FINAL REPORT

Screening to Determine Background PAH Levels in Surface Soil from Controlled Burn Areas

Plum Brook Ordnance Works
Sandusky, Ohio

Prepared for

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

Prepared by

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Screening to Determine Background PAH Levels
in Surface Soils from Controlled Burn Areas

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Screening to Determine Background PAH Levels in Surface Soils from Controlled Burn Areas

Plum Brook Ordnance Works

Sandusky, Ohio

1. INTRODUCTION

The former Plum Brook Ordnance Works (PBOW) located near Sandusky, Ohio 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 United States Army Corps of Engineers (USACE) has identified 16 areas of the Plum Brook Ordnance Works (PBOW) impacted by DOD activities. The areas of concern (AOCs) were identified using information archives, including historical photographs. The historical photographs indicated the physical locations of the building that have been destroyed as part of the DOD decontamination activities in the late 1950s-early 1960s. Although the buildings are no longer visible, portions of the concrete foundations exist, which enables the investigators to accurately extrapolate the location of the original building footprints and potential areas of contamination.

As part of the Remedial Investigations (RI) in the AOCs at PBOW, USACE collected and analyzed soil samples for Polynuclear Aromatic Hydrocarbons (PAHs). PAHs are present in the environment as a result of incomplete combustion of organic matter, naturally occurring oil, human activities such as oil spills, car exhaust, or site development (paved roads), etc. PAHs are not a by-product of the explosives manufacturing process, such as the process at PBOW, but may be present in the site soils as a result of the operations decontamination undertaken after the war, the use of oils for dust control on roadways, other unidentified DOD activity, or current day activities implemented by the National Aeronautics and Space Administration (NASA), the current property owner.

In several AOCs, specifically TNT Area A and Area C, the PAH concentrations were elevated, some above the Remedial Goal Objectives (RGO) for a particular site. USACE investigated the likelihood of elevated concentrations of PAHs resulting from current NASA activities, specifically controlled burns of vegetation in the former manufacturing areas. The Field Sampling Plan is provided in Appendix C and the Site Specific Health and Safety Plan are provided in Appendix D.

2. SOIL SAMPLING

In July 2005, USACE Huntington District conducted surface soil sampling in designated areas of PBOW where controlled burns had been implemented in the spring of 2005. Table 1 identifies the sample locations and description of the area:

TABLE 1. PBOW Sample Areas – Surface Sampling for PAHs

Sample Location	Sample Identification	Description of Area
TNT A – Comm Center	PBOW-05-SS-TNTACC-01	Sampled area located behind NASA entrance gate (Comm Center) within the boundaries of Taylor Road, Maintenance Road and Columbus Avenue.
TNT B – Snake Road	PBOW-05-SS-TNTBSR-01	Sampled area located east of TNT Area B along Snake Road, between Fox Road and Scheid Road.
Columbus Avenue	PBOW-05-SS-COLAVE-01	Sampled area located within the boundaries of Columbus Avenue, Patrol Road and Fox Road.

The latitude and longitude (northing and easting) of the surface soil sample locations within each sample area were determined using a Garmin e-trex Legend C Navigator gps unit. The latitude and longitude locations are summarized in Table 2. Photographs of the typical grab sample locations are presented below and in Appendix A.

TNT Area A – Comm Center

TNT Area B – Snake Rd.

Columbus Avenue

Dedicated stainless steel spoons were used to collect the surface soil samples from the sample locations. The surface soil samples were collected from a depth of 0.5” to 6.0”. A four-point composite sample was collected from each sample location (TNT A – Comm Center, TNT B – Snake Road, or Columbus Avenue). Each composite sample was placed in an amber jar designated for the specific sample location. 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 and shipped to the laboratory overnight by Federal Express.

TABLE 2. Summary of Latitude and Longitude of Grab Samples by Sample Area

Sample Area	Grab Sample No.	Northing	Easting
TNT A – Comm Center	1	625597.68’	1922667.58’
	2	625611.54’	1923272.61’
	3	624172.90’	1920925.25’
	4	624470.96’	1922239.63’
TNT B – Snake Road	1	619776.36’	1921509.20’
	2	617989.52’	1922106.34’
	3	616987.70’	1920655.50’
	4	619167.47’	1920155.38’
Columbus Avenue	1	621318.90’	1925818.35’
	2	620599.31’	1927782.46’
	3	619435.06’	1926763.54’
	4	621588.21’	1927187.52’

3. ANALYTICAL RESULTS

The analytical results for the samples reported non-detectable concentrations for the PAH compounds. The complete laboratory report is provided in Appendix B.

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 sampling activity.

5. SUMMARY AND CONCLUSIONS

The purpose of this sampling activity was to determine the impact of NASA controlled burns on background PAH concentrations in the surface soil.

- In July 2005, USACE mobilized into the field to conduct surface soil screening sampling in recently burned areas.
- Samples were collected from three areas recently burned to control vegetation. A four-point composite sample was collected from each area.
- Surface soil samples were collected from a depth of 0.5”-6.0”.
- The laboratory results indicated the non-detectable levels of PAHs in the surface soil of the recently burned areas.

6. REFERENCES

Streamborn Environmental Services, Inc., *Field Sampling Plan, Determination of PAH Background PAH Levels in Controlled Burn Areas, Former PBOW, Sandusky, Ohio*, June 2005

Streamborn Environmental Services, Inc., *Site-Specific Health and Safety Plan, Lower Toluene Tank Area Soil Sampling and NASA Controlled Burn Area PAH Sampling, Former plum Brook Ordnance Works, Sandusky, Ohio*, June 2005

APPENDIX A

Photographs of Sample Locations

TNT A – Comm Center Sample Locations

Looking north from Maintenance Road, between Taylor Road and Columbus Avenue.

Looking east from Taylor Road, between Columbus Avenue and Maintenance Road.

Looking south from intersection of Taylor Road and Columbus Avenue in gravel parking area behind security building.

TNT B – Snake Road Sample Locations

Looking to the north from Scheid Road

Looking to the southwest from Snake Road, between Fox Road and Scheid Road.

Looking to the southwest from Snake Road, between Fox Road and Scheid Road.

Looking to the southeast from Fox Road.

Columbus Avenue Sample Locations

Looking to the east from Columbus Avenue.

Looking to the southeast from Patrol Road. Columbus Avenue.

Looking to the west
from Patrol Road.

Looking to the southeast from
intersection of Columbus Avenue
and Fox Road.

APPENDIX B

Laboratory Report

The laboratory report provided in this appendix includes results for samples collected during a separate investigation in the Lower Toluene Tank Area (LTTA). The laboratory results presented for the LTTA is not a part of the Background PAH investigation.

APPENDIX C

Field Sampling Plan - Addendum

Final Report

Field Sampling Plan Addendum

Determination of Background PAH Levels in Controlled Burn Areas

Former Plum Brook Ordnance Works Sandusky, Ohio

June 2005

Prepared for

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ADDENDUM

Field Sampling Plan

Determination of Background PAH Levels
Controlled Burn Areas

Former Plum Brook Ordnance Works
Sandusky, Ohio

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 has conducted evaluations of upgradient groundwater and off-site soils to determine background levels of Polynuclear Aromatic Hydrocarbons (PAHs). Determination of background levels of specific contaminants is a necessary factor in establishing acceptable levels of environmental contaminants. The acceptable levels or Remedial Goals are established by the Risk Assessment.

NASA regularly conducts controlled burns of the vegetation in portions of the PBOW property. Controlled burns prevent the growth of unwanted vegetation species and spread of disease in the existing vegetation. In addition to controlling the vegetative growth, the controlled burns also contribute to the levels of PAHs present in the soils. It is not known if the use of controlled burns has impacted PAH levels in the soil in active project areas at PBOW.

The objective of the proposed PAH sampling is to establish background levels of PAHs in the surface soil. USACE coordinated with NASA to identify areas of the site on which the seasonal controlled burns were conducted (TNT Area A, TNT Area B, and Snake Road Burn Grounds). Soil samples will be collected in those areas and analyzed to determine the PAH concentrations.

This addendum is based on the Site-Specific Sampling and Analysis Plan for the Continued Groundwater Remedial Investigation for Background and Downgradient Groundwater", which was prepared by Shaw Environmental, Inc. in July 2003 and is provided as an attachment to this SAP.

BACKGROUND PAH SOIL SAMPLING PROJECT ORGANIZATION AND RESPONSIBILITY

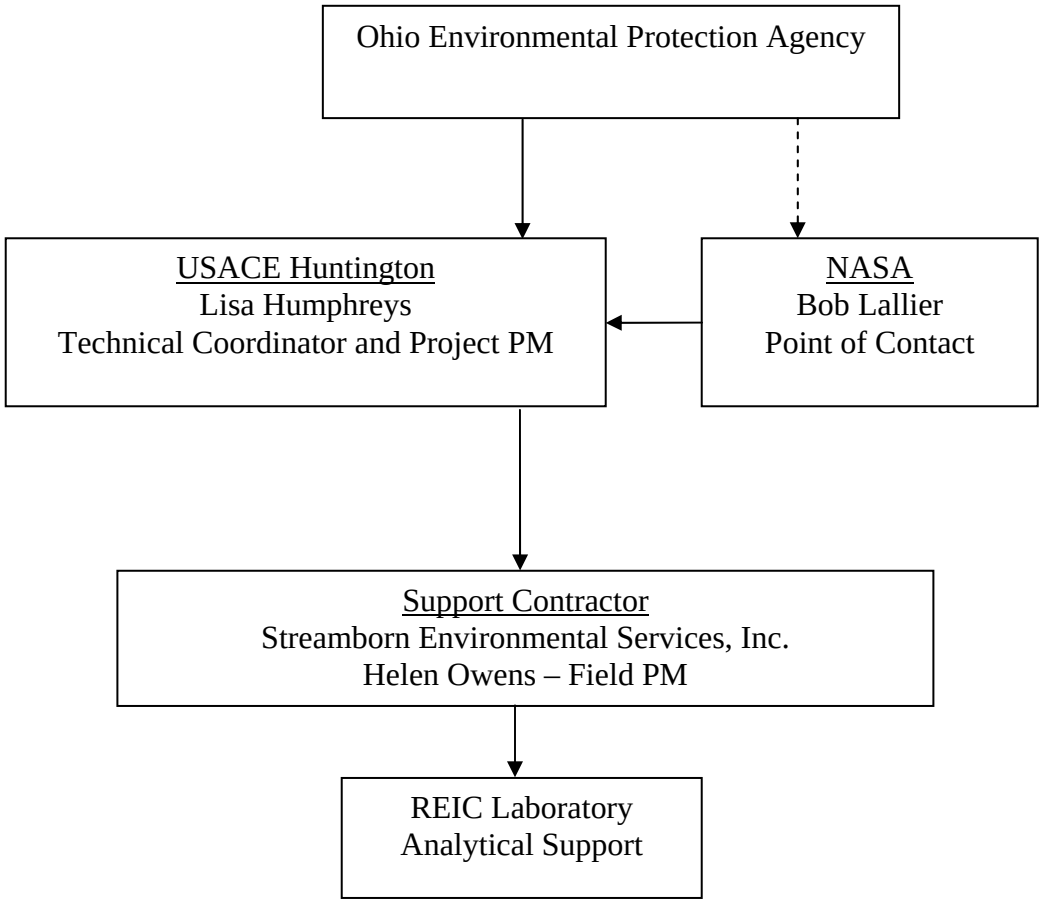
OEPA is responsible for oversight of the project activities and ensuring the activities associated with the environmental restoration efforts are carried out according to regulations and using sound engineering or other technical practices.

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.

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 Determining Background PAH Levels in Soil

Former Plum Brook Ordnance Works
Sandusky, Ohio

DQO	Project Specific Action
State the Problem	Establish background levels of PAHs on the PBOW site.
Identify the Decision	Use the on-site background levels as a factor in determining clean up levels in active project areas.
Identify Inputs to the Decision	Method SW-846 8310 will be used to determine background concentrations of PAHs.
Define the Boundaries of the Study	Sampling will be conducted in areas where NASA has conducted controlled burn activities. NASA conducted burns in spring 2005 in areas around TNT Area A, TNT Area B, and Snake Road Burn Grounds.
Develop a Decision Rule	Compare the data obtained from controlled burn area soil sampling to other background soil data to determine if controlled burn activities have impacted the levels of PAHs found during past investigations. Data obtained from the soil samples collected in the controlled burn areas will be used as the basis for further investigations.
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, samples were collected in areas identified by NASA in which controlled burn activities have been conducted. One composite sample will be collected from each controlled burn area within the AOC. The composite sample will consist of 3 discrete samples. The samples will be analyzed using SW-846 Method 8310.

FIELD ACTIVITIES

During the field activity soil samples will be collected for PAHs. Soil samples will be collected from 3 locations within an AOC in which controlled burns have been conducted. For each location, the three grab samples will be composited into one sample. Hence, one sample per AOC will be generated for a total of three samples for PAH analysis.

NASA has conducted controlled burns in spring 2005 in the areas adjacent to TNT Area A, TNT Area B and Snake Road Burn Grounds. The sampling locations are presented in the diagram presented in Appendix A.

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.

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), which may impact the data quality objectives.

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

Photographic Records

Photographic documentation is invaluable if the sampling and subsequent analytical data result 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

Sample Documentation

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[a]	Site Identification	Sample Number
PB	05	SS	XX	XXX

[a]Sample Types: SS - Surface Soil

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.

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

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.

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

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.

FIELD ASSESSMENT

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.

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

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	Preser-vative	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

Site-Specific Sampling and Analysis Plan

Continued Groundwater Remedial Investigation
Background and Off-Site Downgradient Groundwater

Plum Brook Ordnance Works, Sandusky, Ohio

Shaw Environmental Group, Inc.
July 2003

NOTE

This document is incorporated by reference. The complete document may be found in the Plum Brook Ordnance Works Administrative Record Public Repository at www.lrh.usace.army.mil/fuds/pbow

APPENDIX D

Site-Specific Health and Safety Plan

Site Specific Health and Safety Plan

Lower Toluene Tank Area Soil Sampling
And
NASA Controlled Burn Area PAH Sampling

Former Plum Brook Ordnance Works
Sandusky, Ohio

Prepared for

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February 2005

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PLUM BROOK EMERGENCY CONTACTS

NASA Communications Center (Emergency)	(419) 621-3222
NASA Guard Station	(419) 621-3226
Police	(419) 621-3226
Fire	(419) 627-5863
National Response Center	(800)424-8802
Hospital (Firelands Regional Medical Center)	(419) 626-7455
Poison Control Center	(419) 626-7423
Bob Lallier - NASA	(416) 621-3234
Lisa Humphreys - Huntington District USACE	(304) 399-5953 (304) 617-1461
Helen Owens - Streamborn Env. Inc.	(937) 698-5090 (937) 478-2322

Site Specific Health and Safety Plan

Lower Toluene Tank Area Soil Sampling
And
NASA Controlled Burn Area PAH Sampling

Former Plum Brook Ordnance Works
Sandusky, Ohio

INTRODUCTION

The Lower Toluene Tank Area (LTTA) is one of 16 areas of concern (AOC) identified by USACE environmental investigations. A Limited Site Investigation (LSI) was conducted in the LTTA in 1993. During the LSI, there were no soil samples collected. This soil sampling activity is being conducted to complete the data gap.

This Site Safety and Health Plan (SSHP) sets forth procedures required to protect the health and safety of U.S. Army Corps of Engineers (USACE) project personnel, the public, and the environment. The SSHP assigns responsibilities, establishes personnel protection standards, identifies mandatory safety practices and procedures, and provides for emergencies or contingencies that may arise during soil sampling in the vicinity of the LTTA).

The procedures outlined in this plan are in conformance with applicable local, state, Federal and USACE safety requirements. This plan represents the minimum health and safety requirements to be observed by all personnel conducting sampling activities. Because conditions may vary at each location, it is required that selected personnel protective measures be continually assessed by the designated Site Safety Officer. All project personnel must read this document and adhere to the provisions herein. A copy will be maintained on site at all times during the field investigation.

This plan was developed in accordance with the following:

- Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention
- USACE, Safety and Health Requirements Manual EM-385-1-1
- Occupational Safety and Health Administration (OSHA) Construction Industry Standards, 29 CFR 1926, and General Industry Standards, 29 CFR 1910.120, especially "Hazardous Waste Site Operations and Emergency Responses"
- NIOSH/OSHA/USCG/USEPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", October 1985.

- USACE Safety and Occupational Health Certifications for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, Appendix B, ER385-1-92.

Accident Prevention

The information required by EM 385-1-1, Section 01.A.07 to be contained in an Accident Prevention Plan is included in this SSHP. This SSHP therefore also serves as the Accident Prevention Plan.

Site Description

The former Plum Brook Ordnance Works (PBOW) is located in Sandusky, Erie County, Ohio. This 9,000 acre site was used for the manufacture of explosives during World War II. The site is currently owned by the National Aeronautics and Space Administration (NASA) and is operated as the Plum Brook Station of the John Glenn Research Center at Lewis Field. Numerous investigations have been conducted at the site under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). The environmental restoration project on the site is managed by Huntington District of the U.S. Army Corps of Engineers, with support from the Nashville District. There are currently 16 areas of concern for which chemical contamination related to the former Department of Defense (DOD) activities has been documented at this facility.

Investigation

This investigation will consist of sampling the surface soil in the areas adjacent to the existing toluene tanks. The samples will be analyzed for lead (Pb) and semi-volatile organic compounds (SVOC).At one location, an additional two samples will be collected. One will serve as a duplicate and one will serve as a matrix spike. If the well is not currently being used, it will be purged prior to sampling. If it is being used on a regular basis, no purging will be necessary.

The task-specific hazards and associated task-specific controls are presented under the section, Hazard Analysis and Controls. This table should be used as a starting point in any search for information on task-specific hazards and controls.

Contaminants

The primary constituents of potential concern for this investigation are lead and SVOCs These are identified in Table 1-1, Summary of Exposure Standards and Properties which is provided below. Exposure is expected to be minimized through the use of personal protective clothing (nitrile gloves, safety glasses, and steel toe boots) during sampling in the LTTA.

Visitors

No visitors are expected to be present in the work areas during the sampling, and therefore are not addressed as part of this SSHP.

TABLE 1-1 Summary of Exposure Standards and Properties

HAZARDOUS SUBSTANCES	TWA	TREATMENT	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE	IDLH (NIOSH)
1,3 Dinitrobenzene (99-65-0)	1mg/m^3 (skin) 0.15 ppm (skin) 1 mg/m^3 (skin)	Eye: Irrigate immediately Skin: soap wash Breath: Respiratory support Swallow: Immediate medical attention	Inh, Ing, Abs, Cont	Anoxia, cyanosis, visual disturbances, central blind spot of vision, bad taste, burning of mouth, dry throat, thirsty, yellowing hair, eyes and skin; anemia, live damage.	50 mg/m3
Dinitrotoluene (DNT)	1mg/m^3 (skin) 0.2 ppm (skin) 1.5 mg/m^3 (skin)	Eye: Irrigate immediately Skin: soap wash Breath: Respiratory support Swallow: Immediate medical attention	Inh, Abs, Ing, Cont	Anoxia, cyanosis, anemia, jaundice reproductive effects. Animal carcinogen	Ca [50 mg/m3]
Nitrobenzene	1 ppm (skin) 1 ppm (skin 1 ppm (skin	Eye: Irrigate immediately Skin: soap wash Breath: Respiratory support Swallow: Immediate medical attention	Inh, Abs, Ing, Cont	Irritation of eyes, skin, anoxia; dermatitis, anemia, methemoglobinemia, testicular effects	200 ppm
Trinitrotoluene (TNT)	1.5 mg/m^3 (skin) 0.1 1 mg/m^3 (skin) 1 mg/m^3 (skin)	Eye: Irrigate immediately Skin: soap wash Breath: Respiratory support Swallow: Immediate medical attention	Inh, Abs, Ing, Cont	Irritation of skin, mucous membranes, liver damage, jaundice; cyanosis, sore throat; kidney damage; cardio irregularity	500 mg/m^3

Table 1-1. Continued

HAZARDOUS SUBSTANCES	TWA	TREATMENT	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE	IDLH (NIOSH)
Pentaerythritol Tetranitrate (PETN)	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	Eye: Irrigate immediately Skin: soap wash Breath: fresh air, artificial respiration Swallow: Immediate medical attention	Inh, Abs, Ing,	Reduction of blood pressure, skin irritation, cyanosis, irritability, drowsiness, nausea, sweating, headache, shortness of breath, weakness, dizziness, unconsciousness	N.D.
1,3,5 Trinitrobenzene	1 ppm (skin) 1 ppm (skin 1 ppm (skin	Eye: Irrigate immediately Skin: soap wash Breath: Respiratory support Swallow: immediate medical attention	Inh, Abs, Ing, Cont	Irritating to the skin, mucus membranes, and eyes; nausea, vomiting, diarrhea, and abdominal pain; liver damage	1800 ppm

PEL - Permissible Exposure Limit
TLV - Threshold Limit Value
C – Ceiling
Potential significant exposure IDLH - Immediately Dangerous to Life and Health
BC - Red Blood Cells

CNS - Central Nervous System
NE - None Established
Ing - Ingestion
Cont - Contact
Abs - Absorption
Inh - Inhalation

*All exposure limits presented are 8-Hour Time Weighted Averages (TWAs), unless otherwise specified.

HAZARD ANALYSIS

The purpose of the site biological and physical hazard analysis is to identify and assess potential hazards that may be encountered by personnel during sampling activities and to prescribe required controls. In general, the hazards associated with this project are minimal and exposure to site contaminants is low. The Activity Hazard Analysis presented in Table 2-1and the discussion in this section discuss potential hazards.

Slips, Trips and Falls

Walking surfaces may be uneven or densely vegetated and could present a hazard. Personnel shall wear steel-toed boots, replace equipment when not in use, be alert and watch for uneven surfaces at the site. In the event of rain or snowfall, personnel will exercise caution when moving about the site, being aware of trip, slip or fall hazards which may be hidden in the mud or snow cover.

Lifting Techniques

Lifting and moving equipment can place undue stress on the back, possibly resulting in severe injury. It is important to use good lifting techniques; bend knees and keep loads close to the body. Do not twist or turn and keep back straight when lifting. If a load is heavy or bulky, seek help.

Harmful Plants, Insects and Animals

Personnel working in the field must be aware of the physical hazards posed by coming into contact with harmful plants, animals, and insects. The most likely poisonous plants field personnel will come in contact with are poison ivy and poison oak, both of which are very common in this area. These plants can cause a severe rash, characterized by redness, blisters, swelling, intense burning, and itching. Personnel shall wear the appropriate PPE to prevent dermal exposure to these plants.

Copperheads and rattlesnakes are the predominant poisonous species of snakes in this area. If employees come in contact with a poisonous snake, they should seek immediate medical attention.

Insects that are predominant in this area are bees, mosquitoes, and ticks. Personnel shall wear long pants to reduce the effects of insect bites. Personnel with known allergies should notify the Project Manager and SSHO of these allergies so medicine will be available to counteract their specific allergy.

TABLE 2-1. ACTIVITY HAZARD ANALYSIS

Activity	Potential Hazard	Basic Controls / Safety Procedures
Field mobilization and demobilization	Vehicle operation	• Licensed operators only. • Wear seat belts when moving. • Drive defensibly.
	Material handling	• Lift properly using legs. • Keep load close to body. • Request help from coworker.
Soil sampling	Pinch points	• Use leather gloves. • Be aware of equipment operation. • Be aware of where coworkers are. • Equipment connection / assembly.
	Slips, trips and falls	• Identify trip hazards upon arrival at site. • Backfill sample location as soon as possible after sample collection.
	Eye and face hazards	• Wear ANSI-approved safety glasses. • Control work area.
	Chemical hazards	• Utilize adequate PPE when conditions warrant • Wear safety glasses and nitrile gloves when preparing soil for sampling and collecting samples. • Control area. • Use caution when placing sample in container.
Sample handling	Lifting	• Request assistance from coworker when moving coolers containing samples.

TABLE 2-1. Continued

Activity	Potential Hazard	Basic Controls / Safety Procedures
General site activity	Plants, insects and animals	• Be aware of poisonous plants, i.e. poison ivy, oak and sumac upon arrival at the project area. • Scan the work area for poisonous snakes before beginning any activity. • Watch for snakes when clearing surface vegetation or moving debris.
	Weather conditions	• Dress appropriately for the weather • Allow time to warm up or cool down depending on conditions • Drink fluids regardless of weather conditions • If lightening is in the area, secure site and seek shelter in vehicle away from falling trees or in a building.

Temperature Extremes or Inclement Weather

Temperature extremes can pose serious physical hazards to personnel. Since this investigation is scheduled for the spring of 2005, no extreme temperatures are anticipated. However, heat stress and cold stress will be addressed in this SSHP. Heat stress is a serious condition where the body overheats. Table 2-2 is a summary of heat stress symptoms.

TABLE 2-2 Heat Stress

Condition	Signs/Symptoms	First Aid
Heat cramps	Heavy sweating Painful muscle spasms	Sport drink intake (Gatorade) Rest in cool environment
Heat Syncope	Brief fainting Blurred vision	Water intake Lie down in cool environment
Dehydration	Fatigue and reduced movement	Fluid and salted food intake
Heat Exhaustion	Pale and clammy skin, possible fainting, weakness, fatigue, nausea, dizziness, heavy sweating, blurred vision, body temperature slightly elevated	Lie down in cool environment, water intake, loosen clothing
Heat Stroke	Skin hot and dry, red face, high body temperature, unconsciousness, collapse, convulsions, confusion or erratic behavior	Immediate total cooling Transport to hospital

To avoid injury caused from heat stress, observe the following precautions:

- Adjust the work schedule, if needed to the cooler part of the day.
- Include adequate rests periods in the work schedule.
- Drink lots of water during the day.
- Discontinue work if conditions present a danger to worker safety.

Cold stress and or wet environmental conditions can place workers at risk of cold-related illness. Hypothermia can occur whenever temperatures are below 45 degrees Fahrenheit, and is most common during wet, windy conditions. The principal cause of hypothermia in these conditions is loss of insulating properties of clothing due to moisture, coupled with heat loss due to wind and evaporation of moisture on the skin.

Frostbite, the other illness associated with cold exposure, is the freezing of body tissue, which ranges from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will occur only when ambient temperatures are below 32 degrees Fahrenheit. The risk of frostbite increases as the temperature drops and wind speed increases.

Vehicle Accidents

To prevent vehicular accidents, all traffic laws shall be obeyed, operators must have a valid state driver's license, and use safety belts at all times. Vehicle tire pressure and fluid levels should be inspected on a regular basis.

STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

Helen Owens (Streamborn Environmental Services, Inc.) and Lisa Humphreys (Huntington District, U.S Army Corps of Engineers) will perform the soil sampling in LTTA. The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.) Training certificates are provided in Appendix C.

Field Project Manager

Helen Owens is designated as the field project manager and point of contact (POC) for this project. In this capacity, she will oversee the field activities and review all plans and reports to ensure their concurrence with the project objectives. Ms. Owens has 27 years environmental experience.

Site Safety and Health Officer (SSHO)

Lisa Humphreys is designated as the Site Safety and Health Officer (SSHO). She will enforce the procedures outlined in the SSHP; conduct on-site personnel training; and administer the USACE hazard assessment. The SSHO shall inspect PPE, direct the set up decontamination areas, and control access into the work area. Ms. Humphreys has 16 years environmental experience.

Project Manager

The Huntington District project manager for this investigation is Lisa Humphreys. She will ensure the overall project execution. She has over ten years experience in remedial investigations and working at hazardous waste sites.

Certified Industrial Hygienist (CIH)

Jean Reed, CIH, will verify safe work practices and conditions and support project activities. Ms. Reed is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene. The USACE Huntington District Safety Office is responsible for keeping safety and health records, preparing and/or reviewing SSHPs, and confirming employees' suitability for work.

TRAINING

All field personnel performing work on this project have received forty-hour HAZWOPER training and the associated 8-hour refresher training annually. Additionally, all field personnel have met the training requirements as cited 29 CFR 1910.120.

Site-Specific Training

All field personnel shall receive on site training that is specific to the activities, procedures, monitoring, equipment, and hazard analysis for this site investigation.

Safety Meetings

The Project Manager/SSHO shall conduct daily safety meetings and document on the Tailgate Safety Meeting form provided in Appendix A. Additional briefings will be performed when work practices change, if site conditions change, or if a deficiency has been found. Information to be included on the safety form include:

- Personnel attending
- The topic of discussion
- Tasks expected to be completed that day
- Other safety-related incidents noted

SAFETY PROCEDURES/PPE PROGRAM

Personnel will wear protective equipment meeting appropriate American National Standards Institute (ANSI) standards when their activities involve known or suspected contaminated materials. Level D PPE will be used for all site activities. Based upon the project activities, it is not anticipated that an upgrade of PPE will be necessary.

Level D PPE consists of the following:

- Steel-toe safety shoes
- Safety glasses with side shields
- Chemical resistant gloves
- Sleeved shirt and long trousers

Safety Equipment

A basic first aid kit shall be available during this investigation. The SSHO officer or the designee will perform a daily check to assure that the safety equipment is present and in good working condition.

Exposure Monitoring

No exposure monitoring will be necessary during this investigation.

Site Control Measures

Site control is an essential component in the implementation of the site-specific health and safety program. Excavation or drilling of the soil is not part of this project; however, there will be removal of limited portions of the vegetation at the sample locations to obtain surface soil samples. Access into the area immediately adjacent to the sample location will be restricted to those individuals collecting the samples. Although the areas will be restricted, it is not likely individuals who are not involved with the sampling will be present.

Buddy System

Due to the remoteness of the LTTA, the Buddy System will be utilized at all times and is mandatory. The Buddy System requires that at least two people work as a team; each looking out for the other. Team members utilizing the Buddy System are required to use the same level of PPE.

DECONTAMINATION PLAN

Dedicated sampling equipment will be used for each sampling location, therefore; no decontamination will be necessary.

EMERGENCY RESPONSE AND CONTINGENCY PLAN

In the event of an emergency, work will be stopped immediately and the area evacuated. The appropriate authorities will be notified. An emergency contact list is provided on page iv.

NASA has established strict guidelines to be followed in the event of a medical emergency. The field crew is required to contact the Communications Center (Front gate security) and inform them of the emergency. The Communications Center is responsible for first response and contacting outside emergency personnel, if required. This process is due to the site being a secured facility. The local hospital information is below:

Firelands Regional Medical Center
1101 Decatur Street
Sandusky, Ohio 44870
(419) 626-7455

Driving directions to Firelands Regional Medical Center

- Exit from the main gate of Plum Brook Station to Taylor Road.
- Turn right onto Taylor Road
- Turn right onto Bogart Road
- Turn left onto Route 250
- Turn left onto Perkins Avenue
- Turn right onto Columbus Avenue
- Turn left onto Townsend Street
- Turn left onto Hayes Avenue (Route 4)
- Turn right onto Decatur Street
- Firelands Regional Medical Center is at 1101 Decatur Street.

As an alternative route:

- Exit from the main gate of Plum Brook Station to Taylor Road.
- Turn right onto Taylor Road
- Left onto Columbus Avenue
- Turn left onto Townsend Street
- Turn left onto Hayes Avenue (Route 4)
- Turn right onto Decatur Street
- Firelands Regional Medical Center is at 1101 Decatur Street

Emergency Contacts

PBOW / NASA Communications Center (Emergency)	(419) 621-3222
PBOW / NASA Guard Station	(419) 621-3226
Police	(419) 621-3226
Fire	(419) 627-5863
National Response Center	(800)424-8802
Hospital (Firelands Regional Medical Center)	(419) 626-7455
Poison Control Center	(419) 626-7423
Bob Lallier - NASA Point-of-Contact	(416) 621-3234
Lisa Humphreys - Huntington District USACE	(304) 399-5953 (304) 617-1461
Helen Owens – Streamborn Env. Services, Inc.	(937) 698-5090 (937) 478-2322

Fire or Explosion

In the event of a fire or explosion, the NASA Communications Center (Comm Center) will be contacted. The SSHO will advise the Comm Center of the location, and nature of the fire.

Accident Reporting

In the event of an accident, employees are responsible for reporting all injuries or illnesses as soon as possible to the SSHO. The SSHO is responsible for investigating and reporting accident information and maintaining exposure data. The SSHO shall report findings to management along with a plan to correct whatever deficiency resulted in the accident. Any accident resulting in a serious injury or a fatality must be reported to OSHA within 24 hours and the accident scene shall not be disturbed until it has been released by the investigating authority, except for rescue and emergency measures. The SSHO shall also complete form ENG 3394 within 2 working days for all reportable accidents. An ENG 3394 form will be submitted any time there is an occupational illness/injury resulting in lost workdays, a fatality, permanent disability, or 3 or more persons are hospitalized. Also, a copy of ENG Form 3394 will be completed for property damage of $2,000.00 or more.

Emergency Equipment

Emergency equipment on site include the following:

- First aid kit
- Eye wash bottle
- Cellular phone or 2-way radio

Record Keeping

Implementation of the provisions of this SSHP shall be documented. The SSHO will be responsible for documenting steps taken to be in full compliance with this plan. The SSHO/Project Manager shall keep the following records:

- Copy of the Site Specific Health and Safety Plan
- Report forms (Safety meetings; ENG Form 3394)
- Records of safety violations and remedial actions taken
- OSHA Log 300 for reporting accidents
- Maintain records of all exposure and accident, worker's compensation reports and project man hours
- PPE checklist
- Other pertinent safety and health related observations or documents

REFERENCES

- Occupational Safety and Health Standards for General Industry, 29 CFR 1910
- Army Corps of Engineers, Safety and Health Requirements Manual, EM 385-1-1, 3 September 1996
- USEPA/Environmental Response Team, Health and Safety Planner (HASP), Version 3.0/4.0
- NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health, Guidance Manual for Hazardous Waste Site Activities", October 1985
- American Conference of Governmental Industrial Hygienist, Threshold Limit values and Biological Exposure Indices, 1994-95
- Federal Acquisition Regulation, F.A.R. clause 52.236-13: Accident Prevention.
- Limited Site Investigation, Final Report, PBOW Lower Toluene Tank Area, July 2000
- Quality Assurance Project Plan, Limited Site Investigation, PBOW, Lower Toluene Tank Area, July 2000

APPENDIX A

Reporting Forms

Safety Meeting Report Form

SAFETY MEETING REPORT

Date: _____ Project Name: _____

Project Manager: _____

Meeting Conducted By: _____

Safety Topics

Additional Topics / Comments

Meeting Attendees

Printed Name	Signature	Time

ENG Form 3394

(For Safety Staff only)	REPORT NO.	EROC CODE G0	**UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Attached Instructions and USACE Suppl to AR 385-40)*	**REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)**

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name *(Last, First, MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)*

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(Military time)* hrs	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR's NAME (1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(SPECIFY)*	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(SPECIFY)*	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see instructions)*

a. CONSTRUCTION ACTIVITY	(CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items a, f & g - see instructions)*

a. SEVERITY OF ILLNESS / INJURY	(CODE) #	B. ESTIMATED DAYS LOST	C. ESTIMATED DAYS HOSPITALIZED	D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE) #	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE) #
PRIMARY		TYPE	
SECONDARY		SOURCE	
f. NATURE OF ILLNESS / INJURY			

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see instructions)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE) #	b. PERSONAL FLOATATION DEVICE USED? ☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐ PICKUP/VAN ☐ AUTOMOBILE ☐ TRUCK ☐ OTHER *(Specify)*	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)*	(1) FRONT SEAT			
		(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	B. OWNERSHIP	C. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see instructions)*

a. TYPE OF VESSEL/FLOATING PLANT	(CODE) #	b. TYPE OF COLLISION/MISHAP	(CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

See attached page.

11. CAUSAL FACTOR(S) *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13) — YES / NO

- DESIGN: Was design of facility, workplace or equipment a factor? ☐ ☐
- INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor? ☐ ☐
- PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? ☐ ☐
- OPERATING PROCEDURES: Were operating procedures a factor? ☐ ☐
- JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? ☐ ☐
- HUMAN FACTORS: Did any human factors such as size or strength of person, etc., contribute to accident? ☐ ☐
- ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? ☐ ☐

a. (CONTINUED) — YES / NO

- CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident? ☐ ☐
- OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? ☐ ☐
- SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? ☐ ☐
- PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? ☐ ☐
- DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident ☐ ☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

See attached page.

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS _____ CONTRACTOR _____	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL

16. MANAGEMENT REVIEW *(1st).*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993/0-791,757

APPENDIX B

Directions and Map to Hospital

MAPQUEST

Send To Printer Back To Directions

Start: 6100 Columbus Ave
Sandusky, OH
44870-8329 US

End: 1101 Decatur St
Sandusky, OH
44870-3335 US

Distance: 6.58 miles

Total Estimated Time: 15 minutes

Directions	Distance
START **1.** Start out going NORTHWEST on COLUMBUS AVE toward PATROL RD.	0.4 miles
2. Turn RIGHT onto TAYLOR RD.	1.1 miles
3. Turn LEFT onto US-250.	3.1 miles
4. Turn LEFT onto E PERKINS AVE.	0.5 miles
5. Turn RIGHT onto COLUMBUS AVE.	1.1 miles
6. Turn LEFT onto TOWNSEND ST.	<0.1 miles
7. Turn LEFT onto OH-4/HAYES AVE.	0.1 miles
8. Turn RIGHT onto DECATUR ST.	<0.1 miles
END **9.** End at 1101 Decatur St, Sandusky, OH 44870-3335 US	

Start:
6100 Columbus Ave
Sandusky, OH
44870-8329 US

End:
1101 Decatur St
Sandusky, OH
44870-3335 US

NAVTEQ ON BOARD

Notes:

All rights reserved. Use Subject to License/Copyright
These directions are informational only. No representation is made or warranty given as to their content, road conditions or route usability or expeditiousness. User assumes all risk of use. MapQuest and its suppliers assume no responsibility for any loss or delay resulting from such use.

APPENDIX C

Health and Safety Certification

THE NATIONAL

ENVIRONMENTAL TRAINERS

certify that

Helen Owens

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

"Hazardous Waste Operations and Emergency Response"

meeting the requirements identified in Title 29 CFR 1910.120. This course has been awarded 1.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.

NATIONAL ENVIRONMENTAL TRAINERS

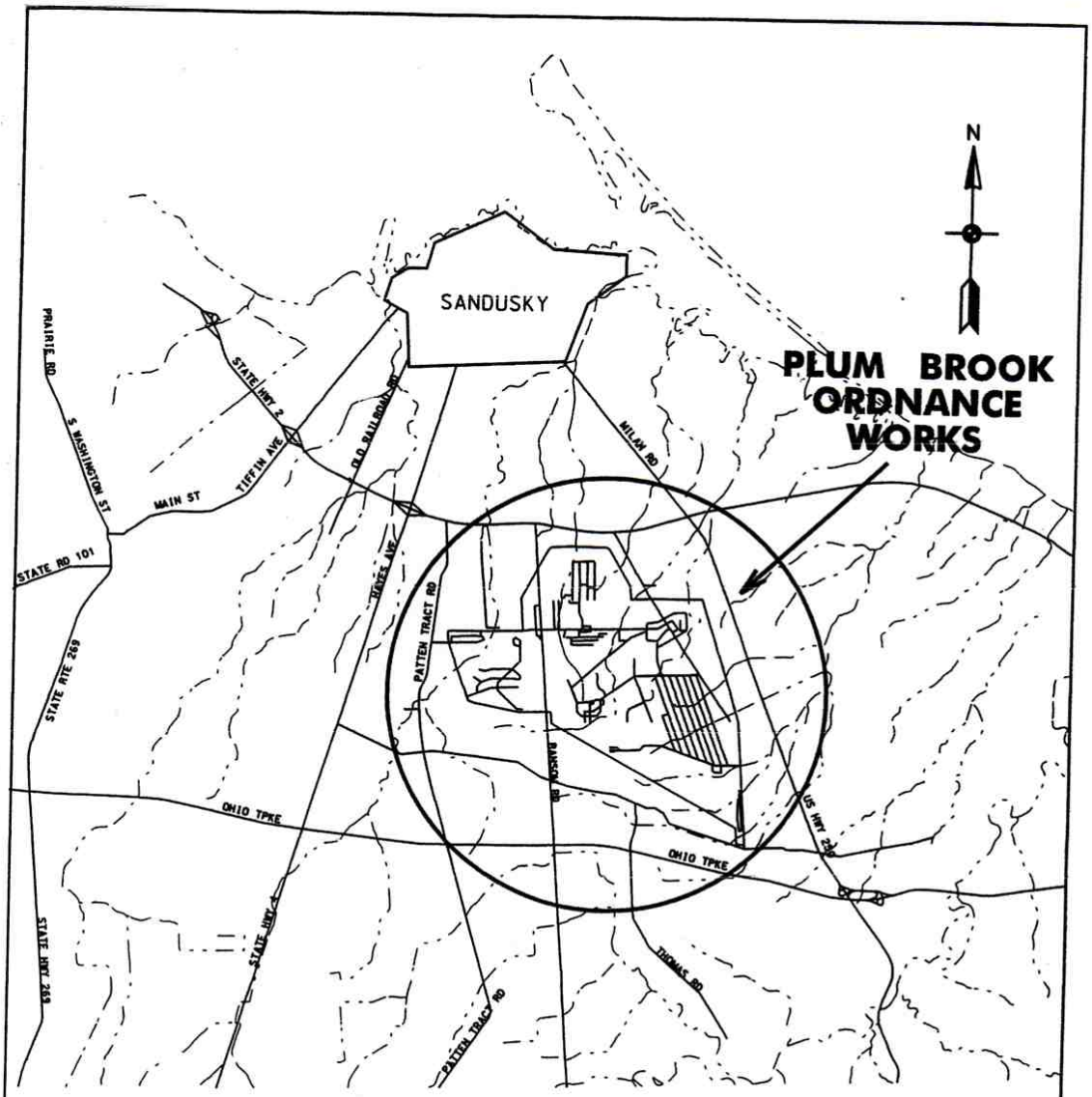
Signature of Instructor

April 7, 2004

Clay Bednarz, MS, CHMM (No. 3482)

APPENDIX D

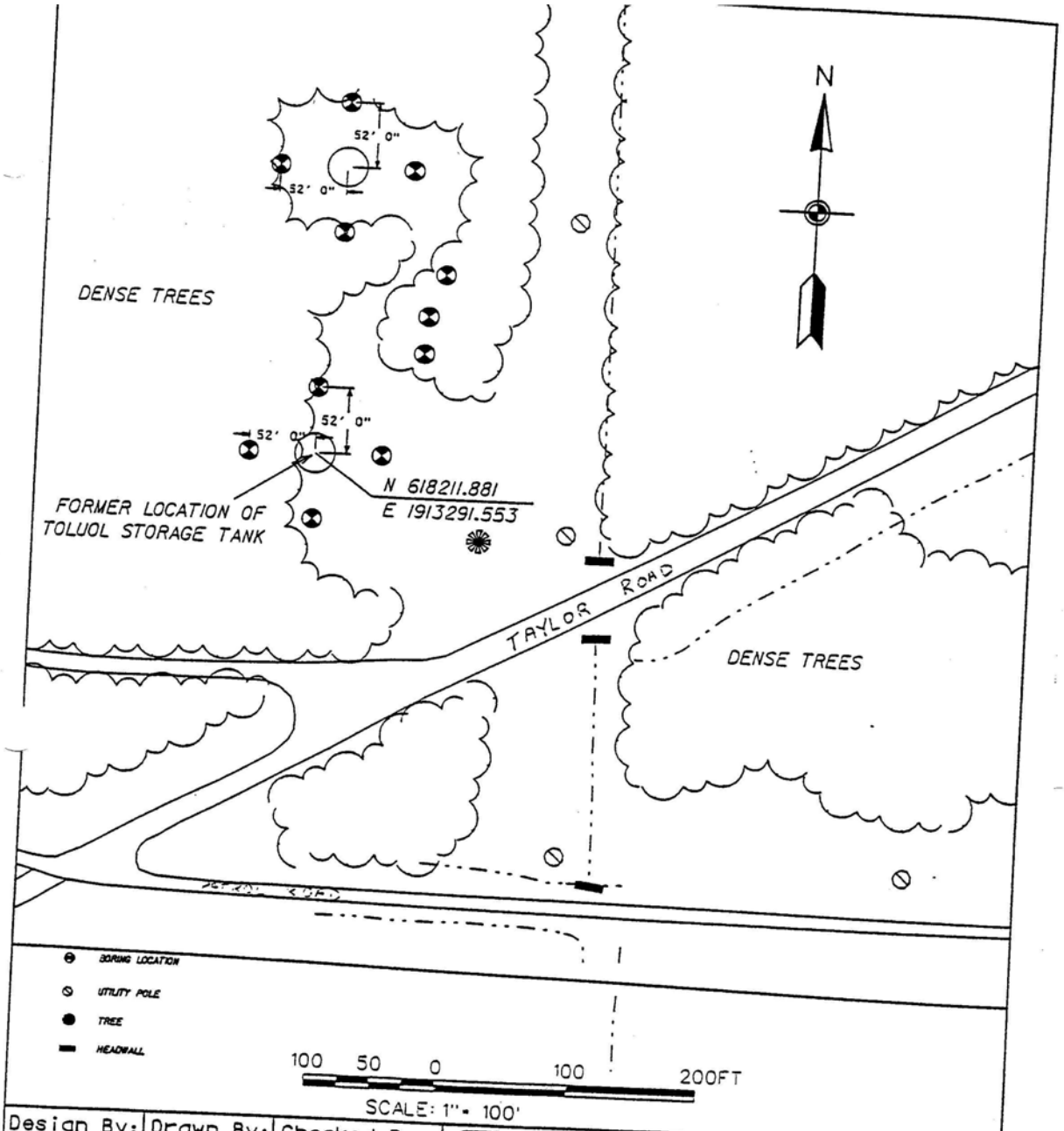
Vicinity Map
Lower Toluene Tank Area



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

APPENDIX E

Proposed Sampling Locations



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

File Name:
Plot Date:

APPENDIX F

Response to Comments

Response to Comments

DRAFT
Site Specific Health and Safety Plan

Lower Toluene Tank Area Soil Sampling
and
NASA Controlled Burn Area PAH Sampling

Former Plum Brook Ordnance Works
Sandusky, Ohio

Comment 1a.
Page 6, Paragraph 2.0. The AHA is in Table 2-2, not in Appendix A

Response
Concur. The subject table has been relabeled as Table 2-1 and relocated to follow the callout in the text for the table containing the AHA, in this case it has become Table 2-1. Table 2-1 in the draft document which presented heat stress symptoms has been relabeled as Table 2-2.

Comment 1b.
Page 6, Paragraph 2.3. In similar plans, insect repellant was not allowed to be used for fear of interference with VOC sampling.

Response
Concur. Insect repellant will not be used during sampling activities. The report has been revised to reflect this revision.

Comment 1c.
Page 11, Paragraph 3.0. The training certificates are in Appendix C, not Appendix A.

Response
Concur. The text has been revised to refer to Appendix C.

Comment 1d.
Page 11. Why are USACE employees directly involved in this work? Lisa Humphreys is designated as the SSHO and the Project Manager and it is indicated that she will actually be doing the soil sampling. The only responsibility that the Safety Office has with this contract is to review the SSHP.

> **Response**
> Under the original Scope of Work for Site Surveys, the contractor was required to assist USACE with sample collection, since this task is being funded under the Site Survey contract, the contractor will assist USACE with collection of the samples in the Lower Toluene Tank Area and the NASA Controlled Burn Areas.

Comment 1e.
Page 12, Paragraph 5.0. To the list of Level D PPE, add safety glasses with side shields.

> **Response**
> Concur. Safety glasses with side shields have been added to the list of Level D PPE requirements.

Comment 1f.
Page 13, Paragraph 6.0. It seems like some decontamination will need to be done at some point on the equipment used and the gloves used.

> **Response**
> As stated in the Plan, we will be using dedicated equipment which will be limited to stainless steel spoons to collect the soil samples. In addition, the chemical resistant gloves, in this case disposable Nitrile® will be used and disposed with the dedicated spoons. All waste materials (gloves and spoons) will be contained in trash bags and disposed in the dumpster.

Comment 2
The following comment may need to be resolved with Contracting Division. They have no record of Streamborn Environmental Services, Inc. in their data system. The contract number referenced in this SSHP was awarded to ICI. Some clarification is needed here.

> **Response**
> Concur. The referenced contract originally was with ICI who was acquired in 2003/2004 by MTC Technologies, Inc. ICI, an MTC Technologies Company, has subcontracted the services to be provided under the referenced contract to Streamborn Environmental Services, Inc. ICI, an MTC Technologies Company and Streamborn Environmental Services, Inc. have a Subcontractor Agreement to provide these services as outlined in the original SOW issued to ICI.

APPENDIX E

Comments and Responses on the Draft Report

Screening to Determine Background PAH Levels in Surface Soil

from

Controlled Burn Areas

Comments on the Draft Report
Screening to Determine Background PAH Levels
In Surface Soil from Controlled Burn Areas
Plum Brook Ordnance Works
Sandusky, Ohio
April 2008

1. General – Remove all reference in the writeup and appendices to the LTT data gaps investigation, data, level II QC, drawings, QC comments, etc.).
2. Page 1, Section 1. Introduction, 3rd paragraph – is it "polycyclic or polynuclear" aromatic hydrocarbons?
3. Page 2, Section 1. Introduction, last paragraph, 1st sentence – add to the end of the sentence ", some above the RGOs (remedial goal objectives) for a particular site."
4. Page 2, Section 2. Soil Sampling –
    a. 1st paragraph, should be "burned", not "burn".
    b. Table 1, Description of Area – should be "sampled", not "sample, it's past tense.
    c. Paragraph 3, insert a typical photo of each of the areas here as well as keep the appendix A photos in the report.
    d. 4th paragraph – use the term "4-point composite" to denote we took grab samples from 4 different locations in each of the areas.
5. Page 3, Section 3. Analytical Results – The Appendix B also shows the analytical for LTT data gaps investigation and it should be removed. It confuses the reader when looking at data that doesn't pertain to this investigation.
6. Pg 4, Section 5. Summary and Conclusions - 2nd bullet – rewrite 2nd sentence as follows: A 4-point composite sample was collected from each area.

Response to Comments

1. General – Remove all reference in the writeup and appendices to the LTT data gaps investigation, data, level II QC, drawings, QC comments, etc.).

   Response – The text of the PAH report was reviewed to locate references to the LTTA sampling and none were found. However, there are references to the LTTA sampling in the Site-Specific Health and Safety Plan and the laboratory data, which are included in the PAH report as an appendix. A notation will be made in the appropriate appendices that the LTTA and PAH investigations were conducted in the field during the same time frame, and samples were submitted to the laboratory on the same Chain of Custody (COC), resulting in the data being reported on the same lab report. In the future, samples from different field activities conducted at the same time will be submitted to the laboratory on separate COCs.

2. Comment - Page 1, Section 1. Introduction, 3rd paragraph – is it "polycyclic or polynuclear" aromatic hydrocarbons?

   Response – The text has been revised to read "As part of the Remedial Investigations (RI) in the AOCs at PBOW, USACE collected and analyzed soil samples for Polynuclear Aromatic Hydrocarbons (PAHs).

3. Comment - Page 2, Section 1. Introduction, last paragraph, 1st sentence – add to the end of the sentence ", some above the RGOs (remedial goal objectives) for a particular site."

   Response – The text has been revised to read "In several AOCs, specifically TNT Area A and Area C, the PAH concentrations were elevated, some above the Remedial Goal Objectives (RGO) for a particular site."

4. Comments - Page 2, Section 2. Soil Sampling –
   a. 1st paragraph, should be "burned", not "burn".

      Response – The term "burned" does not read well, but the text was revised to read "controlled burns" instead of "controlled burn".

   b. Table 1, Description of Area – should be "sampled", not "sample, it's past tense.

      Response – The text was revised to read "sampled".

c. Paragraph 3, insert a typical photo of each of the areas here as well as keep the appendix A photos in the report.

   Response – Photographs of the typical sample locations were inserted into the body of the report and photos were maintained in the appendix.

d. 4th paragraph – use the term "4-point composite" to denote we took grab samples from 4 different locations in each of the areas.

   Response – The text was revised to describe the samples as "four-point" composite samples.

5. Comment - Page 3, Section 3. Analytical Results – The Appendix B also shows the analytical for LTT data gaps investigation and it should be removed. It confuses the reader when looking at data that doesn't pertain to this investigation.

   Response – It is not appropriate to modify the laboratory report, however a notation will be made that the data for the LTTA samples are not a part of the PAH investigation and should be disregarded when reviewing the results for PAHs. To clarify, a notation will be included in the appropriate appendices that the LTTA and PAH investigations were conducted in the field during the same time frame, and samples were submitted to the laboratory on the same Chain of Custody (COC), resulting in the data being reported on the same lab report. In the future, samples from different field activities conducted at the same time will be submitted to the laboratory on separate COCs.

6. Pg 4, Section 5. Summary and Conclusions - 2nd bullet – rewrite 2nd sentence as follows: A 4-point composite sample was collected from each area.

   Response – The text has been revised to read "A four-point composite sample was collected from each area".