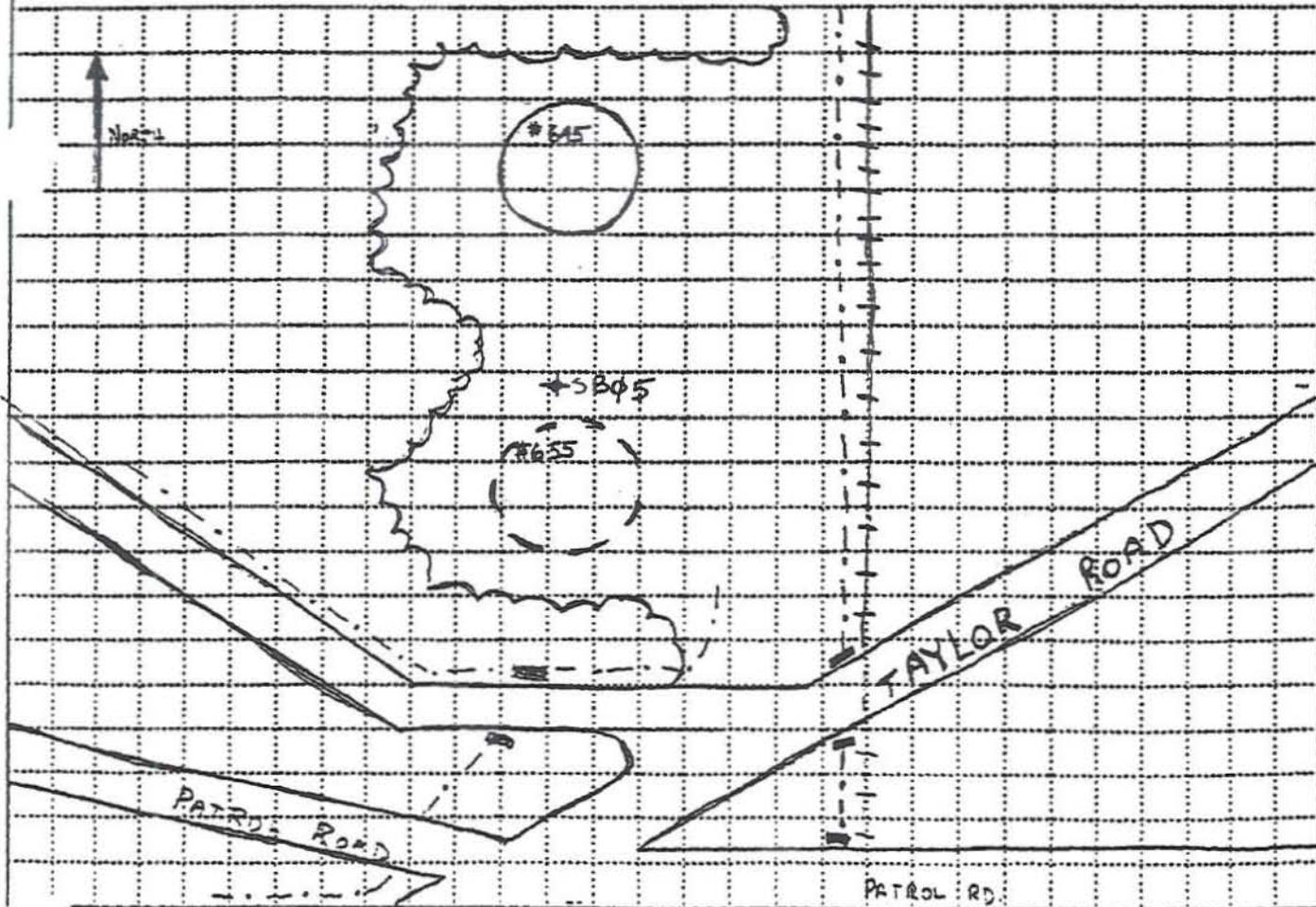
JECT LOWER TOLUENE TANKS

HOLE NO. 5804

HTRW DRILLING LOG		DISTRICT	CELR (LOUISVILLE)	HOLE NUMBER	5B05
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
PROJECT LOWER TOLUENE TANKS - PBOW			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/8" STAINLESS STEEL		8. HOLE LOCATION APPROXIMAT. 40' NORTH OF REMOVED TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNOBTAINED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
		OTHER (SPECIFY) BTEX		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



PROJECT LOWER TOL. TANKS

HOLE NO. 5B05

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
SB 05

ECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS  
2 OF 2

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN, MOIST, SILTY SAND, DENSE SM	PID=1.9		BTEX		
	2	DARK BROWN/BLACK MOIST SAND, DENSE SM	PID=1.3				
	3	COLOR CHANGE TO GRAY-BROWN MOISTURE INCREASING	PID=1.1				
	4	SM	PID=1.9		BTEX		
		TERMINATION @ 4'					

PROJECT

HOLE NO.

HTRW DRILLING LOG		DISTRICT		HOLE NUMBER	
1. COMPANY NAME N/A		CELRL (LOUISVILLE)		SB06	
PROJECT LOWER TOLUENE TANKS - PBOW		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
5. NAME OF DRILLER DARRELL R. DAVIS		4. LOCATION SANDUSKY OH		6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROXIMATE 40' EAST OF REMOVED TANK		9. SURFACE ELEVATION	
12. OVERBURDEN THICKNESS		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
13. DEPTH DRILLED INTO ROCK		15. DEPTH GROUNDWATER ENCOUNTERED N/A		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A	
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
22. DEPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
				OTHER (SPECIFY) BTEX	
				OTHER (SPECIFY)	
				OTHER (SPECIFY)	
				21. TOTAL CORE RECOVERY	
				22. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS				SCALE: NOT TO SCALE	
PROJECT LOWER Tol. TANKS				HOLE NO. SB06	

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
3806

PROJECT LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS  
2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
	1	TOP SOIL - VEGETATION LIGHT BROWN, MOIST, SILTY SAND, DENSE SM	PD=2.3		BTEX		
	2	DARK BROWN/GRAY, MOIST SILTY/CLAYEY/SAND		GEOTECH SAMPLE	BTEX		
	3	SC-SM GRAYISH BROWN, MOIST, SILTY SAND, DENSE					
	4	SM	PD=1.1		BTEX		
		TERMINATION @ 4'					

PROJECT LOWER TOLUENE TANKS

HOLE NO. 3806

HTRW DRILLING LOG		DISTRICT		HOLE NUMBER	
1. COMPANY NAME N/A		CELRL (LOUISVILLE)		SB07	
PROJECT LOWER TOLUENE TANKS - PBDW		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. NAME OF DRILLER DARRELL R. DAVIS		4. LOCATION SANDUSKY, OH		5. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		6. HOLE LOCATION --		8. SURFACE ELEVATION	
12. OVERBURDEN THICKNESS		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
13. DEPTH DRILLED INTO ROCK		15. DEPTH GROUNDWATER ENCOUNTERED N/A		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A	
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNOBTAINED	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -		METALS -	
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL -	
				OTHER (SPECIFY) RTEX	
				OTHER (SPECIFY) -	
				OTHER (SPECIFY) -	
				21. TOTAL CORE RECOVERY %	
				21. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS		SCALE: NOT TO SCALE			
ECT LOWER Tol TANKS		HOLE NO. SB07			

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
SB07

SHEET SHEETS  
2 OF 2

ECT

LOWER TOLUENE TANKS

INSPECTOR

ELEV. (A)	DEPTH (A)	DESCRIPTION OF MATERIALS (B)	FIELD SCREENING RESULTS (C)	GEO TECH SAMPLE OR CORE BOX NO. (D)	ANALYTICAL SAMPLE NO. (E)	BLOW COUNT (F)	REMARKS (G)
		TOP OF ... LIGHT BROWN MIXED w/DARK BROWN BLACK MUDS - ... SM	PID: 0.0		BTEX		
	1	GRANISH BROWN, ... SAND ... ... SM	PID: 0.0				HARD TO RECOVER ... ... ...
	2						
	3		PID: 0.0				
	4	TERMINATION @ 4' SM	PID: 1.0		BTEX		

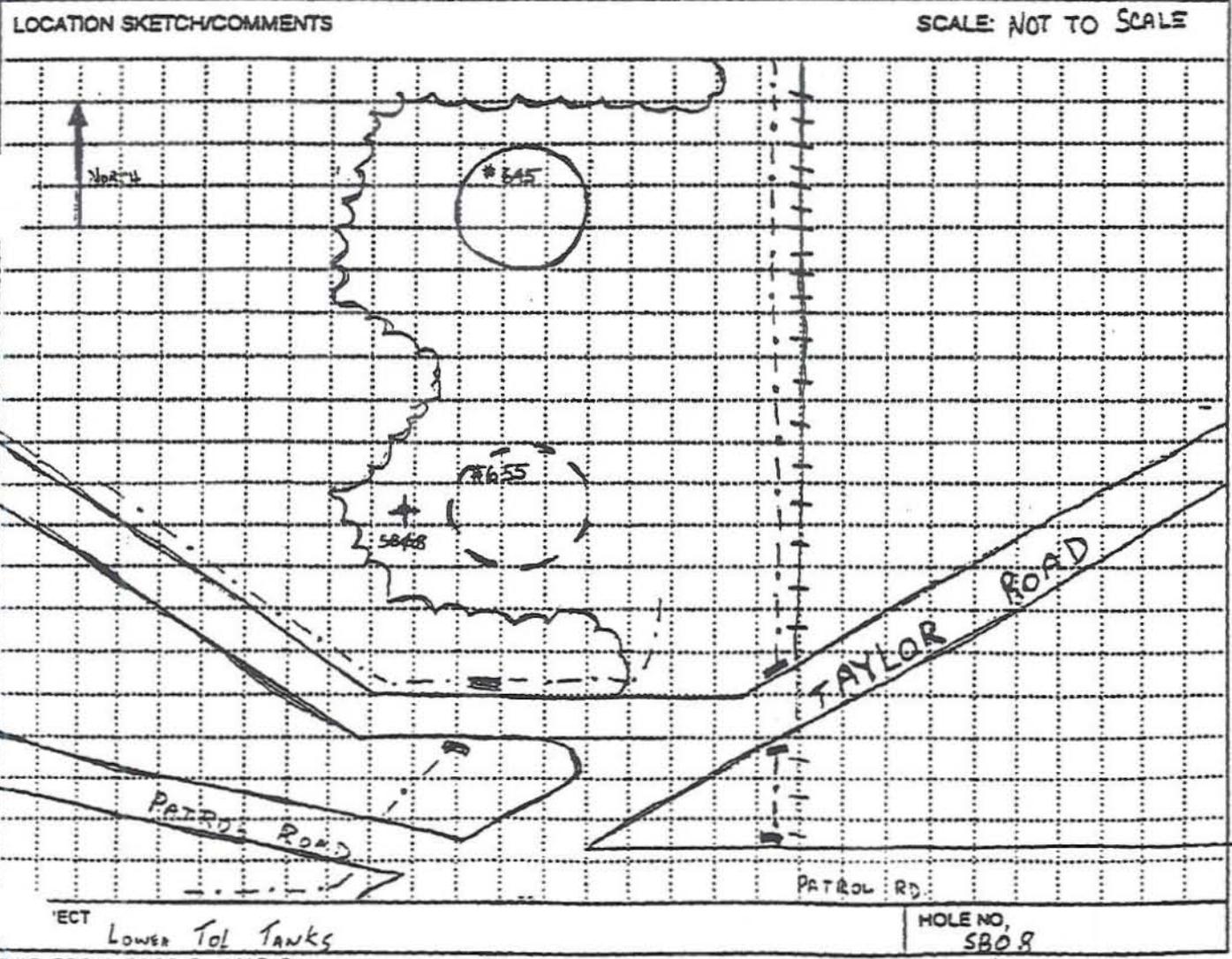
PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SB07

<b>HTRW DRILLING LOG</b>		DISTRICT <b>CELRL (LOUISVILLE)</b>		HOLE NUMBER <b>SBO8</b>	
1. COMPANY NAME <b>N/A</b>		2. DRILL SUBCONTRACTOR <b>N/A</b>		SHEET SHEETS <b>1 OF 2</b>	
3. PROJECT <b>LOWER TOLUENE TANKS - PBOW</b>			4. LOCATION <b>SANDUSKY OH</b>		
5. NAME OF DRILLER <b>DARRELL R. DAVIS</b>			6. MANUFACTURER'S DESIGNATION OF DRILL <b>HAND AUGER</b>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <b>3/4" STAINLESS STEEL</b>		8. HOLE LOCATION <b>APPROX. 40' WEST OF REMOVED TANK</b>			
		9. SURFACE ELEVATION			
		10. DATE STARTED <b>6-9-99</b>		11. DATE COMPLETED <b>6-9-99</b>	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED <b>N/A</b>			
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>N/A</b>			
14. TOTAL DEPTH OF HOLE		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>N/A</b>			
16. GEOTECHNICAL SAMPLES		DISTURBED <b>X</b>		UNOBTAINED	
17. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
				OTHER (SPECIFY) <b>PTEX</b>	
18. DISPOSITION OF HOLE		BACKFILLED <b>X</b>		MONITORING WELL	
				OTHER (SPECIFY)	
				19. TOTAL NUMBER OF CORE BOXES	
				20. TOTAL CORE RECOVERY	
				21. SIGNATURE OF INSPECTOR	



# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB08

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEO TECH SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		TOP SOIL - VEGETATION					
	1	BROWN, MOIST, SILTY SAND DENSE SM	PID=2.2		BTEX		
	2	LIGHT BROWN, MOIST SAND DENSE SM	PID=1.6				
	3	DARK BROWN/BLACK, MOIST SILTY/CLAYEY SAND, DENSE TIGHT SM-SC	PID=3.5				HARD TO ADVANCE AUGER
	4	BRASSH BROWN, MOIST SILTY SAND SM	PID=3.1		BTEX		
	4	TERMINATION @ 3'10"					

PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SB08

HTRW DRILLING LOG		DISTRICT		HOLE NUMBER	
N/A		CELRL (LOUISVILLE)		SB09	
COMPANY NAME		2 DRILL SUBCONTRACTOR		SHEET SHEETS	
N/A		N/A		1 OF 2	
PROJECT			4. LOCATION		
LOWER TOLUENE TANKS - PBOW			SANDUSKY OH		
5. NAME OF DRILLER			6. MANUFACTURER'S DESIGNATION OF DRILL		
DARRELL R. DAVIS			HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT			8. HOLE LOCATION		
3/4" STAINLESS S-FEL			APPROX. 2' EAST OF EXISTING TANK NEAR PIPING VALVE		
			9. SURFACE ELEVATION		
			10. DATE STARTED		
			6-9-99		
			11. DATE COMPLETED		
			6-9-99		
12. OVERBURDEN THICKNESS			15. DEPTH GROUNDWATER ENCOUNTERED		
			N/A		
13. DEPTH DRILLED INTO ROCK			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED		
			N/A		
14. TOTAL DEPTH OF HOLE			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)		
			N/A		
18. GEOTECHNICAL SAMPLES		DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES	
		X			
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)
				BTEX	
21. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	22. SIGNATURE OF INSPECTOR
		X			
LOCATION SKETCH/COMMENTS				SCALE: NOT TO SCALE	
PROJECT				HOLE NO.	
LOWER TOL TANKS				SB09	

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
SB09

JECT Lower Toluene Tanks

INSPECTOR

SHEET SHEETS  
2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEO TECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOPSOIL - VEGETATION					
	1	Light Brown, Dry. Silty Sand, (Like Sand) SM	PID=13.0		BTEX		
	2	TERMINATION @ 1'					
	3						
	4						

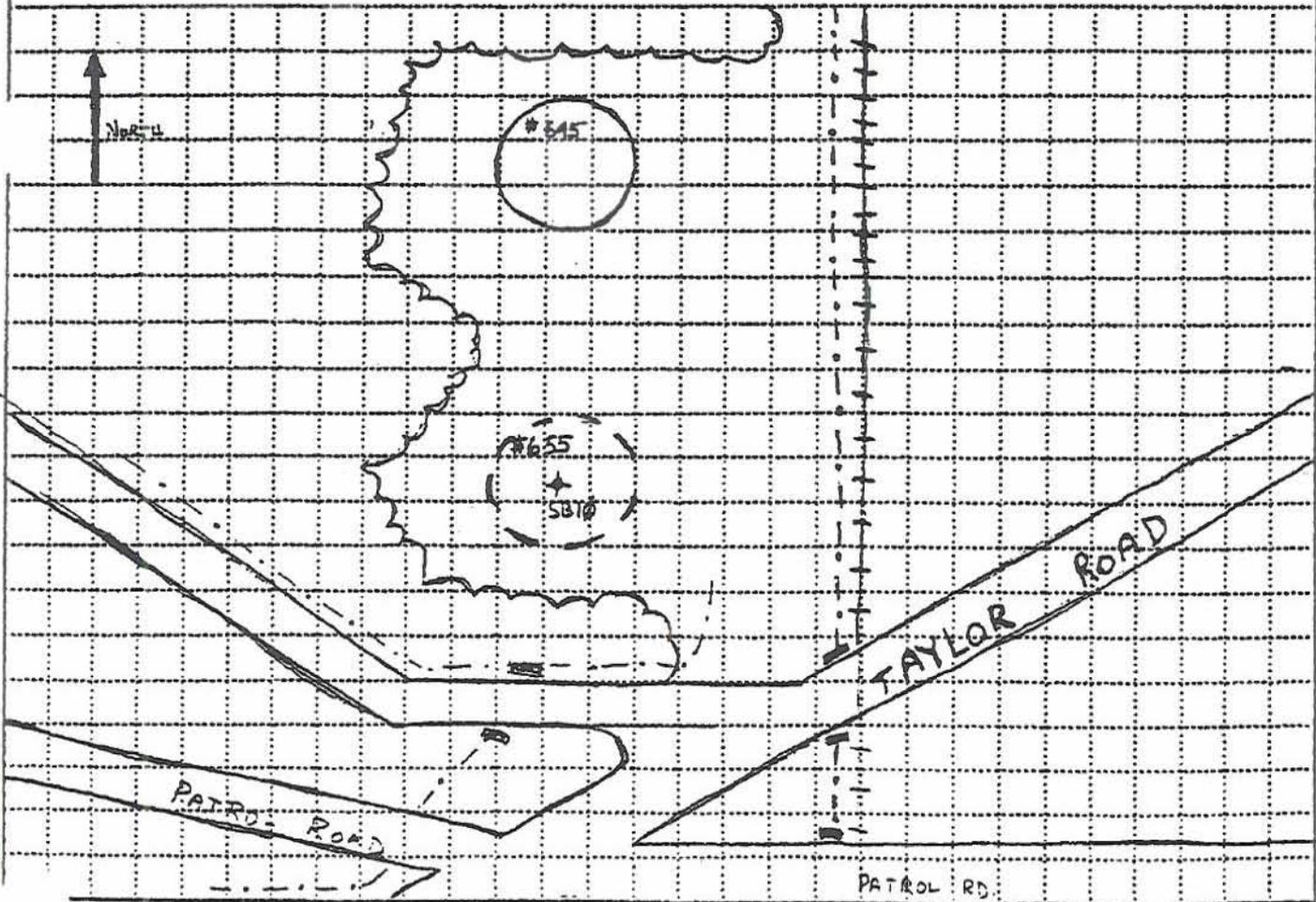
JECT Lower Toluene Tanks

HOLE NO.  
SB09

<b>HTRW DRILLING LOG</b>		DISTRICT <b>CELRL (LOUISVILLE)</b>		HOLE NUMBER <b>SB10</b>	
COMPANY NAME <b>N/A</b>		2 DRILL SUBCONTRACTOR <b>N/A</b>		SHEET SHEETS <b>1 OF 2</b>	
3. PROJECT <b>LOWER TOLUENE TANKS - PBOW</b>			4. LOCATION <b>SANDUSKY OH</b>		
5. NAME OF DRILLER <b>DARRELL R. DAVIS</b>			6. MANUFACTURER'S DESIGNATION OF DRILL <b>HAND AUGER</b>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <b>3/4" STAINLESS STEEL</b>		8. HOLE LOCATION <b>APPROX. CENTER OF REMOVED TANK 2A-FD.VI.</b>			
		9. SURFACE ELEVATION			
		10. DATE STARTED <b>6-9-99</b>		11. DATE COMPLETED <b>6-9-99</b>	
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED <b>N/A</b>			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>N/A</b>			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>N/A</b>			
18. GEOTECHNICAL SAMPLES		DISTURBED <b>X</b>		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC <b>X</b>		METALS	
		OTHER (SPECIFY) <b>ATEX</b>		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY %					
22. DISPOSITION OF HOLE		BAGGED <b>X</b>		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



JECT  
**LOWER TOL. TANK:**

HOLE NO.  
**SB10**

# HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER  
SB 10

SUBJECT  
LOWER Toluene Tanks

INSPECTOR

SHEET SHEETS  
2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
	1	TOP SOIL - VEGETATION Light-BROWN MIST. SAND SAND DENSE	NO REFL		BTEX		Refusal of Refuse Due to Location of Tanks (Concrete Refuse)
	2						
	3	refusal @ 2'6" SM					

SUBJECT  
LOWER Toluene Tanks

HOLE NO.  
SB 10

## Appendix F - BTEX Laboratory Analysis

Quanterra Incorporated  
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## **ANALYTICAL REPORT**

**PBOW-LOWER TOLUENE TANKS**

**Lot #: A9F160102**

**U.S. Army Corps of Engineers**

**QUANTERRA INCORPORATED**

A handwritten signature in black ink, appearing to read "Debora A. Hula".

**Debora A. Hula  
Project Manager**

**July 23, 1999**

## **CASE NARRATIVE**

**A9F160102**

The following report contains the analytical results for twenty solid samples and one quality control sample submitted to Quanterra-North Canton by the U.S. Army Corps of Engineers from the PBOW-Lower Toluene Tanks Site. The samples were received June 11, 1999, according to documented sample acceptance procedures.

Quanterra-North Canton utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the Analytical Methods Summary page in accordance with the method indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

### **SUPPLEMENTAL QC INFORMATION**

#### **SAMPLE RECEIVING**

The cooler was received at the laboratory at a temperature of 1.2° C.

# ANALYTICAL METHODS SUMMARY

A9F160102

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>
Soil and Waste pH	SW846 9045C
Total Organic Carbon	SMCA WALKLEY-BLACK
Total Residue as Percent Solids	MCAWW 160.3 MOD
Volatiles by GC	SW846 8021B

## References:

- MCAWW "Methods for Chemical Analysis of Water and Wastes",  
EPA-600/4-79-020, March 1983 and subsequent revisions.
- SMCA 90-3, Standard Methods of Chemical Analysis, 6th Edition,  
D. Van Nostrand Co., Princeton, N.J., 1963.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical  
Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

A9F160102

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
CWX40	001	PBOW99SB01-1'	06/09/99	10:22
CWX43	002	PBOW99SB02-1'	06/09/99	11:35
CWX44	003	PBOW99SB02-3'9"	06/09/99	11:30
CWX45	004	PBOW99SB03-1'	06/09/99	13:30
CWX47	005	PBOW99SB03-3'5"	06/09/99	13:47
CWX48	006	PBOW99SB04-1'4"	06/09/99	12:27
CWX49	007	PBOW99SB04-4'2"	06/09/99	12:39
CWX4A	008	PBOW99SB05-1'	06/09/99	18:55
CWX4C	009	PBOW99SB05-4'	06/09/99	19:07
CWX4D	010	PBOW99SB06-1'	06/09/99	16:30
CWX4E	011	PBOW99SB06-2'9"	06/09/99	16:38
CWX4H	012	PBOW99SB06-4'	06/09/99	16:50
CWX4K	013	PBOW99SB07-1'	06/09/99	17:37
CWX4M	014	PBOW99SB07-1'DUP	06/09/99	17:37
CWX4N	015	PBOW99SB07-4'	06/09/99	17:50
CWX4P	016	PBOW99SB08-1'	06/09/99	18:28
CWX4Q	017	PBOW99SB08-3'10"	06/09/99	18:39
CWX4V	018	PBOW99SB09-1'	06/09/99	14:41
CWX4X	019	PBOW99SB10-1'	06/10/99	08:57
X52	020	PBOW99SB10-2'6"	06/10/99	09:02
X53	021	TRIP BLANK	06/10/99	.

## NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, point filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB01-1'

GC Volatiles

Lot-Sample #....: A9F160102-001 Work Order #....: CWX40102 Matrix.....: SOLID  
 Date Sampled....: 06/09/99 10:22 Date Received...: 06/11/99  
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 7.0 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	2.9	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	119	(50 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB02-1'

GC Volatiles

Lot-Sample #...: A9F160102-002 Work Order #...: CWX43102 Matrix.....: SOLID  
 Date Sampled...: 06/09/99 11:35 Date Received...: 06/11/99  
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99  
 Prep Batch #...: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 9.8 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>	
	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	117	(50 - 150)	

NOTE (S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB02-3'9"

GC Volatiles

Lot-Sample #....: A9F160102-003    Work Order #....: CWX44102    Matrix.....: SOLID  
Date Sampled....: 06/09/99 11:30    Date Received...: 06/11/99  
Prep Date.....: 06/18/99    Analysis Date...: 06/18/99  
Prep Batch #....: 9172359  
Dilution Factor: 1  
% Moisture.....: 16    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	120	(50 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB03-1'

GC Volatiles

Lot-Sample #....: A9F160102-004 Work Order #....: CWX45105 Matrix.....: SOLID  
 Date Sampled....: 06/09/99 13:30 Date Received...: 06/11/99  
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 14 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	118	(50 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: P80W99SB03-3'5"

GC Volatiles

Lot-Sample #....: A9F160102-005    Work Order #....: CWX47102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 13:47    Date Received...: 06/11/99  
 Prep Date.....: 06/18/99    Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 17    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	121	(50 - 150)	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: P80W99SB04-1'4"

GC Volatiles

Lot-Sample #....: A9F160102-006    Work Order #....: CWX48102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 12:27    Date Received...: 06/11/99  
 Prep Date.....: 06/18/99    Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 9.6    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
<u>SURROGATE</u>			
Trifluorotoluene	120	(50 - 150)	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB04-4'2"

GC Volatiles

Lot-Sample #....: A9F160102-007    Work Order #....: CWX49102    Matrix.....: SOLID  
Date Sampled....: 06/09/99 12:39    Date Received...: 06/11/99  
Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
Prep Batch #....: 9172359  
Dilution Factor: 1  
% Moisture.....: 18    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	114	(50 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB05-1'

GC Volatiles

Lot-Sample #....: A9F160102-008 Work Order #....: CWX4A102 Matrix.....: SOLID  
 Date Sampled...: 06/09/99 18:55 Date Received...: 06/11/99  
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 5.9 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	4.7	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	120	(50 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB05-4'

GC Volatiles

Lot-Sample #....: A9F160102-009    Work Order #....: CWX4C102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 19:07    Date Received...: 06/11/99  
 Prep Date.....: 06/18/99    Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 16    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	115	(50 - 150)	

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-1'

GC Volatiles

Lot-Sample #....: A9F160102-010    Work Order #....: CWX4D102    Matrix.....: SOLID  
 Date Sampled...: 06/09/99 16:30    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 6.6    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
<u>SURROGATE</u>			
Trifluorotoluene	119	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: P80W99SB06-2'9"

GC Volatiles

Lot-Sample #....: A9F160102-011    Work Order #....: CWX4E105    Matrix.....: SOLID  
Date Sampled....: 06/09/99 16:38    Date Received...: 06/11/99  
Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
Prep Batch #....: 9172359  
Dilution Factor: 1  
% Moisture.....: 18    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	112	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-4'

GC Volatiles

Lot-Sample #....: A9F160102-012    Work Order #....: CWK4H102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 16:50    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 14    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	129	(50 - 150)	

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-1'

GC Volatiles

Lot-Sample #....: A9F160102-013    Work Order #....: CWX4K102    Matrix.....: SOLID  
Date Sampled....: 06/09/99 17:37    Date Received...: 06/11/99  
Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
Prep Batch #....: 9172359  
Dilution Factor: 1  
% Moisture.....: 7.7    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	1.2	1.1	ug/kg
<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>	
	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	120	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-1'DUP

GC Volatiles

Lot-Sample #....: A9F160102-014    Work Order #....: CWX4M102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 17:37    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 7.7    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
<u>SURROGATE</u>			
Trifluorotoluene	121	(50 - 150)	

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-4'

GC Volatiles

Lot-Sample #....: A9F160102-015    Work Order #....: CWX4N102    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 17:50    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 17    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
<u>SURROGATE</u>			
Trifluorotoluene	111	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB08-1'

GC Volatiles

Lot-Sample #...: A9F160102-016 Work Order #...: CWX4P102 Matrix.....: SOLID  
Date Sampled...: 06/09/99 18:28 Date Received...: 06/11/99  
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99  
Prep Batch #...: 9172359  
Dilution Factor: 1  
% Moisture.....: 8.8 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	118	(50 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PCOW99SB08-3'10"

GC Volatiles

Lot-Sample #....: A9F160102-017    Work Order #....: CWX4Q102    Matrix.....: SOLID  
 Date Sampled...: 06/09/99 18:39    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 18    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	117	(50 - 150)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: P8OW99SB09-1'

GC Volatiles

Lot-Sample #....: A9F160102-018    Work Order #....: CWX4V102    Matrix.....: SOLID  
Date Sampled....: 06/09/99 14:41    Date Received...: 06/11/99  
Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
Prep Batch #....: 9172359  
Dilution Factor: 1  
% Moisture.....: 4.6    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/kg
Ethylbenzene	ND	1.0	ug/kg
Toluene	ND	1.0	ug/kg
Xylenes (total)	5.0	1.0	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	115	(50 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB10-1'

GC Volatiles

Lot-Sample #...: A9F160102-019    Work Order #...: CWX4X102    Matrix.....: SOLID  
 Date Sampled...: 06/10/99 08:57    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #...: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 4.3    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/kg
Ethylbenzene	ND	1.0	ug/kg
Toluene	ND	1.0	ug/kg
Xylenes (total)	1.3	1.0	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	121	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB10-2'6"

GC Volatiles

Lot-Sample #....: A9F160102-020    Work Order #....: CWX52102    Matrix.....: SOLID  
 Date Sampled....: 06/10/99 09:02    Date Received...: 06/11/99  
 Prep Date.....: 06/19/99    Analysis Date...: 06/19/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1  
 % Moisture.....: 10    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	121	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: TRIP BLANK

GC Volatiles

Lot-Sample #....: A9F160102-021    Work Order #....: CWX53101    Matrix.....: WATER  
 Date Sampled....: 06/10/99    Date Received...: 06/11/99  
 Prep Date.....: 06/18/99    Analysis Date...: 06/18/99  
 Prep Batch #....: 9172352  
 Dilution Factor: 1    Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
Toluene	ND	1.0	ug/L
Xylenes (total)	ND	1.0	ug/L

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	106	(50 - 150)

**QUALITY CONTROL SECTION**

## QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra® Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

### QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

### LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the reparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the reparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

### METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

#### Volatile (GC or GC/MS)

Methylene chloride  
Acetone  
2-Butanone

#### Semivolatile (GC/MS)

Phthalate Esters

#### Metals

Copper  
Iron  
Zinc  
Lead\*

\* for analyses run on TJA Trace ICP or GFAA only

## QUALITY CONTROL ELEMENTS OF SW-846 METHODS (Continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the reparation and reanalysis of all samples in the QC batch.

### MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

### SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (exception for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

For the GC/MS BNA methods, the surrogate criteria is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, TPH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

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### **Quanterra Incorporated – North Canton Facility, Certifications and Approvals:**

*Alabama (#41170), California (#2157), Connecticut (#PH-0590), Florida (#E87225) – Florida CompQAPP (#890651G), Kentucky (#90021), Massachusetts (#M-OH048), Maryland (#272), Minnesota (#39-999-348), Missouri (#6090), New Jersey (#74001), New York (#10975), North Dakota (#R-156), Ohio (#6090), OhioVAP (#CL0024), Pennsylvania (#68-340), South Carolina (#92007001, #92007002, #92007003), Tennessee (#02903), West Virginia (#210), Wisconsin (#999518190), NAVY, ARMY, USDA Soil Permit*

**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**GC Volatiles**

Client Lot #....: A9F160102      Work Order #....: CX60A102-LCS      Matrix.....: WATER  
 LCS Lot-Sample#: A9F210000-352      CX60A103-LCSD  
 Prep Date.....: 06/18/99      Analysis Date...: 06/18/99  
 Prep Batch #....: 9172352  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	107	(71 - 132)			SW846 8021B
	111	(71 - 132)	3.3	(0-20)	SW846 8021B
Benzene	104	(73 - 134)			SW846 8021B
	107	(73 - 134)	3.1	(0-20)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	104	(50 - 150)
	101	(50 - 150)

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**GC Volatiles**

Client Lot #....: A9F160102      Work Order #....: CX600102-LCS      Matrix.....: SOLID  
 LCS Lot-Sample#: A9F210000-359      CX600103-LCSD  
 Prep Date.....: 06/18/99      Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	88	(66 - 129)			SW846 8021B
	88	(66 - 129)	0.84	(0-20)	SW846 8021B
Benzene	89	(69 - 132)			SW846 8021B
	89	(69 - 132)	0.61	(0-20)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	95	(50 - 150)
	95	(50 - 150)

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9F160102  
MB Lot-Sample #: A9F210000-352

Work Order #...: CX60A101

Matrix.....: WATER

Analysis Date...: 06/18/99  
Dilution Factor: 1

Prep Date.....: 06/18/99  
Prep Batch #...: 9172352

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Benzene	ND	1.0	ug/L	SW846 8021B
Ethylbenzene	ND	1.0	ug/L	SW846 8021B
Toluene	ND	1.0	ug/L	SW846 8021B
Xylenes (total)	ND	1.0	ug/L	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	101	(50 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9F160102  
MB Lot-Sample #: A9F210000-359

Work Order #...: CX600101

Matrix.....: SOLID

Analysis Date...: 06/18/99  
Dilution Factor: 1

Prep Date.....: 06/18/99  
Prep Batch #...: 9172359

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Benzene	ND	1.0	ug/kg	SW846 8021B
Ethylbenzene	ND	1.0	ug/kg	SW846 8021B
Toluene	ND	1.0	ug/kg	SW846 8021B
Xylenes (total)	ND	1.0	ug/kg	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	121	(50 - 150)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102      Work Order #....: CWX40103-MS      Matrix.....: SOLID  
 MS Lot-Sample #: A9F160102-001      CWX40104-MSD  
 Date Sampled....: 06/09/99 10:22      Date Received...: 06/11/99  
 Prep Date.....: 06/18/99      Analysis Date...: 06/18/99  
 Prep Batch #....: 9172359  
 Dilution Factor: 1      % Moisture.....: 7.0

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	86	(50 - 142)			SW846 8021B
	87	(50 - 142)	0.88	(0-40)	SW846 8021B
Benzene	88	(62 - 150)			SW846 8021B
	89	(62 - 150)	1.7	(0-33)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	92	(50 - 150)
	92	(50 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Units and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102      Work Order #....: CX046104-MS      Matrix.....: WATER  
 MS Lot-Sample #: A9F160186-003      CX046105-MSD  
 Date Sampled...: 06/15/99 09:00      Date Received...: 06/16/99  
 Prep Date.....: 06/19/99      Analysis Date...: 06/19/99  
 Prep Batch #....: 9172352  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	105	(55 - 159)			SW846 8021B
	110	(55 - 159)	4.3	(0-25)	SW846 8021B
Benzene	102	(55 - 161)			SW846 8021B
	106	(55 - 161)	3.9	(0-25)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	114	(50 - 150)
	121	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

bold print denotes control parameters

# Chain of Custody Record



QUA 4124

Client: **USACE** Project Manager: **DARRELL R. DAVIS** Date: **6-10-99** Chain Of Custody Number: **61624**

Address: \_\_\_\_\_ Telephone Number (Area Code)/Fax Number: **502 582-5561** Lab Number: \_\_\_\_\_ Page **1** of **1**

City: **LOUISVILLE** State: **KY** Zip Code: \_\_\_\_\_ Site Contact: \_\_\_\_\_

Project Name: **PBOW - Lower Toluene TANKS** Carrier/Waybill Number: \_\_\_\_\_

Contract/Purchase Order/Quote No.: \_\_\_\_\_

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	Analysis		
					Type	No.			BTEX	TOC + PH	Geotechnical
PBOW99 SB 01 - 1'	6-9-99	10:22	GRASS <sub>soil</sub>	2oz		1					
PBOW99 SB 02 - 1'	6-9-99	11:35	GRASS <sub>soil</sub>			1					
PBOW99 SB 02 - 3'9"	6-9-99	11:30	GRASS <sub>soil</sub>			1					
PBOW99 SB 03 - 1'	6-9-99	12:30	GRASS <sub>soil</sub>			3					
PBOW99 SB 03 - 3'5"	6-9-99	12:47	SOIL			1	N/A				
PBOW99 SB 04 - 1'4"	6-9-99	12:27	SOIL			1					
PBOW99 SB 04 - 4'2"	6-9-99	12:39	SOIL			1					
PBOW99 SB 05 - 1'	6-9-99	18:55	SOIL			1					
PBOW99 SB 05 - 4'	6-9-99	19:07	SOIL			1					
PBOW99 SB 06 - 1'	6-9-99	16:30	SOIL			1					
PBOW99 SB 06 - 2'9"	6-9-99	16:38	SOIL			3					
PBOW99 SB 06 - 4'	6-9-99	16:50	SOIL			1					
PBOW99 SB 07 - 1'	6-9-99	17:37	SOIL			1					
PBOW99 SB 07 - 1' DUP	6-9-99	17:37	SOIL			1					
PBOW99 SB 07 - 4'	6-9-99	17:50	SOIL			1					
PBOW99 SB 08 - 1'	6-9-99	18:28	SOIL			1					

Special Instructions: \_\_\_\_\_

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Turn Around Time Required:  Normal  Rush

QC Level:  I.  II.  III.

Project Specific (Specify): \_\_\_\_\_

1. Relinquished By: *Darrell R. Davis* Date: **6-10-99** Time: **14:10**

1. Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

2. Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

2. Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

3. Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

3. Received By: *William R. Carter* Date: **6/11/99** Time: **1000A**

Comments: **PLEASE PERFORM MS/MGD FOR L. EX FROM these samples**

# Chain of Custody Record



QUA-4124

Client <b>USACE</b>		Project Manager <b>DARCELL R. DAVIS</b>		Date <b>6-10-99</b>	Chain Of Custody Number <b>51625</b>
Address		Telephone Number (Area Code)/Fax Number <b>502 (582) - 5561</b>		Lab Number	
City <b>LOUISVILLE</b>	State <b>KY</b>	Zip Code	Site Contact		
Project Name <b>PBOW - Lower TOLUENE TANKS</b>			Carrier/Waybill Number		
Contract/Purchase Order/Quote No.					

Page **2** of **2**

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	Analysis									
					Type	No.												
PBOW 995808 - 3' 10"	6-9-99	18:39	SOIL			1			✓✓✓✓✓ BTEX									
PBOW 995809 - 1'	6-9-99	14:47	SOIL			1												
PBOW 995810 - 1'	6-10-99	8:57	SOIL			1												
PBOW 995811 - 2' 6" TRIP BEAK	-	-	-			2	N/A											

Special Instructions

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown				Sample Disposal <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Turn Around Time Required <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush				OC Level <input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.					
1. Relinquished By <i>Darrell D.</i>		Date <b>6-10-99</b>		Time <b>14:10</b>		1. Received By		Date	Time
2. Relinquished By		Date		Time		2. Received By		Date	Time
3. Relinquished By		Date		Time		3. Received By <i>Darrell R. Davis</i>		Date <b>6-11-99</b>	Time <b>1000A</b>

Comments

## Appendix G - Geotechnical Data



**GRAIN SIZE DATA**



ENGINEERING • TESTING • INSPECTION

**APPLIED CONSTRUCTION TECHNOLOGIES, INC.**

210 HAYES DRIVE • SUITE C • CLEVELAND, OHIO 44131 • (216) 459-TEST • FAX (216) 459-8954  
478 E. EXCHANGE ST. • SUITE 202 • AKRON, OHIO 44304 • (330) 253-TEST • FAX (330) 253-3462

June 28, 1999

Quanterra, Inc.  
4101 Shuffel Drive  
North Canton, Ohio 44720

Attention: Ms. Debora A. Hula

SUBJECT: LAB TEST RESULTS  
FOR TWO SUBMITTED SAMPLES  
CLIENT CODE: 383620  
LAB P.O. SR016700

ACT PROJECT NO. 9901.16  
Report No. 17 - 28 June 1999

Enclosed are grain size analysis results for two jar samples of soil with organics submitted to ACT on June 12, 1999. Grain size analyses, which included a hydrometer for all of the samples, were performed per ASTM D-422, and samples were visually classified per ASTM D-2487. Materials submitted were non-plastic.

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

by:

GEORGE WOZNIAK, C.E.T.  
Manager - Materials Laboratory

GW:jh





U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB03-1'

General Chemistry

Lot-Sample #....: A9F160102-004    Work Order #....: CWX45    Matrix.....: SOLID  
Date Sampled....: 06/09/99 13:30    Date Received...: 06/11/99  
% Moisture.....: 14

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	5.2 Dilution Factor: 1		No Units	SW846 9045C	06/11/99	9169204
Percent Solids	86.2 Dilution Factor: 1	0.10	%	MCWW 160.3 MOD	06/17-06/18/99	9168143
Total Organic Carbon	8300 Dilution Factor: 1	120	mg/kg	SMCA WALKLEY-BLAC	07/05/99	9186124

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-2'9"

General Chemistry

Lot-Sample #....: A9F160102-011    Work Order #....: CWX4E    Matrix.....: SOLID  
 Date Sampled....: 06/09/99 16:38    Date Received...: 06/11/99  
 % Moisture.....: 18

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	6.3		No Units	SW846 9045C	06/11/99	9169204
	Dilution Factor: 1					
Percent Solids	82.5	0.10	%	MCAW 160.3 MOD	06/17-06/18/99	9168143
	Dilution Factor: 1					
Total Organic Carbon	14000	120	mg/kg	SMCA WALKLEY-BLAC	07/05/99	9186124
	Dilution Factor: 1					

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A9F160102

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Total Organic Carbon	110	Work Order #: CXP61102 (69 - 130)	LCS Lot-Sample#: A9G050000-124 SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A9F160102

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Solids	ND	0.10	%	MCAWW 160.3 MOD	06/17-06/18/99	9168143
		Dilution Factor: 1				
Percent Solids	ND	0.10	%	MCAWW 160.3 MOD	06/22-06/23/99	9173141
		Dilution Factor: 1				
Total Organic Carbon	ND	100	mg/kg	SMCA WALKLEY-BLAC	07/05/99	9186124
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102      Work Order #....: CWTRH-SMP      Matrix.....: SOLID

CWTRH-DUP

Date Sampled....: 06/10/99 09:30    Date Received...: 06/11/99

% Moisture.....: 6.6

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
		<u>RESULT</u>		<u>RPD</u>	<u>LIMIT</u>		<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Solids	93.4	93.4	%	0.006	(0-20)	SD Lot-Sample #: A9F140104-017	06/22-06/23/99	9173141

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

**SAMPLE DUPLICATE EVALUATION REPORT**

General Chemistry

Client Lot #....: A9F160102      Work Order #....: CWV8R-SMP      Matrix.....: SOLID

CWV8R-DUP

Date Sampled....: 06/11/99      Date Received...: 06/12/99

% Moisture.....: 9.8

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Organic Carbon	16000	16000	mg/kg	0.54	(0-20)	SD Lot-Sample #: A9F140142-014 SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102      Work Order #....: CWX4E-SMP      Matrix.....: SOLID

CWX4E-DUP

Date Sampled....: 06/09/99 16:38      Date Received...: 06/11/99

% Moisture.....: 18

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Solids	82.5	82.1	%	0.53	(0-20)	SD Lot-Sample #: A9F160102-011 MCAWW 160.3 MOD	06/17-06/18/99	9168143

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9F160102      Work Order #...: CWX4N-SMP      Matrix.....: SOLID

CWX4N-DUP

Date Sampled...: 06/09/99 17:50      Date Received...: 06/11/99

% Moisture.....: 17

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Solids	83.3	82.9	%	0.39	(0-20)	SD Lot-Sample #: A9F160102-015 MCAWW 160.3 MOD	06/22-06/23/99	9173141

Dilution Factor: 1

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

**SAMPLE DUPLICATE EVALUATION REPORT**

**General Chemistry**

Client Lot #...: A9F160102      Work Order #...: CWX45-SMP      Matrix.....: SOLID

CWX45-DUP

Date Sampled...: 06/09/99 13:30      Date Received...: 06/11/99

% Moisture.....: 14

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u> <u>RESULT</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u> <u>LIMIT</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Percent Solids	86.2	87.2	%	1.1	(0-20)	SD Lot-Sample #: A9F160102-004 MCAWW 160.3 MOD	06/17-06/18/99	9168143

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102

Work Order #....: CWX5E-SMP  
CWX5E-DUP

Matrix.....: SOLID

Date Sampled....: 06/11/99 18:19 Date Received...: 06/14/99

‡ Moisture.....: 12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Organic Carbon	8100	7800	mg/kg	3.4	(0-20)	SD Lot-Sample #: A9F160105-002 SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.  
Results and reporting limits have been adjusted for dry weight.

## Appendix H - Variance Report

## Variance Report

For the purpose of this investigation, variances are defined as necessary changes or modifications to the planned activities as specified by the Quality Assurance Project Plan (QAPP). Variances do not significantly affect the quality of the data or process being modified. The following are the variances that occurred during this investigation.

**Variance#1:** All subsurface soil samples at the four locations (40 feet North, South, East, and West) around each tank were collected for laboratory analyses regardless of screening data.

***Justification:*** The field team leader made this decision based on the low readings of the headspace screening. The QAPP required that only additional 4-5 samples would be selected based on the highest field screening results of the subsurface soils.

***Impact:*** This action had no adverse effects on the quality of the data. This action increased the number of samples obtained for chemical analyses within close proximity of the tank locations.

**Variance#2:** Surface water and sediment samples were not collected from drainage ditches and the surface water depression at the site.

***Justification:*** The field team leader made this decision based on the low headspace screening results indicating that there was no contamination at the tank locations.

***Impact:*** These potential migration pathways were not sampled. The laboratory analytical results indicated the field team leader assumption was confirmed. No contamination source was identified. Therefore, there was no need to sample the potential migration pathways. There was no impact on the quality of the data and information collected.

**Variance #3:** The sample identification procedures set forth in the QAPP (USACE, 1999) were not followed.

*Justification:* The sample identification numbers were assigned, however the field team leader included the sample depths within the identification number.

*Impact:* There will be no significant effects on the quality of data and information collected.

**Appendix I - Environmental Information  
and Imaging Services (ERIIS) Data**

## ERIIS REPORT OVERVIEW

The following features are available for an ERIIS report:

- \* Database Report
  - \* Statistical Profile
  - \* Database Records
- \* Related Maps
  - \* Digital Custom Plotted Map
  - \* Sanborn Fire Insurance Map(s)
  - \* Topographical Map(s)

### **Statistical Profile**

The statistical profile is an at-a-glance numeric summary of the databases searched for your ERIIS Report.

### **Database Records**

The detailed federal and state database information indicates potential and actual environmental threats within the study radius. These records are sorted by their distance from the study site.

### **Digital Custom Map**

The digital custom map is cross referenced with the database records. The cross-in-circle in the center of the map represents the study site. The red circles represent distances from the study site. The plottable sites in the report are distinguished on the map by symbols of different shape and color.

### **Historic Fire Insurance Maps**

The ERIIS collection of historical Sanborn Fire Insurance Maps covers 14,000 cities and towns. These maps may indicate prior use of the study site. If no maps are available for the study site, a notice to that effect is included. This notice should serve as evidence of due diligence.

### **Topographical Map**

USGS topographical maps show natural and man-made features as well as the shape and elevation of the terrain. The 7.5 minute quad maps are produced at a scale of 1:24,000, or one inch represents 2,000 feet.

If you have any questions about this report,  
please contact ERIIS Customer Service at 1-800-989-0403

ERIIS CORRIDOR STATISTICAL PROFILE  
State: OH

ERIIS Report #317596A

Mar 4, 1995

Site:  
SOUTH OF SANDUSKY  
SANDUSKY, OH

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<u>Database</u>	<u>Plotted Sites</u>
NPL	0
RCRIS_CA	0
RCRIS_TS	1
CERCLIS	0
NFRAP	1
RCRIS_LG	0
RCRIS_SG	1
ERNS	0
HWS	1
LRST	6
SWF	0
RST	9
	<hr/>
	19

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NR in a radius count indicates that the database cannot be reported by this search criteria due to insufficient and/or inaccurate addresses reported by a federal/state agency.

**ENVIRONMENTAL RISK INFORMATION & IMAGING SERVICES  
DATABASE REFERENCE GUIDE**

**NPL**  
Date of Data: 10/14/1998  
Release Date: 10/20/1998  
Date on System: 11/20/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
703/603-8881  
Date of Last Contact: 11/02/1998

**National Priorities List**

The NPL Report is an EPA listing of the nation's worst uncontrolled or abandoned hazardous waste sites. NPL sites are targeted for possible long-term remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. In addition, the NPL Report includes information concerning cleanup agreements between EPA and Potentially Responsible Parties (commonly called Records of Decision, or RODs), any liens filed against contaminated properties, as well as the past and current EPA budget expenditures tracked within the Superfund Consolidated Accomplishments Plan (SCAP).

**RCRIS CA**  
Date of Data: 07/01/1998  
Release Date: 09/18/1998  
Date on System: 12/04/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
800/424-9346  
Date of Last Contact: 11/04/1998

**Resource Conservation and Recovery Information System - TSD's Subject to Corrective Action**

The RCRIS\_CA Report contains information pertaining to hazardous waste treatment, storage, and disposal facilities (RCRA TSD's) which have conducted, or are currently conducting, a corrective action(s) as regulated under the Resource Conservation and Recovery Act. The following information is included within the RCRIS\_CA Report:  
- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)  
- Inspections & evaluations conducted by federal and state agencies  
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties  
- Information pertaining to corrective actions undertaken by the facility or EPA

**RCRIS TS**  
Date of Data: 07/01/1998  
Release Date: 09/18/1998  
Date on System: 12/04/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
800/424-9346  
Date of Last Contact: 11/04/1998

**Resource Conservation and Recovery Information System - Non-Corrective Action TSD Facilities**

The RCRIS\_TS Report contains information pertaining to facilities which either treat, store, or dispose of EPA regulated hazardous waste. The following information is also included in the RCRIS\_TS Report:  
- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)  
- Inspections & evaluations conducted by federal and state agencies  
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties

**CERCLIS**  
Date of Data: 10/14/1998  
Release Date: 10/20/1998  
Date on System: 11/13/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
703/603-8881  
Date of Last Contact: 11/02/1998

**Comprehensive Environmental Response, Compensation, and Liability Information System**

The CERCLIS Database is a comprehensive listing of known or suspected uncontrolled or abandoned hazardous waste sites. These sites have either been investigated, or are currently under investigation by the U.S. EPA for the release, or threatened release of hazardous substances. Once a site is placed in CERCLIS, it may be subjected to several levels of review and evaluation, and ultimately placed on the National Priorities List (NPL). In addition to site events and milestone dates, the CERCLIS Report also contains financial information from the Superfund Consolidated Accomplishments Plan (SCAP).

**NFRAP**  
Date of Data: 10/14/1998  
Release Date: 10/20/1998  
Date on System: 11/13/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
703/603-8881  
Date of Last Contact: 11/02/1998

**No Further Remedial Action Planned Sites**

The No Further Remedial Action Planned Report (NFRAP), also known as the CERCLIS Archive, contains information pertaining to sites which have been removed from the U.S. EPA's CERCLIS Database. NFRAP sites may be sites where, following an initial investigation, either no contamination was found, contamination was removed quickly without need for the site to be placed on the NPL, or the contamination was not serious enough to require federal Superfund action or NPL consideration.

**RCRIS LG**  
Date of Data: 07/01/1998  
Release Date: 09/18/1998  
Date on System: 12/04/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
800/424-9346  
Date of Last Contact: 11/04/1998

**Resource Conservation and Recovery Information System - Large Quantity Generators**

The RCRIS\_LG Report contains information pertaining to facilities which either generate more than 1000kg of EPA regulated hazardous waste per month, or meet other applicable requirements of the Resource Conservation and Recovery Act. The following information is also included in the RCRIS\_LG Report:  
- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)  
- Inspections & evaluations conducted by federal and state agencies  
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties  
- Information pertaining to corrective actions undertaken by the facility or EPA

ENVIRONMENTAL RISK INFORMATION & IMAGING SERVICES  
DATABASE REFERENCE GUIDE

**RCRIS SG**

Date of Data: 07/01/1998  
Release Date: 08/18/1998  
Date on System: 12/04/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
800/424-9346  
Date of Last Contact: 11/04/1998

**Resource Conservation and Recovery Information System - Small Quantity Generators**

The RCRIS SG Report contains information pertaining to facilities which either generate between 100kg and 1000kg of EPA regulated hazardous waste per month, or meet other applicable requirements of the Resource Conservation and Recovery Act. On advice of the U.S. EPA, ERIS does not report so-called "RCRA Protective Filers." Protective Filers, commonly called Conditionally Exempt Small Quantity Generators (CESQG's), are facilities that have completed RCRA notification paperwork, but are not, in fact, subject to RCRA regulation. The determination of CESQG status is made by the U.S. EPA. The following information is also included in the RCRIS SG Report:  
- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)  
- Inspections & evaluations conducted by federal and state agencies  
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties  
- Information pertaining to corrective actions undertaken by the facility or EPA

**ERNS**

Date of Data: 10/08/1998  
Release Date: 10/09/1998  
Date on System: 11/13/1998  
US Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
202/260-2342  
Date of Last Contact: 10/19/1998

**Emergency Response Notification System**

ERNS is a national computer database system that is used to store information concerning the sudden and/or accidental release of hazardous substances, including petroleum, into the environment. The ERNS Reporting System contains preliminary information on specific releases, including the spill location, the substance released, and the responsible party. Please note that the information in the ERNS Report pertains only to those releases that occurred between January 1, 1997 and October 8, 1998.

**HWS**

Date of Data: 01/02/1998  
Release Date: 01/02/1998  
Date on System: 02/27/1998  
OH Environmental Protection Agency  
Emergency and Remedial Response Division  
614/644-2924  
Date of Last Contact: 08/19/1998

**Ohio Master Sites List**

The Ohio Master Sites List tracks sites in Ohio where hazardous waste has been found or where there are any known, suspected, or likely release of such wastes from a facility.

**PST**

Date of Data: 10/01/1998  
Release Date: 11/20/1998  
Date on System: 12/04/1998  
OH Office of the State Fire Marshal  
Bureau of Licensing and Certification  
614/752-7924  
Date of Last Contact: 12/01/1998

**Ohio Leaking Underground Storage Tank Report**

The Ohio Leaking Underground Storage Tank Report (formerly The Petroleum Underground Storage Tank Release Incident Report, or PUSTRI) is a comprehensive listing of all reported active and inactive leaking underground storage tanks located within the State of Ohio.

**SWF**

Date of Data: 12/31/1997  
Release Date: 02/01/1998  
Date on System: 03/11/1998  
OH Environmental Protection Agency  
Division of Solid Waste Management  
614/644-3135  
Date of Last Contact: 10/16/1998

**Ohio Solid Waste Facility List**

The Ohio Solid Waste Facility List contains information pertaining to all active and closed permitted solid waste landfills and processing facilities within the State of Ohio.

**RST**

Date of Data: 10/01/1998  
Release Date: 10/01/1998  
Date on System: 10/01/1998  
OH Office of the State Fire Marshal  
Bureau of Licensing and Certification  
614/752-7924  
Date of Last Contact: 10/26/1998

**Ohio Underground Storage Tank Report**

The Ohio Underground Storage Tank Report is a comprehensive listing of all registered active and inactive underground storage tanks located within the State of Ohio.

## ERIS SUMMARY OF PLOTTABLE SITES

ERIS Report #317596A

Mar 4, 1999

FRIIS ID.	FACILITY/ADDRESS	DATABASE	DISTANCE FROM SITE	MAP ID
J05009583	HEMMINGER FARMS 1118 FOX RD SANDUSKY, OH 44870-8367 COUNTY: ERIE	LRST	Corridor	9583
39005013250	NASA 6100 CLEVELAND AVE SANDUSKY, OH 44870 COUNTY: ERIE	LRST	Corridor	3250
39005013251	NASA 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3251
39013000073	NASA LERC PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RCRIS_TS	Corridor	73
39039000797	NASA PLUM BROOK 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NFRAP	Corridor	797
39005013257	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3257
39010005044	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5044
39010005045	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5045
39010005046	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5046
10005047	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5047
39010005048	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5048
39010005049	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5049
39010005050	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5050
39010005051	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5051
39010005052	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5052
39005013258	NASA PLUMBROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3258
39005014705	PERKINS TRANSP. BUS GARAGE TAYLOR RD AT COLUMBUS AVE SANDUSKY, OH 44870 COUNTY: ERIE	LRST	Corridor	4705
39050000278	US NASA PLUM BROOK TAYLOR & COLUMBUS RD SANDUSKY, OH 44870 COUNTY: ERIE	HWS	Corridor	278
08010305	USDOI SANDUSKY BIOLOGICAL STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RCRIS_SG	Corridor	305

ERIS ENVIRONMENTAL DATA REPORT  
 RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM  
 RCRIS\_TS - PLOTTABLE SITES - PAGE 1

ERIS Report #317596A

Mar 4, 1999

ERIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39013000073 OH3800015379	NASA LERC PLUM BROOK STATION COUNTY: ERIE	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	FACILITY NOT REPORTED IN RAATS	Corridor Site		73

FACILITY VIOLATIONS

	<u>DATE DETERMINED:</u>	<u>DATE RESOLVED:</u>	<u>AREA OF VIOLATION:</u>
1.	08/24/1989	12/05/1991	GENERATOR-ALL REQUIREMENTS
2.	08/24/1989	12/05/1991	GENERATOR-LAND BAN REQUIREMENTS
3.	02/18/1992	05/20/1992	GENERATOR-ALL REQUIREMENTS

FACILITY EVALUATIONS

	<u>EVALUATION DATE:</u>	<u>EVALUATING AGENCY:</u>	<u>TYPE OF EVALUATION:</u>	<u>AREA(S) OF EVALUATION:</u>
1.	08/24/1989	STATE	COMPLIANCE EVALUATION INSPECTION	GENERATOR-ALL REQUIREMENTS GENERATOR-LAND BAN REQUIREMENTS
2.	02/18/1992	STATE	COMPLIANCE EVALUATION INSPECTION	GENERATOR-ALL REQUIREMENTS GENERATOR-LAND BAN REQUIREMENTS

FACILITY ENFORCEMENTS

	<u>ENFORCEMENT DATE:</u>	<u>ENFORCING AGENCY:</u>	<u>TYPE OF ACTION:</u>	<u>PENALTY(S):</u>
1.	08/21/1990	EPA	WRITTEN, INFORMAL ADMINISTRATIVE ACTION	
2.	02/28/1992	STATE	WRITTEN, INFORMAL ADMINISTRATIVE ACTION	

ERIIS ENVIRONMENTAL DATA REPORT  
CERCLIS NO FURTHER REMEDIAL ACTION PLANNED SITES  
NFRAP - PLOTTABLE SITES - PAGE 1

ERIIS Report #317586A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39039000797 OH3800015379	NASA PLUM BROOK COUNTY: ERIE	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329	Corridor		797
	<u>SITE EVENT(S)</u> DISCOVERY PRELIMINARY ASSESSMENT STATE, FUND FINANCED	<u>COMPLETE DATE</u> 08-01-1983 08-01-1984 09-30-1994			

ERIIS ENVIRONMENTAL DATA REPORT  
RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM  
RCRI8\_SG - PLOTTABLE SITES - PAGE 1

ERIIS Report #317586A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
38008010305 OH3143890250	USDOJ SANDUSKY BIOLOGICAL STATION COUNTY: ERIE	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329	FACILITY NOT REPORTED IN RAATS	Corridor Site		305

ERIIS ENVIRONMENTAL DATA REPORT  
OHIO MASTER SITES LIST  
HWS - PLOTTABLE SITES - PAGE 1

ERIIS Report #317598A

Mar 4, 1999

ERIIS ID US EPA ID. OH EPA ID.	FACILITY	ADDRESS	PRIORITY	DELISTED(Y/N)	MAP ID
39050000278 OH3800015379 322-0552	US NASA PLUM BROOK DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	TAYLOR & COLUMBUS RD SANDUSKY, OH 44870 COUNTY: ERIE	NO PRIORITY	NOT REPORTED	278

ERIS ENVIRONMENTAL DATA REPORT  
OHIO LEAKING UNDERGROUND STORAGE TANKS  
LRST - PLOTTABLE SITES - PAGE 1

ERIS Report #317598A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39005009583	HEMMINGER FARMS	1118 FOX RD SANDUSKY, OH 44870-8367	ERIE	Corridor Site		9583
<u>INCIDENT NO.</u> 220219400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.				
39005014705	PERKINS TRANSP. BUS GARAGE	TAYLOR RD AT COLUMBUS AVE SANDUSKY, OH 44870	ERIE	Corridor Site		4705
<u>INCIDENT NO.</u> 228167200	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				
39005013260	NASA	8100 CLEVELAND AVE SANDUSKY, OH 44870	ERIE	Corridor Site		3250
<u>INCIDENT NO.</u> 22936903 22936902	<u>STATUS</u> INITIAL CORRECTIVE ACTION NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM AN UST NOT REGULATED BY RCRA SUBTITLE I. ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.				
39005013251	NASA	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3251
<u>INCIDENT NO.</u> 22936901 22936907 22936905 22936906 22936908 22936904	<u>STATUS</u> NO FURTHER ACTION NO FURTHER ACTION INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST. ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST.				
39005013257	NASA PLUM BROOK STATION	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3257
<u>INCIDENT NO.</u> 22936910	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				
39005013258	NASA PLUMBROOK STATION	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3258
<u>INCIDENT NO.</u> 22936911	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				

ERIIS ENVIRONMENTAL DATA REPORT  
OHIO UNDERGROUND STORAGE TANKS  
RST - PLOTTABLE SITES - PAGE 1

ERIIS Report #317598A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER	MAP ID	
39010005044 0-227802	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135	PETER W. MCCALLUM (216) 433-8852	5044	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	28	REMOVED	NOT REPORTED	3,000	55	BARE STEEL
	29	REMOVED	NOT REPORTED	770	33	BARE STEEL
	30	REMOVED	NOT REPORTED	770	33	BARE STEEL
	31	REMOVED	NOT REPORTED	770	33	BARE STEEL
39010005045 0-227803	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5045	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	32	REMOVED	USED OIL	1,500	55	BARE STEEL
39010005046 0-227804	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5046	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	201	CURRENTLY IN USE	GASOLINE	8,000	8	FIBERGLASS
	202	CURRENTLY IN USE	DIESEL	8,000	8	FIBERGLASS
39010005047 0-227805	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5047	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	37	REMOVED	NOT REPORTED	12,000	18	BARE STEEL
	38	REMOVED	NOT REPORTED	12,000	18	BARE STEEL
39010005048 0-227806	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5048	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	39	REMOVED	UNK	250	UNK	UNKNOWN
39010005049 0-227807	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5049	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	23	REMOVED	USED OIL	500	36	BARE STEEL
39010005050 0-227808	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5050	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	24	REMOVED	USED OIL	1,000	29	BARE STEEL

ERIS ENVIRONMENTAL DATA REPORT  
OHIO UNDERGROUND STORAGE TANKS  
RST - PLOTTABLE SITES - PAGE 2

ERIS Report #317588A

Mar 4, 1989

ERIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER	MAP ID	
39010005051 0-227809	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5081	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	28	REMOVED	NOT REPORTED	11,000	29	BARE STEEL
	27	REMOVED	NOT REPORTED	11,000	29	BARE STEEL
39010005052 0-227810	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	8100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5052	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	35	REMOVED	GASOLINE	8,000	55	BARE STEEL

## Unplottable Sites

The remaining report pages list additional environmental sites that have been selected based on geographic criteria unique to your study site. They are classified as "unplottable sites" and require further investigation to assess their potential impact on your site.

### How to Evaluate Unplottable Sites

#### Step 1

**Streets Within the Radius:** the following page is an alphabetical index of all streets that intersect or are contained within the largest study radius (usually one mile).

#### Step 2

**Cross-Reference:** use the "Streets Within the Radius" index to cross-reference the unplottable sites. For example, if Maple Avenue and Oak Avenue are listed in the street index, then any unplottable sites with a Maple Avenue or Oak Avenue address should be checked for possible impact on study site.

### Questions on ERIIS' Proprietary Geocoding?

We're happy to answer any questions you might have about our data processing and **point-geocoding** (assigning a latitude and longitude to each address). Just give us a call on our toll-free number at (800) 989-0402 and let us know what state you're calling from. Our customer service staff is available from 8 a.m. to 8 p.m. (EST).

### The ASTM Standard Practice For Environmental Site Assessments

As stated in the recently published **Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E1527)** by the American Society for Testing and Materials (ASTM):

"For large databases with numerous facility records (such as RCRA hazardous waste generators and registered underground storage tanks), the records are not practically reviewable unless they can be obtained from the source agency in the smaller geographic area of ZIP code (3.3.24)."

Therefore, this Report contains information available by latitude/longitude or by ZIP code. If your research requires environmental records for which only city or county information is available (i.e., no valid street or ZIP code) ERIIS will include this data at no extra charge.

ERIS LIST OF STREETS IN THE RADIUS

ERIS Report #317596A

Mar 4, 1999

STREET NAME

BIRCHWOOD DR  
E BOGART ROAD  
W BOGART ROAD  
BOSTON ROAD  
BOTAY ROAD  
BOUY ROAD  
BOX FACTORY ROAD  
CAMBRIDGE CIR  
CAMPBELL ST  
CLARK ROAD  
COLUMBUS AVE  
COUNTRY PLACE DR  
DALLAS AVE  
DEERFIELD LANE  
DENVER AVE  
FOX ROAD  
HARTFORD AVE  
INDIANA AVE  
INDUSTRIAL PKY  
KIRKWOOD TER  
LAKE CT  
S LAKE WILMER DR  
LINDEN WAY  
LINDEN WAY DR  
LISBON CIR  
LONDON ROAD  
N MAGAZINE ROAD  
MAINTENANCE ROAD  
MASON ROAD  
MEMPHIS AVE  
MICHIGAN AVE  
MILAN ROAD  
NORMANDY CT  
OHIO TER  
PARKWAY S  
PATROL ROAD  
PATTEN TRACT ROAD  
PENNSYLVANIA AVE  
PENTOLITE ROAD  
RANSOM ROAD  
RICHMOND CIR  
SCHEID ROAD  
SCHENK ROAD  
SHORT CUT ROAD  
STATE HWY 2  
SWANO DR  
TAYLOR ROAD  
US HWY 250  
VIRGINIA AVE  
WALT LAKE TRL

**ERIS SUMMARY OF UNPLOTTABLE SITES**  
(Facilities sorted alphabetically within ZIP Code)

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID.	FACILITY/STREET	CITY/STATE/ZIP/COUNTY	DATABASE
J005021849	BOB GARBA-FRANKLIN FLATS 90801 RIVER VIEW DR	HURON, OH 44839 COUNTY: ERIE	LRST
39005022207	CONSOLIDATED ELECTRIC 1901 SAWMILL INDUSTRIAL PKWY	HURON, OH 44839 COUNTY: ERIE	LRST
39010004952	DANIEL & CAROL LAPP 2112 CLEVELAND RD	HURON, OH 44839 COUNTY: ERIE	RST
39005022311	DANIEL LAPP 2112 CLEVELAND AVE	HURON, OH 44839 COUNTY: ERIE	LRST
39010019398	DENNIS MICHELSON 2416 CLEVELAND SANDUSY RD	HURON, OH 44839 COUNTY: ERIE	RST
39010005028	ERIE COUNTY LANDFILL HOOVER RD	HURON, OH 44839 COUNTY: ERIE	RST
39005022468	ERIE CTY LANDFILL HOOVER RD	HURON, OH 44839 COUNTY: ERIE	LRST
39005022729	GASTOWN 3674 2103 CLEVELAND	HURON, OH 44839 COUNTY: ERIE	LRST
38005022843	GTE NORTH, INC. MAIN ST	HURON, OH 44839 COUNTY: ERIE	LRST
39010005038	GTE NORTH, INC. MAIN & SHIRLEY	HURON, OH 44839 COUNTY: ERIE	RST
39018000056	HURON LIME COMPANY LANDFILL #1 RIVER RD	HURON, OH 44839 COUNTY: ERIE	SWF
118000052	HURON LIME COMPANY LANDFILL #2 PO BOX 451	HURON, OH 44839-0451 COUNTY: ERIE	SWF
39005023854	PRESTON TRUCKING CO 1711 SAWMILL INDUSTRIAL PKWY	HURON, OH 44839 COUNTY: ERIE	LRST
39010004878	RYE BEACH HY-MILER 2026 CLEVELAND RD	HURON, OH 44839 COUNTY: ERIE	RST
39005025012	YELLOW FREIGHT RYE BEACH RD	HURON, OH 44839 COUNTY: ERIE	LRST
39005021816	BFI SR 101	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39010004932	C.S.C. OIL CO. #484 607 PERKINS AVE	SANDUSKY, OH 44870 COUNTY: ERIE	RST
39005022026	CAUSEWAY DR LIFT STA 1300 CAUSEWAY DR	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39010004967	CEDAR POINT #1 CAUSEWAY DR	SANDUSKY, OH 44870 COUNTY: ERIE	RST
39005022195	COMMODORE PERRY SVC PLAZA MILE POST 100.0 SOUTH SIDE	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39008008756	ERIE COUNTY SCHOOLS 7142 TAYLOR-COLUMBUS AVE	SANDUSKY, OH 44870 COUNTY: ERIE	RCRIS_SG
39005022515	FARWELL ST LIFT STATION FARWELL ST	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39005022720	GAS AMERICA 7065 US RT 30	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39008008438	GORDON FOOD SERVICE INC 1415 HOLLAND RD	PERRYSBURG, OH 44870 COUNTY: ERIE	RCRIS_SG

ERIIS ENVIRONMENTAL DATA REPORT  
RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM  
RCRIS\_SG - UNPLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1989

ERIIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES
38008004325 OHD981786650	NORTHCOAST AUTO BODY COUNTY: ERIE	1944 ONE HALF MILAN RD SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
38008004832 OHD982211450	SOHIO OIL CO NO 06672 COUNTY: ERIE	RTE 2 AND RTE 250 SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
38008008758 OHR000003673	ERIE COUNTY SCHOOLS COUNTY: ERIE	7142 TAYLOR-COLUMBUS AVE SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
39008009438 OHR000025809	GORDON FOOD SERVICE INC COUNTY: ERIE	1415 HOLLAND RD PERRYSBURG, OH 44870	FACILITY NOT REPORTED IN RAATS

**ERIS ENVIRONMENTAL DATA REPORT**  
**EMERGENCY RESPONSE NOTIFICATION SYSTEM**  
**ERNS - UNPLOTTABLE SITES**

ERIS Report #317598A

Mar 4, 1999

ERIS ID REPORT NUMBER SOURCE AGENCY	SPILL CITY, STATE, ZIP CODE SPILL COUNTY	DISCHARGER NAME ORGANIZATION ADDRESS	MEDIA AFFECTED					SPILL DATE WATER WAY AFFECTED
			GRND	LAND	WATER	AIR	WATER	
39002000030 420277 NATL. RESPONSE CTR	SANDUSKY, OH 44870 ERIE	JIMS AUTO SALVAGE 1707 GEORGE STREET SANDUSKY, OH 44870	N	N	N	N	N	01/17/1998 STORM DRAIN/SOIL

LOCATION: Superior Street / Dead End, North Side Of Venice Road

DESCRIPTION: Caller States: Company Towed Many Vehicles Over 2 Days, Some Of The Vehicles Being Towed Spilled Gasoline And Motor Oil Onto The Roadway

MATERIAL SPILLED: Oil, Misc: Motor QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk  
 Oil: Diesel QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk  
 Gasoline: Automotive (4.23g Pb/g) QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk

ACTIONS TAKEN: None / Police Were Onscene, Were Going To Make Company Clean Up / Nothing Has Been Done To Date

MISCELLANEOUS: Sandusky Bay Is .5 Miles Away / Some Product Has Reached A Storm Drain And It Has Been Raining

ERIIS ENVIRONMENTAL DATA REPORT  
OHIO MASTER SITES LIST  
HWS - UNPLOTTABLE SITES

Mar 4, 1999

ERIIS Report #317590A

ERIIS ID US EPA ID. OH EPA ID.	FACILITY	ADDRESS	PRIORITY	DELISTED(Y/N)
39050000992 OHD980611487 362-0117		PORT CLINTON, OH 44870 COUNTY: ERIE	LOW	YES REASON: DSIWM SITE
39050000993 OHD980611487 362-0117		PORT CLINTON, OH 44870 COUNTY: ERIE	LOW	YES REASON: DSIWM REGULATION

ERIS ENVIRONMENTAL DATA REPORT  
OHIO LEAKING UNDERGROUND STORAGE TANKS  
LRST - UNPLOTTABLE SITES

ERIS Report #317598A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY
39005021849	BOB GARBA-FRANKLIN FLATS	90801 RIVER VIEW DR HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 228205100	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022207	CONSOLIDATED ELECTRIC	1901 SAWMILL INDUSTRIAL PKWY HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 224197300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022311	DANIEL LAPP	2112 CLEVELAND AVE HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 222179300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022468	ERIE CTY LANDFILL	HOOVER RD HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 397128300	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022729	GASTOWN 3674	2103 CLEVELAND HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 229105800	<u>STATUS</u> CORRECTIVE ACTIONS IN PROGRESS	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022843	GTE NORTH, INC.	MAIN ST HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 226093300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005023854	PRESTON TRUCKING CO	1711 SAWMILL INDUSTRIAL PKWY HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 224197400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005025012	YELLOW FREIGHT	RYE BEACH RD HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 220108100	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005021816	BFI	SR 101 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 221113001	<u>STATUS</u> DISPROVED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIS ENVIRONMENTAL DATA REPORT  
OHIO LEAKING UNDERGROUND STORAGE TANKS  
LRST - UNPLOTTABLE SITES

ERIS Report #317596A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY
39005022028	CAUSEWAY DR LIFT STA	1300 CAUSEWAY DR SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220128300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022195	COMMODORE PERRY SVC PLAZA	MILE POST 100.0 SOUTH SIDE SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 72948000	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022515	FARWELL ST LIFT STATION	FARWELL ST SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220078600	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022720	GAS AMERICA	7085 US RT 30 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 880063800	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005023788	PETERSON LIFT STATION	PETERSON LN SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 222274400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024063	SANDUSKY BD OF EDUCATION	8118 CAMP ST SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 222173700	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024532	UNITED PARCEL SERV	PERKINS AVE SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220165100	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024817	UNKNOWN	PERKINS TOWNSHIP SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 22704500	<u>STATUS</u> DISPROVED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005024819	UNKNOWN	RAMADA & US RT 250 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 221060800	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIS ENVIRONMENTAL DATA REPORT  
OHID LEAKING UNDERGROUND STORAGE TANKS  
LRST - UNPLOTTABLE SITES

ERIS Report #317596A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY
39005024848	UNKNOWN (CITY WATER/SEWER LINE)	SR 101 SANDUSKY, OH 44870	ERIE
INCIDENT NO. 22113000	STATUS REPORTED	LUST TRUST FUND (LTF) ELIGIBILITY ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIIS ENVIRONMENTAL DATA REPORT  
OHIO SOLID WASTE FACILITIES  
SWF - UNPLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY ADDRESS	OPERATOR ADDRESS
39018000058 22-00-04	HURON LIME COMPANY LANDFILL #1 RIVER RD HURON, OH 44839 COUNTY: ERIE  FACILITY TYPE: INDUSTRIAL SW LF CAPACITY: NOT REPORTED	H J MICHAELS HURON LIME COMPANY NOT REPORTED NOT REPORTED (419) 433-2141  FACILITY STATUS: CLOSED
39018000052 22-00-05	HURON LIME COMPANY LANDFILL #2 PO BOX 451 HURON, OH 44839-0451 COUNTY: ERIE  FACILITY TYPE: INDUSTRIAL SW LF CAPACITY: NOT REPORTED	A.J. PARIS, HURON LIME COMPANY PO BOX 451 HURON, OH 44839 (419) 433-2141  FACILITY STATUS: ACTIVE
39018000388	HENSEN DUMP AKA HURON LIME CO. #2 WEST SIDE OF RIVER ROAD, 1/2 MILE HURON TOWNSHIP, OH COUNTY: ERIE  FACILITY TYPE: PRIVATE, LIME SLUDGE CAPACITY: 12 ACRES	NOT REPORTED NOT REPORTED NOT REPORTED NOT REPORTED  FACILITY STATUS: CLOSED 1982

ERIS ENVIRONMENTAL DATA REPORT  
OHIO UNDERGROUND STORAGE TANKS  
RST - UNPLOTTABLE BITES

ERIS Report #317596A

Mar 4, 1999

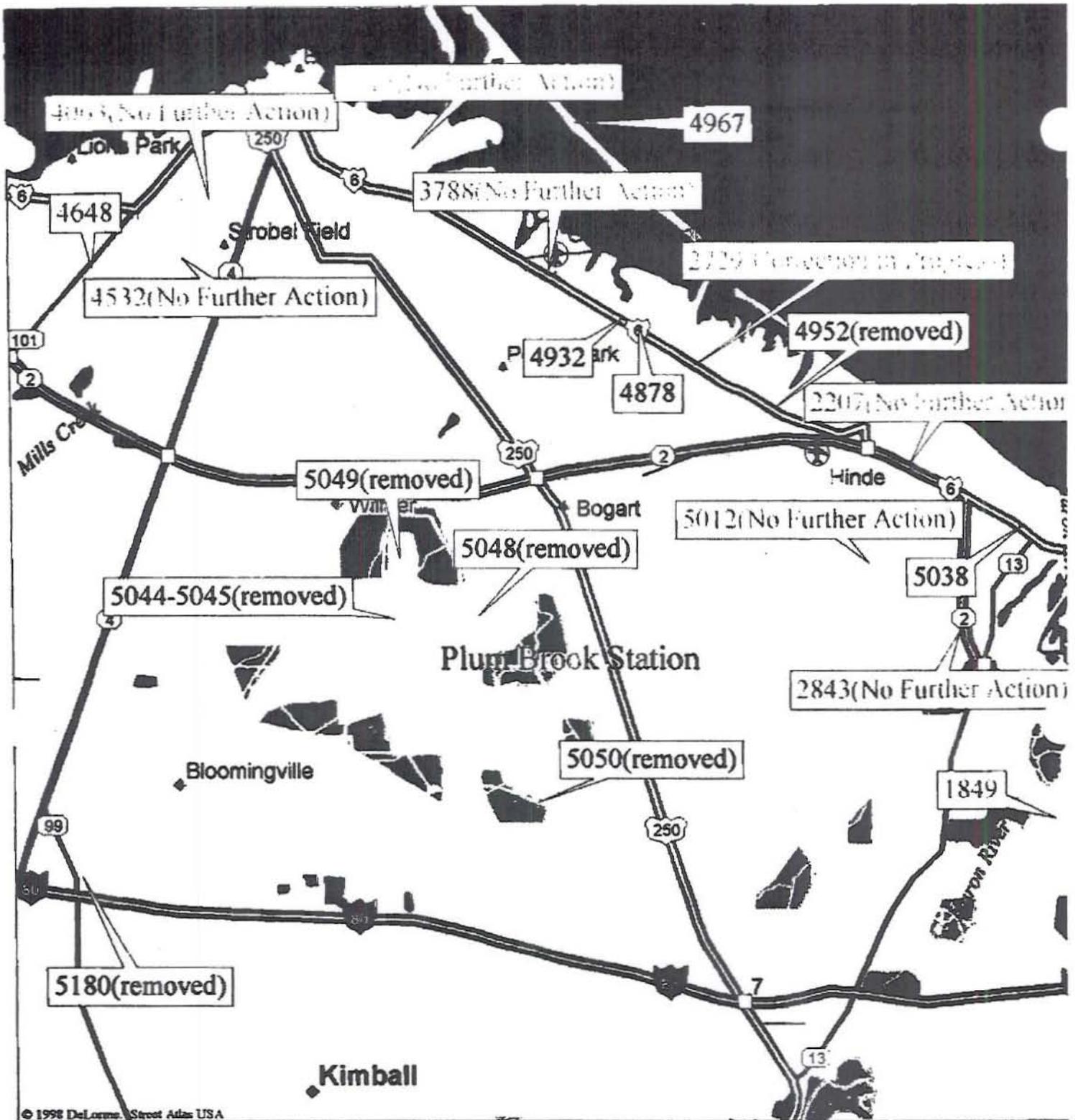
ERIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER		
39010004878 0-220041	RYE BEACH HY-MILER	2028 CLEVELAND RD HURON, OH 44839 COUNTY: ERIE	DISTRICT PETROLEUM PRODUCTS, INC 1832 MILAN RD SANDUSKY, O 44870	MIKE STIPP		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	GASOHOL	10,000	23	FIBERGLASS	
2	CURRENTLY IN USE	GASOHOL	4,000	23	BARE STEEL	
3	CURRENTLY IN USE	GASOHOL	6,000	23	BARE STEEL	
4	CURRENTLY IN USE	GASOHOL	6,000	23	BARE STEEL	
5	CURRENTLY IN USE	KEROSENE	2,000	23	BARE STEEL	
6	TEMPORARILY OUT OF USE	USED OIL	550	23	BARE STEEL	
39010004952 0-220235	DANIEL & CAROL LAPP	2112 CLEVELAND RD HURON, OH 44839 COUNTY: ERIE	DANIEL & CAROL LAPP 404 S HAMPTON CT HURON, OH 44839			
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
2	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
3	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
39010005028 0-225986	ERIE COUNTY LANDFILL	HOOVER RD HURON, OH 44839 COUNTY: ERIE	ERIE COUNTY COMMISSIONERS PO BOX 370 HURON, OH 44839	JACK R. MYERS		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	DIESEL	1,000	27	UNKNOWN	
39010005038 0-227135	GTE NORTH, INC.	MAIN & SHIRLEY HURON, OH 44839 COUNTY: ERIE	GTE NORTH, INC. 1300 COLUMBUS SANDUSKY RD N MARION, OH 43302	KEITH E. ZUSPAN		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
2	CURRENTLY IN USE	DIESEL	8,000	1	FIBERGLASS	
39010019398 0-220307	DENNIS MICHELSON	2416 CLEVELAND SANDUSY RD HURON, OH 44839 COUNTY: ERIE	DENNIS MICHELSON 8322 146TH ST SW EDMONDS, WA 98026			
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
2	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
3	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
4	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
39010004932 0-220181	C.S.C. OIL CO. #484	807 PERKINS AVE SANDUSKY, OH 44870 COUNTY: ERIE	C.S.C. OIL CO. 2210 GOLDSMITH LN - STE 108 LOUISVILLE, KY 40218	WILLIAM SHEPARD		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	
2	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	
3	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	

ERIS ENVIRONMENTAL DATA REPORT  
OHIO UNDERGROUND STORAGE TANKS  
RST - UNPLOTTABLE SITES

ERIS Report #317586A

Mar 4, 1989

ERIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER		
39010004967 0-220277	CEDAR POINT	#1 CAUSEWAY DR SANDUSKY, OH 44870 COUNTY: ERIE	CEDAR FAIR LIMITED PARTNERSHIP PO BOX 5006 SANDUSKY, OH 44870	RONALD K. FUSSNER		
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	10	CURRENTLY IN USE	GASOLINE	10,000	13	FIBERGLASS
	11	CURRENTLY IN USE	DIESEL	8,000	13	FIBERGLASS
	4	CURRENTLY IN USE	GASOLINE	2,500	8	FIBERGLASS
	6	CURRENTLY IN USE	USED OIL	2,500	7	FIBERGLASS
	7	CURRENTLY IN USE	DIESEL	6,000	7	FIBERGLASS
	8	CURRENTLY IN USE	GASOLINE	10,000	7	FIBERGLASS
	9	CURRENTLY IN USE	GASOLINE	10,000	13	FIBERGLASS
39010009258 0-380093	SANDUSKY STEEL & SUPPLY CO.	4957 RT 250 N NORWALK, OH 44870 COUNTY: ERIE	SANDUSKY STEEL & SUPPLY CO. 4957 RT 250 N MILAN, OH 44846	STEVE LICHTESSIEN		
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	1	REMOVED	GASOLINE	550	24	BARE STEEL
39010015180 0-720201	O.E. MEYER CO.	1520 E STATE ST SANDUSKY, OH 44870 COUNTY: ERIE	O.E. MEYER CO. PO BOX 479 SANDUSKY, OH 44870			
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	1	REMOVED	UNK	2,000	34	COMPOSITE
	2	REMOVED	UNK	2,000	34	UNKNOWN



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Mag 12.00

Tue Aug 10 14:12 1999

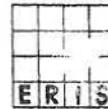
Scale 1:87,500 (at center)

2 Miles

2 KM

- Local Road
- Major Connector
- State Route
- Primary State Route
- Ferry
- Interstate/Limited Access
- Toll Highway
- US Highway

- Exit
- Utility/Pipe
- Railroad
- Small Town
- Airfield
- Park/Reservation
- Locale
- Public Airport



505 Huntmar Park Dr, Suite 200  
Herndon, VA 20170  
(703)834-0600 (800)989-0402  
FAX: (703)834-0606

## SITE INFORMATION

South Of Sandusky  
Sandusky, OH  
Sandusky County  
Job Number: 317596A  
Map Plotted: Mar 4, 1999

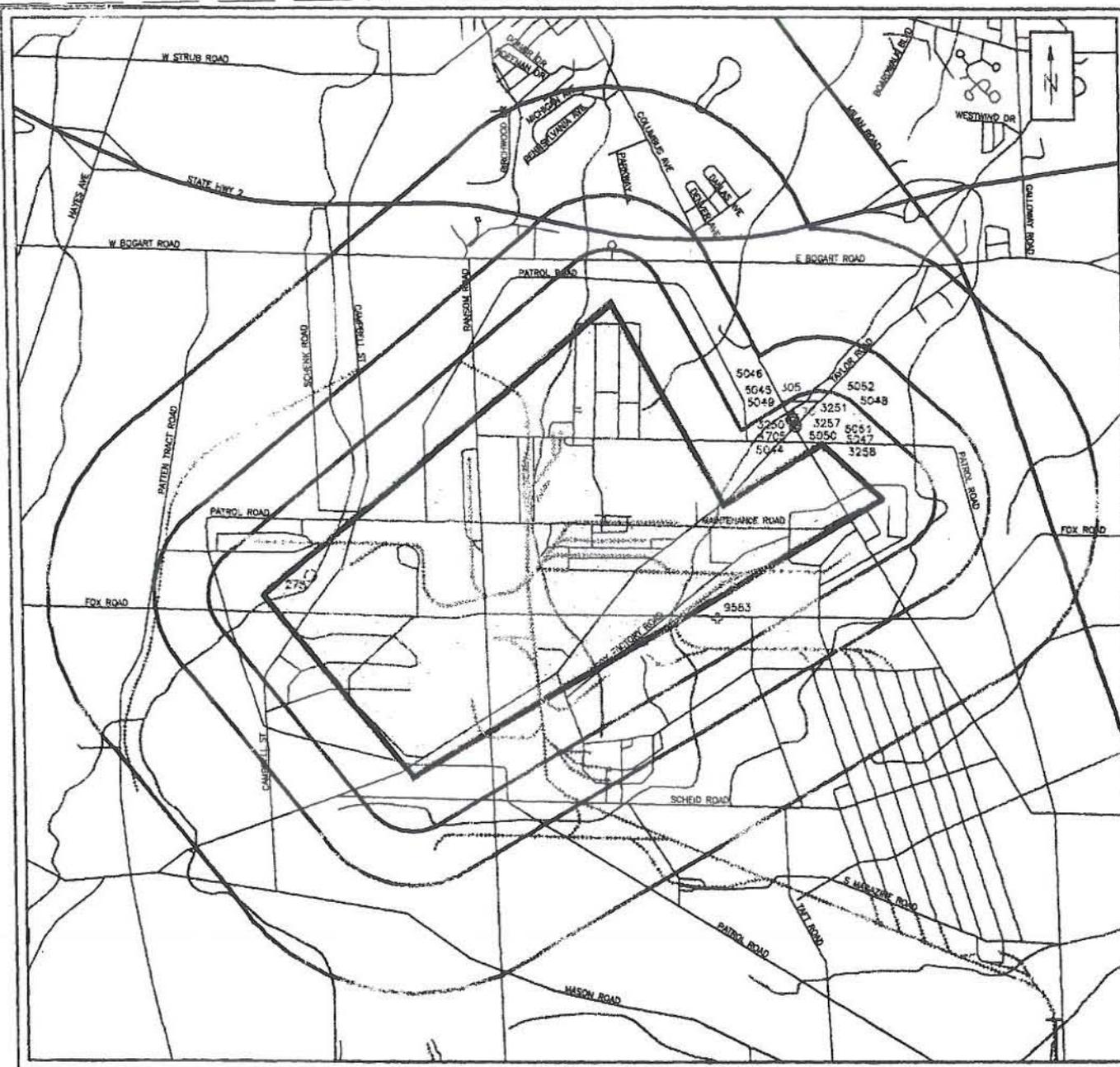
## MAP LEGEND

- Study Site
- ASTM Buffer
- Hydrography
- Railroads
- Roads
- Highways
- NPL 0 Sites
- RCRIS\_TS 1 Site
- RCRIS\_CA 0 Sites
- CERCLIS 0 Sites
- NFRAP 1 Site
- RCRIS\_LG 0 Sites
- RCRIS\_SG 1 Site
- ERNS 0 Sites
- HWS 1 Site
- LRST 6 Sites
- SWF 0 Sites
- RST 9 Sites

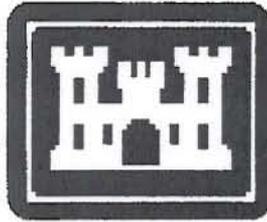
Miles



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## **Appendix J - Data Review / Data Validation**



**U.S. Army Corps  
of Engineers**  
Louisville District

# **Data Review and Data Validation**

for  
the former  
**Plum Brook Ordnance Works**

**Lower Toluene Tank Area**

Defense Environmental Restoration Program  
For  
Formerly Used Defense Sites  
Hazardous, Toxic and Radiological Waste

Sandusky, Ohio  
Project Number G05OH001824

July 2000

# **1 INTRODUCTION**

The United States Army Corps of Engineers (USACE), Louisville District (CELRL) has performed a QC Data Review and Data Validation for chemical data generated by Quanterra Incorporated, from soil samples collected at the Former Plum Brook Ordnance Works (PBOW), Lower Toluene Tank Area (LTTA). One hundred percent of the data underwent a data review and 10 percent of the data underwent full data validation. The data review and validation followed the general guidance provided in the National Functional Guidelines for Organic Review (EPA, 1999). While these guidance documents were written for methods following the Contract Laboratory Program (CLP) Statement of Work (SOW), the guidelines were used where appropriate for the validated methods.

The data review included the review of the sample results and the quality control summary forms, while the data validation additionally included the review of raw data. The specific elements included in the data review and validation processes are identified in the subsequent sections. Where required, data were qualified as U (nondetect), J (estimated) or R (rejected) based on the data review and validation procedures.

The report is organized such that Section 1 summarizes the results of the data review, validation and the data usability for the subject site investigation. Section 2 provides the details of the data review. Section 3 provides the details of the data validation.

## **1.1 Data Review Summary**

No samples were qualified based on the Data Review.

## **1.2 Validation Summary**

No samples were qualified based on the Data Validation.

## **1.3 Data Usability**

All data should be used for their intended purposes.

## 2 QC DATA REVIEW - Lower Toluene Tank Area (LTTA)

### Samples Collected for (LTTA) SI investigation

Sample Identification	Date Collected	Analyses
PBOW99SB01-1'	9 June 1999	BTEX
PBOW99SB02-1'	9 June 1999	BTEX
PBOW99SB02-3'9"	9 June 1999	BTEX
PBOW99SB03-1'	9 June 1999	BTEX
PBOW99SB03-3'5"	9 June 1999	BTEX
PBOW99SB04-1'4"	9 June 1999	BTEX
PBOW99SB04-4'2"	9 June 1999	BTEX
PBOW99SB05-1'	9 June 1999	BTEX
PBOW99SB05-4'	9 June 1999	BTEX
PBOW99SB06-1'	9 June 1999	BTEX
PBOW99SB06-2'9"	9 June 1999	BTEX
PBOW99SB06-4'	9 June 1999	BTEX
PBOW99SB07-1'	9 June 1999	BTEX
PBOW99SB07-1' DUP	9 June 1999	BTEX
PBOW99SB07-4'	9 June 1999	BTEX
PBOW99SB08-1'	9 June 1999	BTEX
PBOW99SB08-3'10"	9 June 1999	BTEX
PBOW99SB09-1'	9 June 1999	BTEX
PBOW99SB10-1'	9 June 1999	BTEX
PBOW99SB10-2'6"	9 June 1999	BTEX
TRIP BLANK	9 June 1999	BTEX

### 2.1 Data Package Completeness

*Were all items delivered as specified in the QAPP and COC?*

Yes.

### 2.2 Laboratory Case Narrative

*Were problems noted in the laboratory case narrative or cooler receipt form, which are not discussed in subsequent sections?*

No.

### 2.3 Sample Preservation and Holding Times

*Were samples properly preserved and extracted/analyzed within QAPP limits?*

The cooler containing the subject samples was received at the laboratory at a temperature of 1.2° C. This temperature was outside the recommended  $4 \pm 2^{\circ}\text{C}$  preservation temperature. The samples were intact and were not frozen. No qualifiers were assigned to the samples based on the cooler temperature exceeding the recommended preservation temperature. All samples were extracted and analyzed within the required holding times of 14 days as stated in the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

## **2.4 Blank Contamination**

*Were any target analytes detected in the Method Blanks or Trip Blanks?*

No.

## **2.5 Laboratory Control Sample**

*Were LCS recoveries within evaluation criteria?*

Yes.

## **2.6 Surrogate Recoveries**

*Were surrogate recoveries within evaluation criteria?*

Yes.

## **2.7 Matrix Spike and Matrix Spike Duplicate Recoveries and RPDs**

*Were MS/MSD samples analyzed and reported at the required frequency?*

Yes.

*Were MS/MSD sample recoveries and RPDs within evaluation criteria?*

Yes.

## **2.8 Lab Duplicate Results**

*Were lab duplicate samples analyzed at the required frequency?*

The laboratory did not prepare and analyze a laboratory duplicate for one of the subject samples. The laboratory, however, did prepare a laboratory control sample and laboratory control sample duplicate (LCS/LCSD). These samples served as the lab duplicates and were analyzed within the required frequency.

*Were the laboratory duplicate sample RPDs within the evaluation criteria?*

The LCS/LCSD RPDs were within the evaluation criteria.

## **2.9 Field Duplicate Results**

*Were field duplicate samples collected and analyzed for the subject site investigation?*

Yes.

*Were field duplicates within the evaluation criteria?*

Yes.

## **2.10 Sample Dilutions**

*Were samples diluted which exceed 10 X QAPP limits?*

No.

## **2.11 Additional Qualifications**

*Were additional qualifications applied?*

No.

### **3 FULL VALIDATION OF BTEX DATA - (LTTA)**

This section describes the full validation for two soil samples that were analyzed for BTEX compounds by USEPA SW-846 Method 8021B. Samples were analyzed by Quanterra Incorporated of North Canton, Ohio and submitted as part of sample delivery group (SDG) A9F160102. Samples included as part of this validation are listed below:

#### Sample Identification #

PBOW99SB01-1'

PBOW99SB10-2'6"

Evaluation of the analytical data followed procedures outlined in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Review (USEPA, 1999) where applicable to SW-846 Method 8021B. The evaluation criteria used during validation were a combination of those criteria presented in Method 8021B and the laboratory criteria based on historical data (performance based criteria).

Criteria evaluated included the following method performance criteria:

- Completeness of data package
- Significant problems identified in the Laboratory Case narrative
- Sample preservation and holding times
- GC/PID/FID instrument performance
- Initial Calibration
- Calibration Verification
- Method Blank
- Surrogate recoveries
- Laboratory control samples
- MS/MSD samples
- Internal standard areas and retention times
- Target compound identification and quantitation
- Overall assessment of the data

#### **3.1 Data Package Completeness**

The data package was reviewed to make certain that it contained the data contractually required in the deliverable received from the laboratory. This included checking the data package for the results of each analyte requested, for each field sample submitted in the analytical batch, along with requested QC documentation and raw data for the respective methods. The data package was complete for this validation.

### **3.2 Problems Identified in the Laboratory Case Narrative**

The case narrative indicated that the laboratory received the subject samples outside of temperature preservation criteria. This issue is discussed in the appropriate section below. No other significant problems were noted in the case narrative.

### **3.3 Sample Preservation and Holding Times**

Review of the sample collection and analysis dates involved comparing the chain-of-custody, the summary forms, the raw data forms, and the chromatograms for accuracy, consistency, and holding time compliance. The laboratory case narrative and the cooler receipt form indicated the samples were received at 1.2° C, which is below the recommended  $4 \pm 2$  °C cooler temperature. The samples were intact and not frozen. It was determined that the temperature did not adversely affect the BTEX analyses. All samples were analyzed within the required holding time. No qualifiers were assigned to the subject samples based sample preservation or holding times.

### **3.4 Initial Calibration**

Calibration criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for BTEX analyses. Review of the raw data verified that an initial calibration was analyzed at the beginning of the run sequence. At least five standards were used to establish the initial calibration curve as required by Method 8021B. For the initial calibration, the response factors (RFs) were reviewed and were greater than 0.05 for all analytes. Review of the initial calibration summary forms also indicated % relative standard deviation (RSDs) were  $\leq 20$  percent for the BTEX target analytes. Recalculation of the RFs and %RSD for all standard compounds were performed, and no calculation or transcription errors were noted. No Qualifiers were assigned to the subject samples based on initial calibration criteria.

### **3.5 Calibration Verification**

Review of the sample chromatograms indicated the calibration verifications (CVs) were performed approximately every 12 hours of operation. Based on the review of continuing calibration raw data and summary forms, all RFs met the evaluation criteria of greater than 0.05 for all target BTEX analytes. In addition, percent differences (%Ds) met the evaluation criteria of  $\leq 15$  percent for all target BTEX analytes. Recalculation of the RF and %D for the BTEX target analytes was completed, and no errors in calculation were noted. No samples were qualified based on continuing calibration criteria.

### **3.6 Blank Samples**

The purpose of the method blank sample is to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Method blank samples were analyzed with each analytical batch as required by USEPA SW-846 Method 8021B. Review of the method blank chromatogram and associated raw data revealed that all target analytes were reported as non-detect, however low levels of ortho-xylene were detected in the method blank. The response for o-xylene was very low and below quantitation limits, and therefore was not reported in the method blank. The subject samples did have reported hits of ortho-xylene that were close to the reporting limit. Based on this information an expanded review of all sample chromatograms took place. This was done to evaluate ortho-xylene detections for all the samples in the SDG. Ortho-xylene was detected in all but 2 of the samples. Fourteen of the samples had ortho-xylene detected but were below quantitation limits. Five samples had detections of ortho-xylene above the quantitation limit and were reported. None of the samples in the SDG were qualified based on method blank contamination, primarily because there were no reported hits in the method blank.

The purpose of the trip blank is to evaluate the existence and magnitude of contamination problems while the samples are in transit from the field to the laboratory. Review of the trip blank chromatograms and associated raw data revealed that all target analytes were reported as non-detect. No samples were qualified based trip blank analysis.

### **3.7 Surrogate Spike Recoveries**

Surrogate compounds were used to evaluate the overall laboratory sample preparation efficiency on a per-sample basis. All surrogate recoveries were within the method acceptance criteria for the subject samples. The surrogate recoveries were recalculated, and the summary forms versus the raw data were verified. No calculation or transcription errors were noted. No samples were qualified based on surrogate recoveries.

### **3.8 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples**

MS/MSD samples were analyzed to assess accuracy and precision for the analyses. The MS/MSD summary form indicated the sample used as the MS/MSD sample for the batch was PBOW99SB01-1'. The recoveries and RPDs were recalculated for the subject sample MS/MSD. All evaluation criteria for recovery and RPDs were met, and no transcription or calculation errors were noted. No samples were qualified based on MS/MSD evaluations.

### **3.9 Internal Standard Areas and Retention Times**

Internal standard areas and retention times were evaluated to ensure that the instrument sensitivity and response were stable during the analysis. The internal standard and retention time summary form for each sample was evaluated. All criteria were met. No samples were qualified based on internal standards and retention times.

### **3.10 Laboratory Control Samples (LCS)**

LCS's were analyzed to assess the accuracy of the analytical process. All LCS data were within the evaluation criteria. Recoveries for LCSs were recalculated using the summary forms. No calculation or transcription errors were noted. No samples were qualified based on LCSs.

### **3.11 Target Compound Identification and Quantitation**

For validation of the compound identification, raw data and chromatograms were reviewed to verify that major peaks were identified, and that the relative retention time was no greater than .06 relative retention time units of the associated continuing calibration standard retention times. The raw data and chromatograms were used to ensure that target analytes were correctly identified. The evaluation and identification of the internal standards, surrogates, MS/MSD, and LCS further support the validation. No qualification of any of the data is required.

### **3.12 Overall Data Assessment**

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Acceptable levels of accuracy and precision, based on MS/MSD, LCS, and surrogate data were achieved for this SDG. In addition, completeness defined to be the percentage of analytical results, which are judged to be valid, was 100 percent. The data quality objectives pertaining to the analytical data for this project were clearly met.

## **Appendix K - Review Comments**

## Comment Responses

**Document:** Draft Final Report for the Limited Site Inspection for "The Lower Toluene Tank Area"

**Name:** Susan P. Allemeier, CELRH-EC-CE

1. Page 2, first paragraph, third sentence, "burn grounds" should be "burning grounds".

Response: The text will be edited accordingly.

2. Page 5, first full sentence, " and even producing caverns" should be "and even produced caverns".

Response: The text will be edited accordingly.

3. Page 5, 1.5, second paragraph, first sentence, what is the purpose of the ( ) in this sentence?

Response: The parentheses were inadvertently placed in the text. They will be removed from the text.

4. Page 5-6, the last sentence on page 5 does not connect to the sentence on the top of page 6.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

5. Page 7, section 3.2, second sentence, put a "." Between "Figure 3-2" and "Four".

Response: The text will be edited accordingly.

6. Page 7, section 3.2, second paragraph, last sentence reads, These two sample samples were chosen...." Please revise.

Response: The word "sample" will be removed from the text.

7. Page 8, first full paragraph, last sentence, put a space between "Table 3-1" and "below".

Response: The text will be edited accordingly.

## Comment Responses

8. Page 10, section 7.0, first sentence, revise to, "the purpose of this site investigation of the lower toluene tank area was to gather data necessary to evaluate the site for contamination due to past DOD activities."

Response: The text will be edited accordingly.

9. Page 11, second bullet, second sentence, "...it appears the site has (not hase) essentially...."

Response: The text will be edited accordingly.

10. Page 11, section 8.0, this is written in the 1<sup>st</sup> person, please revise.

Response: The words "we believe" will be removed from the text.

11. Figures: the figure between Figure 1-5 and Figure3-2 is copied as a mirror image and appears backwards. Please correct this and also please assign a figure number to this figure.

Response: This figure is an overlay for Figure 3-2 depicting ground elevations. The figure will be assigned a figure number (Figure 3-2a).

## Comment Responses

**Document:** Draft Final Report for the Limited Site Inspection for "The Lower Toluene Tank Area"

**Name:** Janet K. Wolfe, CELRH-EC-CE

1. Section 1.1.2, Site Specific (site description). Does the remaining tank contain any sludges? Is there piping to other areas associated with the tanks?

Response: The tanks were decommissioned in 1945 by pumping out their contents, draining transfer lines, and opening top and bottom flanges for ventilation. During the visual survey field personnel were unable to gain access inside the tank for inspection. There were transfer lines present at the site during the time when the tanks were in operation, however during the visual survey these lines could not be located (Section 3.1 page 7).

2. Section 2.0, Previous Investigations. Refer to the last sentence on page 5 stating " the results of these analyses..." There is information missing. The sentence is incomplete.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

3. Section 3.3, Field Screening, Table 3.1. The sample number for the fill valve location should be identified in this table for clarity.

Response: Sample number "PBOW99SB09-1" is the number for the fill valve and is in Table 3-1.

4. Section 8.0, Recommendations. Address what the plans are for the remaining tank. Will this tank be removed? Are sludges remaining in the tank?

Response: The Lower Toluene Tank Area is presently under the ownership of NASA. Future land use of the site is unknown at this time. The primary focus of this investigation was to determine if any contamination is present at the site due to past DOD activities.

5. Figures. Figure 1-3 is missing. There needs to be a site map that indicates the location of the Lower Toluene Area in relation to the remainder of the site.

Response: Figure 1-3 will be included in the report.

## Comment Responses

**Document:** Final Report, Limited Site Inspection for "The Lower Toluene Tank Area"

**Name:** Ronald E. Nabors, Ohio EPA

1. Section 2.0, Previous Investigations, Page 5: The last sentence on page 5, When carried over to page 6, makes no sense. Please revise this section.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

2. Section 3.3 Field Screening, Page 8: Photoionization is misspelled in the first sentence.

Response: The text will be edited accordingly.

3. Section 7.0 Summary and Conclusions, Page 11: The word "has" is misspelled in the second sentence of the second bullet.

Response: The text will be edited accordingly.

4. General comment: The Target Parameters for this investigation should have included analysis for Lead and Semivolatile Organic Compounds (SVOCs).

Response: The reviewer's point is valid and will be taken into consideration during the next phase of work performed at the site. The primary focus for this limited site investigation was to determine if the toluene stored within the tanks had adversely impacted the site through spills and leaks. The recommendation section of the final report will be edited to reflect that further investigation is required by OEPA DERR to address the Lower Toluene Tank Area.

**APPENDIX D**

**Site Specific Health and Safety Plan  
And  
Field Sampling Plan**

**ADDENDUM**

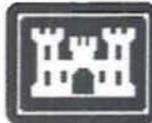
**Field Sampling Plan**

**Limited Site Investigation  
Lower Toluene Tank Area**

**Former Plum Brook Ordnance Works  
Sandusky, Ohio**

**March 15, 2005**

US Army Corps of Engineers  
Huntington District



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### APPENDICES

**Appendix A – Sample locations**

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## **ADDENDUM**

### **Site-Specific Sampling Plan**

#### **Limited Site Investigation Lower Toluene Tank Area**

#### **Former Plum Brook Ordnance Works Sandusky, Ohio**

### **1 PROJECT BACKGROUND**

The 9,000 acre former Plum Brook Ordnance Works located in Sandusky, and Erie county Ohio, was built in early 1941 to manufacture explosives during World War II. The site is currently owned by the National Aeronautics and Space Administration and is operated as the Plum Brook Station (PBS) of the John Glenn Research Center.

The environmental restoration of the site is being managed by the Huntington District of the US Army Corps of Engineers (USACE). USACE Nashville District is providing technical investigation support.

USACE Louisville District conducted a Limited Site Investigation (LSI) in the Lower Toluene Tank Area and issued a report of findings in July 2000. One of the comments from Ohio EPA on the LSI report required soil samples be collected and analyzed for lead (Pb) and Semivolatile Organic Compounds (SVOC). This addendum has been prepared in response to the agency's comment.

This addendum to the field sampling plan addresses the procedures to sample surface soil in the Lower Toluene Tank Area (LTTA) of the former Plum Brook Ordnance Works (PBOW) to determine if chemical contamination related to former Department of Defense (DOD) activities has impacted the surface soil in this area. This addendum is based on the original Field Sampling Plan (FSP) developed for the Limited Site Investigation. The FSP is provided as reference in the appendices.

### **2 LTTA SOIL SAMPLING PROJECT ORGANIZATION AND RESPONSIBILITY**

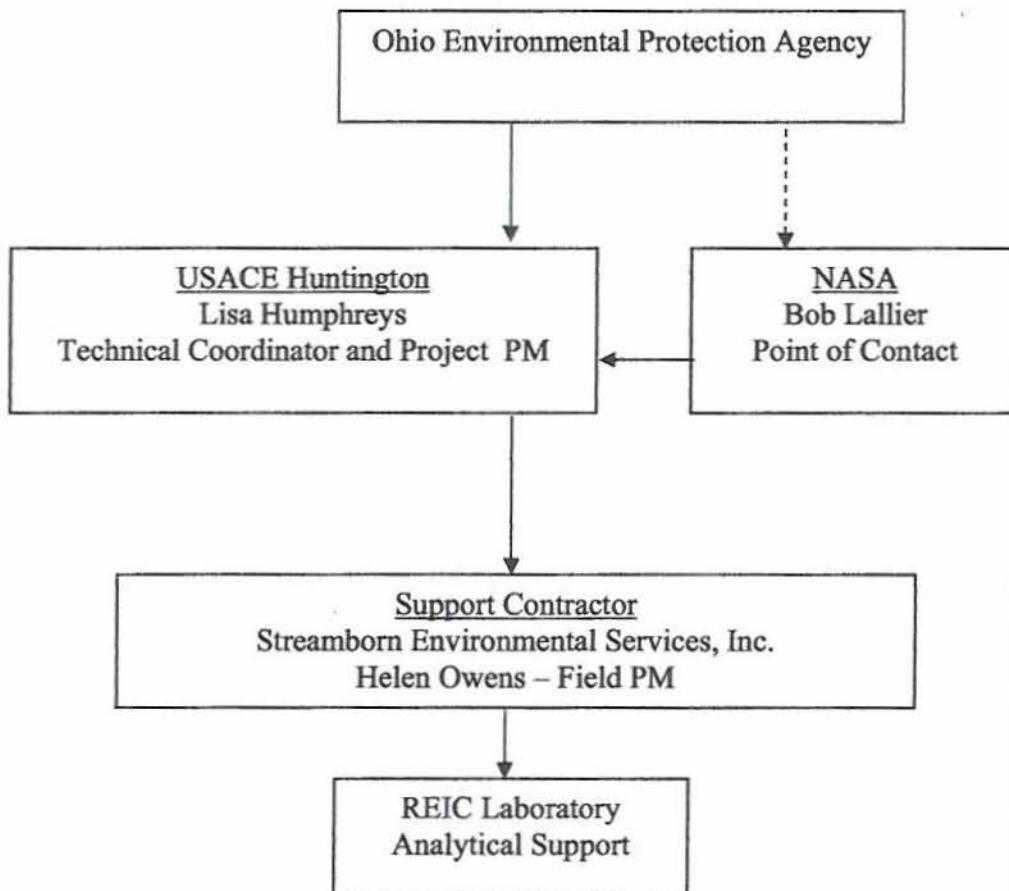
OEPA is responsible for oversight of the project activities and to ensure the activities associated with the environmental restoration efforts are carried out according to regulations and using sound engineering or other technical practices.

Since this project is taking place on NASA owned property, NASA will be informed about project activities. USACE will maintain communication with the NASA POC and coordinate field activities and site access through the POC. and provide access to the site.

USACE Huntington District will have overall project management responsibility. USACE is responsible for the environmental restoration activities in the areas of concern (AOC), and therefore communicates activities with OEPA, NASA and USACE contractors.

The USACE contractor is responsible for assisting the USACE in achieving the objectives of this project. This includes preparation of equipment, sample collection and shipment, sample analysis, and data summaries.

The contract laboratory is responsible for providing sample containers, sample analysis and laboratory reports. Below is a diagram of the project management and responsibility.



**Hierarchy of Project Management and Responsibility**

## PROJECT OBJECTIVES

Data Quality Objectives (DQO) for the Lower Toluene Tank Area Soil Sampling Former Plum Brook Ordnance Works  
Sandusky, Ohio

DQO	Project Specific Action
State the Problem	Determine if past DOD activities resulted in contamination of the soils in the LTТА.
Identify the Decision	If contaminants are detected in the LTТА soils, it will indicate that DOD activities have impacted the LTТА soils.
Identify Inputs to the Decision	Method SW-846 8270 for semivolatile organic compounds (SVOC) and Method SW-846 6010B for lead (Pb) will be used to determine if past DOD activities have contaminated private wells
Define the Boundaries of the Study	Project area is limited to the soils in the Lower Toluene Tank Area.
Develop a Decision Rule	If SVOCs or Pb is detected, it will indicate that DOD activities have impacted the surface soils in the LTТА.
Specify Limits on Decision Errors	There will be a 20% limit to decision error.
Optimize the Design	To optimize the sampling design for this investigation, various locations were targeted in areas that would provide the greatest information. A total of 6 samples will be collected from private wells and analyzed for SVOCs and Pb by SW-846 Methods 8270 and 6010B, respectively.

## NON-MEASUREMENT DATA ACQUISITION

USACE Louisville District conducted a Limited Site Investigation of the Lower Toluene Tank Area which is summarized in a report dated July 2000. Surface soil samples were sampled and analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) as part of the LSI. The data collected from this (2005) sampling activity will be used to complete the data gaps from the July 2000 LSI. The data will be submitted to OEPA for review and the agency will determine if the site can be closed out without further investigation.

### **3 FIELD ACTIVITIES**

During the field activity samples will be collected for lead (Pb) analysis and for semivolatile organic compounds (SVOC) analysis. Soil samples for lead analysis will be collected from 4 locations around each tank site. For each tank area, the four grab samples will be composited into one sample. Hence, we will generate one sample per tank area for a total of two samples for lead analysis. Three soil samples will be collected near the former drain valve pit which is situated to the east of the tanks along a shallow ditch. The three samples will be composited into one sample for SVOC analysis. The sampling locations are presented in the diagram presented in Appendix A.

### **4 FIELD OPERATIONS DOCUMENTATION**

To provide a written record of the sample collection the following will be completed: sample labels, daily contractor quality control reports (QCR), chain-of-custody, custody seals, and field logbooks.

#### **4.1 Daily Quality Control Report (QCR)**

During the field investigation, daily QCRs will be prepared, dated, signed by the field project manager, and will be included in the summary report.

These reports will include, at minimum, weather information at the time of sampling, identification of all samples taken, any problems encountered, and any deviation from this Field Sampling Plan (FSP), that may impact the data quality objectives.

#### **4.2 Field Logbooks**

The logbook will contain sufficient information to enable the sampling activity to be reconstructed without relying on the collector's memory. Project field logbook will be bound and have page numbers and water-resistant pages. All pertinent information regarding the site and sampling procedures will be documented as near to real-time as possible. At the conclusion of each day, the person maintaining the logbook will sign and date the documentation entries. Logbooks will be kept in the field team member's possession. Upon completion of the project, the logbook becomes part of the project final evidence file. The following topics will be included in the field logbook:

- Name and exact location of site of investigation
- Name and title of the person maintaining logbook
- Name and responsibilities of all persons on site
- Date and time of arrival and departure at site location

- Name and address of the field contacts
- Names, affiliations, and purpose of all site visitors
- Level of personal protection equipment worn on site
- Weather conditions on the day of sampling
- Field equipment used
- Instrument calibration information
- Sample locations, numbers, and analytical parameters requested
- Type, quantity and storage location of waste generated
- Description of number of shipping coolers packed
- Name and address of the laboratory receiving samples
- Date of shipment

### 4.3 Photographic Records

Photographic documentation is invaluable if the sampling and subsequent analytical data end in litigation, enforcement, or cost recovery actions.

Photographs will be taken to document sampling points. For each photograph taken the following items will be noted in the field logbook:

- Date
- Time
- Photographer's name and signature
- Name of site
- General direction faced and description of the subject
- Sequential number of the photograph and roll number
- Site photo map

### 4.4 Sample Documentation

#### 4.4.1 Sample Number System

The numbering system to be used during this investigation will conform to the USACE-Huntington District's numbering convention. Specifically, each sample will be assigned a unique sample identification number that describes the sampling location. Each number consists of a group of letters and numbers, separated by hyphens. Following is the description of the numbering system to be used for the Plum Brook Project.

Project Code	Year	Sample Type <sup>a</sup>	Site Identification	Sample Number
PB	05	SS	XX	XXX

<sup>a</sup>Sample Types: SS - Surface Soil

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March 2005

Site identification will be the sequential location number. For example, sample number PB-05-RW-02-02, is the sample taken at location 02 (site identification) and is the second sample taken at this location.

#### **4.4.2 Sample Labels**

Sample labels are required to properly identify samples and other evidence. All samples will be properly labeled with the label affixed to the container prior to transportation to the laboratory. Information on the sample labels will include, but not limited to, the following:

- Sample Identification Number
- Sampler's name and signature or initials
- Preservatives
- Type of analysis and method number
- Date and Time the sample was taken
- Type of sample. discrete or composite

#### **4.4.3 Chain-Of-Custody (COC) Records**

COC provides documentation of the handling of each sample from the time it is collected until it is destroyed. The COC serves as a legal record of possession of the sample. The COC record will remain with the sample at all the time and will bear the name of the person assuming the responsibility for the samples. The samples will be considered under custody if one or more of the following criteria are met:

- The sample is in the sampler's possession
- The sample is in the sampler's view after possession
- The sample is placed under lock to prevent tampering
- The sample is stored in a designated secure area

One or more custody seals will be placed on the shipping containers (coolers). The seals will be signed and dated by the field project manager. An example of the Chain-of-Custody form is presented in Appendix B.

## **5 SAMPLE PACKING AND SHIPPING REQUIREMENTS**

The following steps will be followed for sample packing and shipment.

- Completely cover the sample label with clear plastic tape

- Wrap the sample container with bubble wrap (securing it with plastic tape), place the container in a Zip-lock bag, and seal the bag
- Place additional bubble wrap in the bottom of the shipping cooler to provide a cushion. Place the sample containers upright in the cooler so they will not touch during shipment
- Place bags of ice around, among, and on top of the containers. Fill the cooler with packing material
- Place the chain of custody record in a sealed waterproof plastic bag. Attach the bag to the inside of the cooler lid with duct tape
- Tape the drain shut with duct tape
- Wrap the cooler completely with strapping tape at a minimum of two locations
- Do not cover any labels
- Attach the completed shipping label to the top of the cooler(s)
- Affix at least two custody seals to the outside of the cooler
- Put "This Side Up" labels on all four sides and "Fragile" labels on at least two sides

Primary samples will be shipped via overnight courier to:

REI Consultants, Inc. (REIC Laboratory)  
 225 Industrial Park Road  
 P.O. Box 286  
 Beaver, WV 25813  
 800.999.0105

## **6 MANAGEMENT OF INVESTIGATION DERIVED WASTE (IDW)**

Every attempt to minimize the generation of IDW will be observed. To minimize waste, dedicated samplers and disposable bags will be utilized. An auger or shovel will be used to remove surface debris and decontaminated using an Alconox® solution and subsequently rinsed with deionized water.

After the soil sample is collected, the excess soil from the bag will be used to backfill the sample location. The sample bag and spoons will be containerized. The spent Alconox® solution and rinse water will be containerized.

The IDW will be stored temporarily in an area designated by NASA/PBOW facility pending receipt of laboratory analysis to determine if the waste is hazardous. IDW will be disposed at an approved off-site facility within 3 months of collection.

## 7 FIELD ASSESSMENT

### 7.1 Quality Control (QC)

USACE will ensure that quality is maintained throughout the field work by following the three-step phased approach: preparatory, initial, and follow-up for each definable feature of work. These plans will be incorporated into the final report.

### 7.2 Sampling Apparatus and supplies

A checklist for packing is provided below.

	packing material		shipping coolers		steel toe boots
	clear/electrical tape		nitrile gloves		paper towels
	shipping labels		COC forms		duct tape
	zip lock bags		IDW container labels		plastic sheeting
	ice		IDW containers		sample containers
	bubble wrap		field logbook		jar labels
	sharpie/pen/pencil		trash bags		digital camera
	custody seals		hard hat		first aid kit

## 8 NONCONFORMANCE/CORRECTIVE ACTIONS

Any nonconformance should be recorded in the logbook and reported to the PM. If the nonconformance/corrective action does not affect project objectives, it will be noted in the logbook and submitted in the final report. If the nonconformance/corrective action affects the project objectives or decisions to be made from the results the sample may be recollected and reanalyzed. If instrumentation is inoperable, the fieldwork may be placed on hold until instrumentation is operable.

## **APPENDIX A**

### **Former Plum Brook Proposed Sampling Locations**



**APPENDIX B**

**Chain-of-Custody**

### Chain-Of-Custody

The Chain-of-Custody provided by REIC Laboratories will be used for this project. The REIC COC contains information similar to the COC example below.

Proj. No.		Project Name			Number of Containers	VOCs (EPA 8260)	TPH-GRO (8015M)	Herbicides (8151)	Pesticides (8081)	PCBs (EPA8082)	8 RCRA Metals	Remarks
Sampler: (Signature)												
Date/Time	Grab or Composite	Preservative	Matrix	Site Code / Sample Number								
Sample Relinquished by: (Sig.)		Date/Time Received by: (Sig.)		Date/Time	Hazards Associated with Sample							
Sample Relinquished by: (Sig.)		Date/Time Received by: (Sig.)		Date/Time								
Sample Relinquished by: (Sig.)		Date/Time Received by Lab: (Sig.)		Date/Time	Remarks at time of receipt:							
Custody Seal No:				Lab Case No.:								

**APPENDIX C**

**LSI Field Sampling Plan  
USACE Louisville District  
July 2000**

**APPENDIX E**

**Ohio EPA Letter  
Recommendation for No Further Action**



State of Ohio Environmental Protection Agency

Northwest District Office

347 North Dunbridge Road  
Bowling Green, OH 43402-9398

TELE: (419) 352-8461 FAX: (419) 352-8468  
www.epa.state.oh.us

Bob Taft, Governor  
Bruce Johnson, Lieutenant Governor  
Joseph P. Koncelik, Director

July 5, 2006

Ms. Lisa Humphreys  
U.S. Army Corps of Engineers  
CELRH-PM-PP-P  
502 Eighth Street  
Huntington, West Virginia 25701-2070

RE: Plum Brook Ordnance Works, Lower Toluene Tank Area

Dear Ms. Humphreys:

Ohio EPA has reviewed the Final Report for the former Plum Brook Ordnance Works, Lower Toluene Tank Area, dated July 2000, and the Addendum, Lower Toluene Tank - Limited Site Investigation, Data Gap Completion for SVOC and Lead, dated July 2005. At your request, Ohio EPA has considered the rationale and necessity of further action to address the limited, surficial PAH contamination discovered in the Tank Area.

It is the opinion of Ohio EPA that no further sampling or soil remediation is warranted at the Lower Toluene Tank Area. This conclusion is based on several factors.

First, the initial scope of the investigation was to evaluate the site for contamination due to past DOD activities. These activities would reasonably include handling and storing toluene product. Therefore, any contamination that would have resulted from normal handling or inadvertent releases of toluene would be in the form of VOCs. Appropriately, the soil was evaluated for BTEX contamination and all levels were found to be less than Region 9 PRGs.

Secondly, the detection of PAH contaminants has no demonstrable connection with the storage or handling of toluene product. Therefore it is logical to assume that the PAH detections are from an otherwise unidentified source. Considering the wide range of activities which produce PAHs, and which are believed to have occurred in the area (road asphalt, rail shipping, refuse burning), it is reasonable to assume that the PAH contamination is an artifact of anthropogenic activities unrelated to the toluene tanks.

Finally, as no site-wide background levels for PAH contamination have been established, upon which to compare detections in the tank area, it would not be reasonable to conclude that the detections in question simply represent exceedences on a site-wide basis.

Sincerely,

Paul M. Jayko  
Division of Emergency & Remedial Response

/l/r

pc: DERR-NWDO File  
Richard Meadows, USACE

