Work Plan
for
Site Screening Process Investigation
at
Site 43 - Toluene Disposal

Naval District Washington,
Indian Head
Indian Head, Maryland

Naval Facilities Engineering Command
Washington
Contract Number N62472-03-D-0057
Contract Task Order 0006

February 2005

060403/P

WORK PLAN
FOR
SITE SCREENING PROCESS INVESTIGATION

AT
SITE 43 - TOLUENE DISPOSAL

NAVAL DISTRICT WASHINGTON, INDIAN HEAD
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Washington
1314 Harwood Street, SE
Washington Navy Yard, D.C. 20374-5018

Submitted by:
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CONTRACT NUMBER N62472-03-D-0057
CONTRACT TASK ORDER 0006

FEBRUARY 2005

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BTAG	Biological Technical Assistance Group
CLEAN	Comprehensive Long-Term Environmental Action Navy
CTO	Contract Task Order
DOT	Department of Transportation
DPD	direct-push drilling
DQO	Data Quality Objective
E/A&H	Ensafe/Allen & Hoshall
EPA	Environmental Protection Agency
FOL	field operations leader
FS	feasibility study
FSP	Field Sampling Plan
GPS	global positioning system
HSA	hollow-stem auger
IDW	investigation-derived waste
IHDIV-NSWC	Indian Head Division, Naval Surface Warfare Center
IR	Installation Restoration
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NAD	North American Datum
NDW-IH	Naval District Washington, Indian Head
NEESA	Naval Energy and Environmental Support Activity
PA	Preliminary Assessment
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RBC	risk-based concentrations
RI	remedial investigation
RPM	Remedial Project Manager
SI	Site Inspection
SOP	Standard Operating Procedure
SOW	Statement of Work
SSL	soil screening level

SSP	Site Screening Process
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TtNUS	Tetra Tech NUS, Inc.
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This Site Screening Process (SSP) Work Plan for an investigation at the Naval District Washington, Indian Head (NDW-IH) in Indian Head, Maryland was prepared by Tetra Tech NUS, Inc. (TtNUS) in response to Contract Task Order (CTO) 0006 under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-03-D-0057. The purpose of this Work Plan is to develop and describe the field sampling activities to be conducted at Site 43 – Toluene Disposal.

1.2 SCOPE AND OBJECTIVE

TtNUS has been tasked to develop this Work Plan to support the SSP at NDW-IH Installation Restoration (IR) Site 43. The objective of the SSP is to acquire sufficient data to assess the extent of environmental contamination and the associated risks to human health, welfare, and the environment. The data collected for the SSP are to be sufficient to provide the basis for a determination that either (1) a remedial investigation/feasibility study (RI/FS), FS, another investigation, and/or a removal action, as appropriate, be performed on the area addressed by the SSP or (2) the area does not pose a threat, or potential threat, to public health, welfare, or the environment and therefore the area should be removed from further study under the Federal Facility Agreement.

1.3 STATION BACKGROUND

NDW-IH is located in northwestern Charles County, Maryland. As shown on Figure 1-1, NDW-IH is approximately 25 miles southwest of Washington, D. C. NDW-IH is a military facility consisting of the Main Area on the Cornwallis Neck Peninsula and the Annex on Stump Neck, which is located across Mattawoman Creek. The Stump Neck Annex is not contiguous with the Main Area and is operated by a tenant. As shown on Figure 1-2, the Main Area is bounded by the Potomac River to the northwest, west, and south, Mattawoman Creek to the south and east, and the Town of Indian Head to the northeast. The location of Site 43 is shown on Figure 1-2.

The primary mission of the Indian Head Division, Naval Surface Warfare Center (IHDIV-NSWC), the main tenant of NDW-IH, is as follows:

- To provide services in energetics for all warfare centers through engineering, fleet and operational support, manufacturing technology, limited production, and industrial base support.

- To provide research, development, testing, and evaluation of energetic materials, ordnance devices and components, and other related ordnance engineering standards including chemicals, propellants and their propulsion systems, explosives, pyrotechnics, warheads, and simulators.

- To provide support to all warfare centers, military departments, and the ordnance industry for special weapons, explosive safety, and ordnance environmental issues.

- To execute other responsibilities assigned by the Commander of IHDIV-NSWC.

1.4 DATA QUALITY OBJECTIVES

This Work Plan has been developed using the Data Quality Objective (DQO) Process. The DQO Process is a focused, iterative process for developing the data collection strategy to support decision making. The goal of the process is to conduct investigations in an efficient and effective manner without unnecessary precision and redundancy of data. The seven steps comprising this process are listed in Table 1-1 along with the sections of this Work Plan that address the steps.

1.5 PROJECT ORGANIZATION

The activities described in this Work Plan will be performed by TtNUS with support from the Navy. The Navy Remedial Project Manager (RPM) is:

Joseph Rail (Code C21EC)
Naval Facilities Engineering Command Washington
1314 Harwood Street, SE
Washington Navy Yard, D.C. 20374-5018
(202) 685-3105
(202) 433-6193 (FAX)
Email: joseph.rail@navy.mil

Mr. Shawn Jorgensen will be the primary contact at the facility:

Mr. Shawn Jorgensen, Code HN2SJ
Naval District Washington, Indian Head
Building 289 101 Strauss Avenue
Indian Head, MD 20640-5035
(301) 744-2263
(301) 744-4180 (FAX)
E-mail: jorgensensa@ih.navy.mil

The TtNUS project organization chart is shown on Figure 1-3.

1.6 DOCUMENT ORGANIZATION

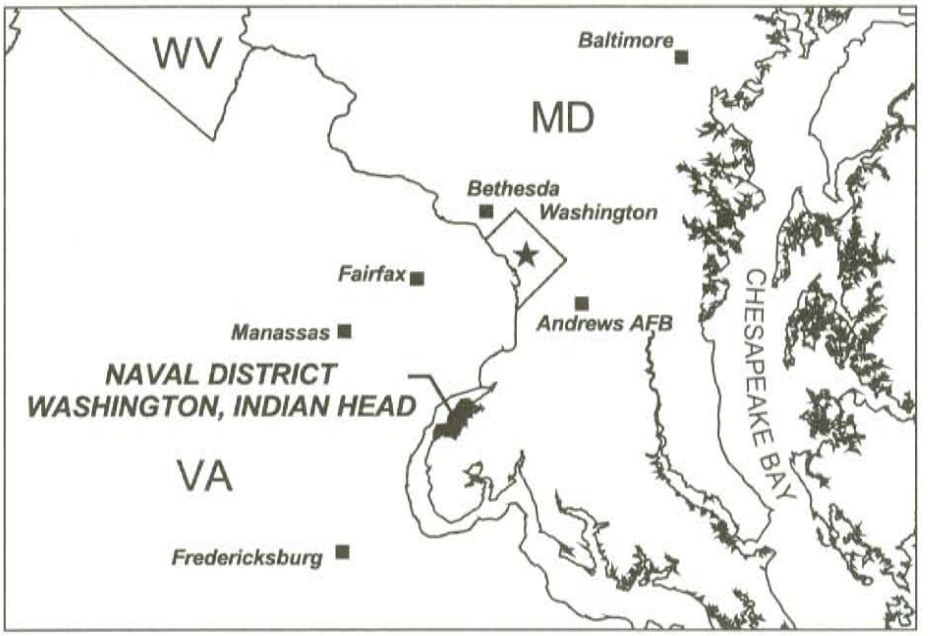
This Work Plan is intended for use in conjunction with the Master Plans for Installation Restoration Program Environmental Investigations at NDW-IH (TtNUS, 2004), which include the Master Work Plan, Master Field Sampling Plan (FSP), and Master Quality Assurance Project Plan (QAPP), each of which provide general information applicable to all sites at NDW-IH. This Work Plan includes site-specific information to be used for the SSP investigation at Site 43. Section 1.0 is the introduction to this site-specific Work Plan and describes the purpose of the document, outlines the scope and objectives of the work, summarizes the background of the Indian Head facility, explains how the DQO process is addressed in this Work Plan, and describes the project organization. Section 2.0 develops the rationale for and outlines the investigations to be implemented at Site 43. Section 3.0 describes the details regarding field operations, and Section 4.0 summarizes the sampling procedures. Appendix A is the project-specific Health and Safety Plan, and Appendix B is the project-specific QAPP.

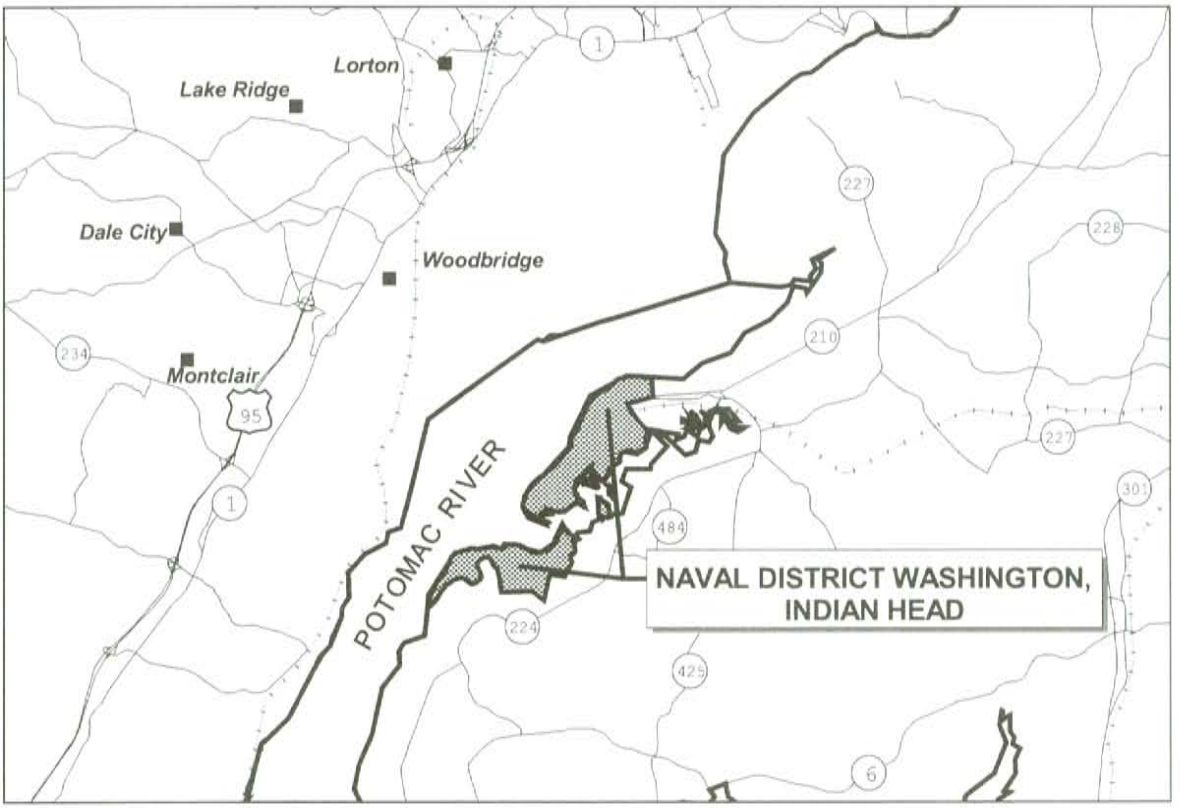
TABLE 1-1

INTEGRATION OF DQO PROCESS INTO SITE-SPECIFIC WORK PLAN
SITE 43 - TOLUENE DISPOSAL
NDW, IH, INDIAN HEAD, MARYLAND

DQO Step[(1)]	Location in Work Plan Document
1. State the Problem	Section 2.3.1
2. Identify the Decision	Section 2.3.2
3. Identify the Inputs to the Decision	Section 2.3.3
4. Define the Boundaries of the Study	Section 2.3.4
5. Develop a Decision Rule	Section 2.3.5
6. Specify Tolerable Limits on Decision Efforts	QAPP (Appendix B)
7. Optimize the Design for Obtaining Data	Section 2.3.6; Table 2-1

1 Source: EPA, 2000.





DRAWN BY: K. PEILA — DATE: 2/4/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER: 2193	OWNER NO: 0006
CHECKED BY: G. LATULIPPE — DATE: 2/2/04	FACILITY LOCATION MAP NAVAL DISTRICT WASHINGTON, INDIAN HEAD INDIAN HEAD, MARYLAND	APPROVED BY: GJL — DATE: 6/4/04	
COST/SCHEDULE-AREA		APPROVED BY: — DATE: —	
SCALE: AS NOTED		DRAWING NO: FIGURE 1-1	REV: 0

P:\GIS\NSWC_INDIAN_HEAD\WORKPLAN_SITELOCATION.APR FACILITY LOCATION MAP 8/2/04 KMP

P:\GIS\INDIANHEAD_NSWC\APR\COMMUNITYRELATIONSPLAN.APR SSP SITE 43 8/2/04 KMP

DRAWN BY: K. PEILA — DATE: 6/2/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER: 2193	OWNER NUMBER: 0006
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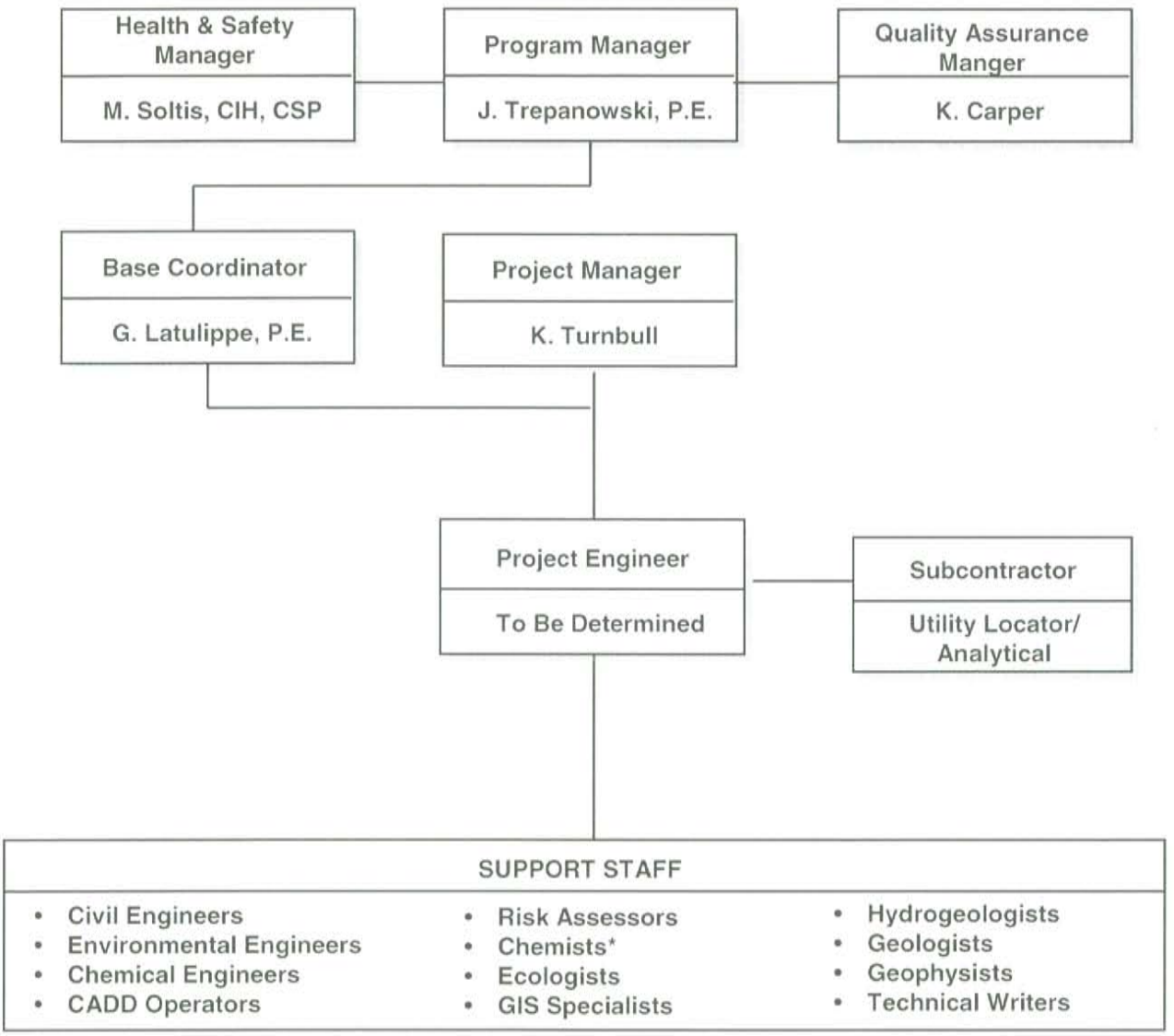
COST/SCHEDULE-AREA		APPROVED BY: — — DATE: —	
SCALE: AS NOTED		DRAWING NO.: FIGURE 1-2	REV: 0

FIGURE 1-3

TETRA TECH NUS PROJECT ORGANIZATION CHART
SITE SCREENING PROCESS WORK PLAN
SITE 43 – TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND



* J. Samchuck will be responsible for data validation.

2.0 SSP INVESTIGATION RATIONALE

This section provides the rationale for development of the site-specific sampling activities for Site 43.

2.1 SITE BACKGROUND

Site 43 - Toluene Disposal includes two separate areas in the southwestern portion of the Main Area. The first is near a utility pole approximately 30 feet northwest of and across the road from Building 1041, and the second is the northern corner of Building 1040. It is estimated that, for a period of more than 2 years during parts-cleaning operations, unknown quantities of spent solvents were improperly disposed in the drainage ditch outside the door (northeast) of Building 1040 (acetone) and at the base of the pole by Building 1041 (acetone and toluene).

2.2 HISTORICAL ENVIRONMENTAL DATA

A Preliminary Assessment (PA) was performed in 1991 (NEESA, 1992). The PA recommended a Site Inspection (SI) for the area near the utility pole across the road from Building 1041. Sampling was not recommended for Building 1040 because acetone would readily volatilize under ambient conditions rather than migrate through the soil to groundwater.

An SI was performed in the Building 1041 area (E/A&H, 1994). Ten soil-gas borings were completed approximately 12 feet below ground surface (bgs), and soil-gas samples were analyzed for volatile organic compounds (VOCs). Toluene and chlorinated solvents were detected at 3 of the 10 soil-gas locations. Four surface soil samples (0 to 1 foot bgs) were collected near the utility pole and analyzed for VOCs and semivolatile organic compounds (SVOCs). The VOC acetone was detected at one location. No other VOCs or SVOCs were detected. The SI recommended additional sampling to determine whether VOCs were present in subsurface soil near the utility pole.

2.3 FIELD INVESTIGATION SCOPE DEVELOPMENT

2.3.1 Statement of the Problem

Unknown quantities of solvents from Buildings 1040 and 1041 were released at Site 43.

2.3.2 Identify the Decision

Sampling is needed to determine whether residual contamination in soil or groundwater at Site 43 poses potential risks to human health or the environment. The sampling results will be used to determine

whether the risks exist at levels that require the initiation of a removal action (unacceptable), remedial investigation or further evaluation (potentially unacceptable), or no further action (acceptable).

2.3.3 Inputs to the Decision

Information required for the decision is the analytical results for the samples, which will be analyzed for volatile organic compounds (VOCs), metals, and explosives. These are the chemicals that may have been present in the solvents disposed at the site.

The analytical results for soil samples will be compared to the following screening levels: United States Environmental Protection Agency (EPA) Region 3 soil risk-based concentrations (RBCs), EPA generic soil screening levels (SSLs) for inhalation, EPA Region 3 SSLs for migration to groundwater, EPA Region 3 Biological Technical Assistance Group (BTAG) soil screening levels, and facility background concentrations. The analytical results for groundwater samples will be compared to the following screening levels: EPA Region 3 tap water RBCs and drinking water standard Maximum Contaminant Levels (MCLs).

2.3.4 Study Boundaries

The study area for Building 1040 includes the drainage ditch near the door of the building where solvents were reportedly disposed. The media of interest for the SSP evaluation are surface soil, subsurface soil, and shallow groundwater.

The study area for Building 1041 includes the area near the utility pole across the road from the building where solvents were reportedly disposed. During the SI, surface soil samples were collected approximately 10 feet on either side of the pole along the road and the adjacent drainage ditch. The soil-gas borings where VOCs were detected were in the same general area. The media of interest for the SSP evaluation are surface soil, subsurface soil, and groundwater.

2.3.5 Decision Rule

If the maximum concentration of any chemical exceeds its corresponding screening level at a concentration that suggests an imminent threat to human health or the environment, the site will be recommended for a removal action.

If the maximum concentration of any chemical exceeds its corresponding screening level at a concentration that suggests a potential threat to human health or the environment, the site will be recommended for further evaluation. Risk screening evaluations will be conducted in an SSP Report to

determine the magnitude of the potential threats. The screening evaluations may include comparison of detected concentrations to NDW-IH background levels, comparison of detected concentrations to human health and ecological screening levels, estimation of cancer and non-cancer risks to human receptors, and estimation of ecological risks.

If the maximum concentrations of all chemicals are below their corresponding screening levels, the site will be recommended for no further action.

2.3.6 Sampling Design

A judgmental sampling design, rather than a probabilistic (statistically-based) sampling design, is appropriate for the SSP evaluation. At the SSP stage (screening level), the primary goal is to determine whether there has been a release that requires additional action, investigation, or evaluation or whether no further action is required.

For Building 1040, two soil borings will be installed in and downgradient of the area where the release reportedly occurred and where residual contamination would most likely be encountered. One boring will be installed in the drainage ditch near the building door, and the other boring will be installed within the ditch approximately 25 feet downgradient (southeast) of the first boring. One of the borings will be installed to a depth of approximately 8 feet, which is the maximum depth where residual contamination would most likely be encountered. The other boring will be installed to a depth below the water table and converted into a groundwater monitoring well to determine whether there has been a release to groundwater.

For Building 1041, four soil borings will be installed approximately 10 feet on either side of the utility pole in the area where the highest soil-gas readings were observed during the SI. Three of the borings will be installed to a depth of approximately 8 feet, which is the maximum depth where residual contamination would most likely be encountered. One of the borings will be installed to a depth below the water table and converted into a groundwater monitoring well to determine whether there has been a release to groundwater. Two borings will be installed along the road, and two borings will be installed in the drainage ditch.

A surface soil sample will be collected at each location by Buildings 1040 and 1041 and analyzed for Target Compound List (TCL) VOCs, Target Analyte List (TAL) metals, and explosives. VOCs are components of the solvents used in the buildings, and metals and explosives may be present from the parts-cleaning operations. The borings will be advanced at 1- to 2-foot intervals depending on the equipment used to advance the borings, and the cores or cuttings from each interval will be screened for the presence of organic vapors. The subsurface soil interval with the highest organic vapor reading will

be analyzed for VOCs, metals, and explosives. If none of the subsurface intervals exhibit elevated organic vapor readings, the sample from the 1- to 2-foot interval will be analyzed. A groundwater sample will be collected from each monitoring well by Buildings 1040 and 1041 and analyzed for the same parameters.

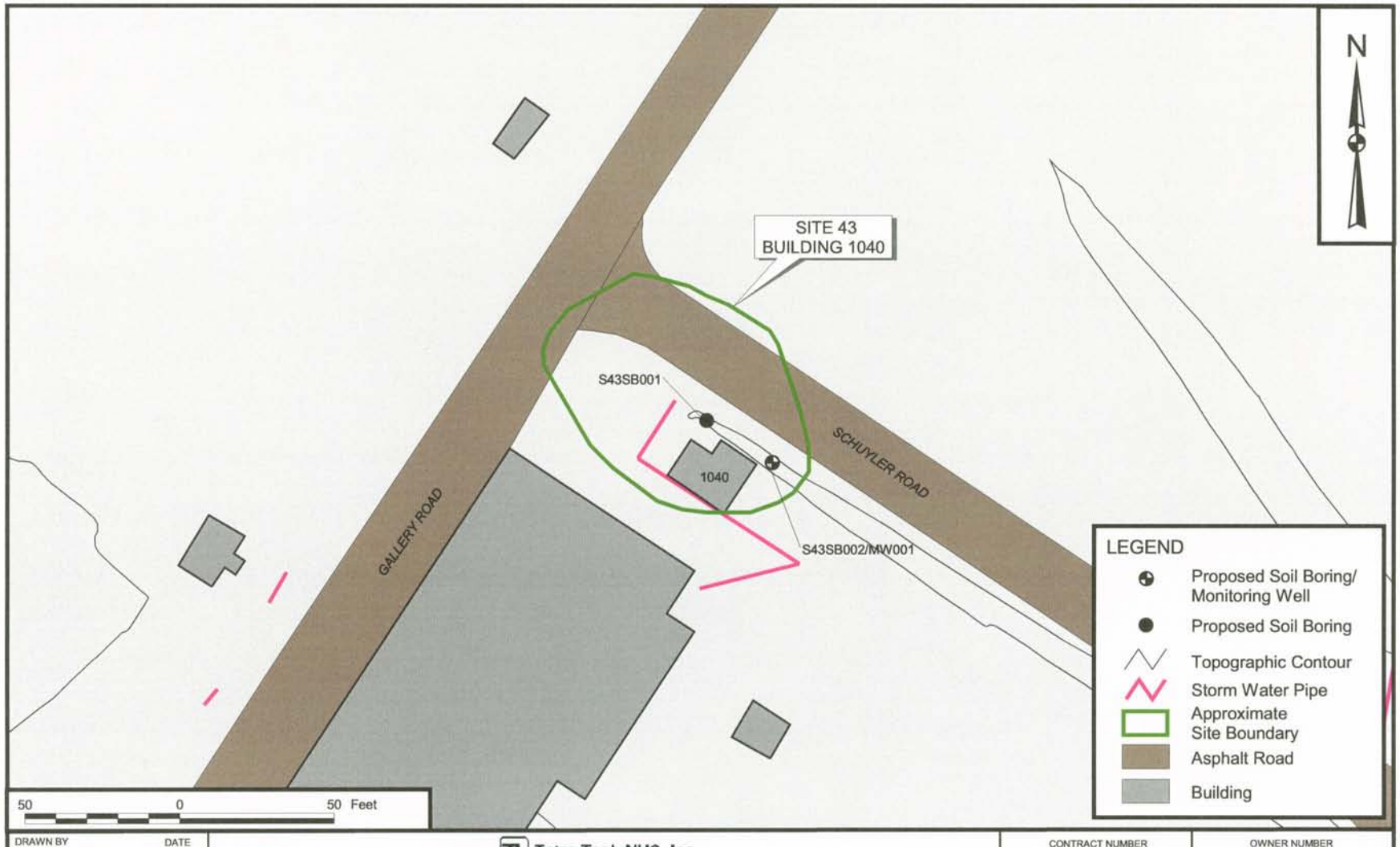
Table 2-1 is a summary of the samples to be collected and the associated laboratory analysis. The sample locations are shown on Figure 2-1 (Building 1040) and Figure 2-2 (Building 1041). Sampling locations are approximate and may be moved based on field conditions (e.g., presence of utilities, clearance for drilling rigs).

TABLE 2-1

SAMPLING AND ANALYSIS SUMMARY
SITE 43 – TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Location	Sample Number	Sample Depth (feet bgs)	Laboratory Analysis		
			TCL VOCs	TAL Metals	Explosives
Soil					
S43SB001	S43SS0010001	0 to 1	X	X	X
	S43SB0010101	1 to 2[(1)]	X	X	X
S43SB002/MW001	S43SS0020001	0 to 1	X	X	X
	S43SB0020101	1 to 2[(1)]	X	X	X
S43SB003	S43SS0030001	0 to 1	X	X	X
	S43SB0030101	1 to 2[(1)]	X	X	X
S43SB004	S43SS0040001	0 to 1	X	X	X
	S43SB0040101	1 to 2[(1)]	X	X	X
S43SB005	S43SS0050001	0 to 1	X	X	X
	S43SB0050101	1 to 2[(1)]	X	X	X
S43SB006/MW002	S43SS0060001	0 to 1	X	X	X
	S43SB0060101	1 to 2[(1)]	X	X	X
Groundwater					
S43MW001	S43MW0010101	NA	X	X	X
S43MW002	S43MW0020101	NA	X	X	X

1 Sampled depth may change based on field screening for organic vapors.
bgs Below ground surface.
NA Not applicable.
TAL Target Analyte List.
TCL Target Compound List.
VOCs Volatile Organic Compounds.



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COST/SCHEDULE-AREA		APPROVED BY: — — DATE: —	
SCALE: AS NOTED		DRAWING NO.: FIGURE 2-1	REV: 0

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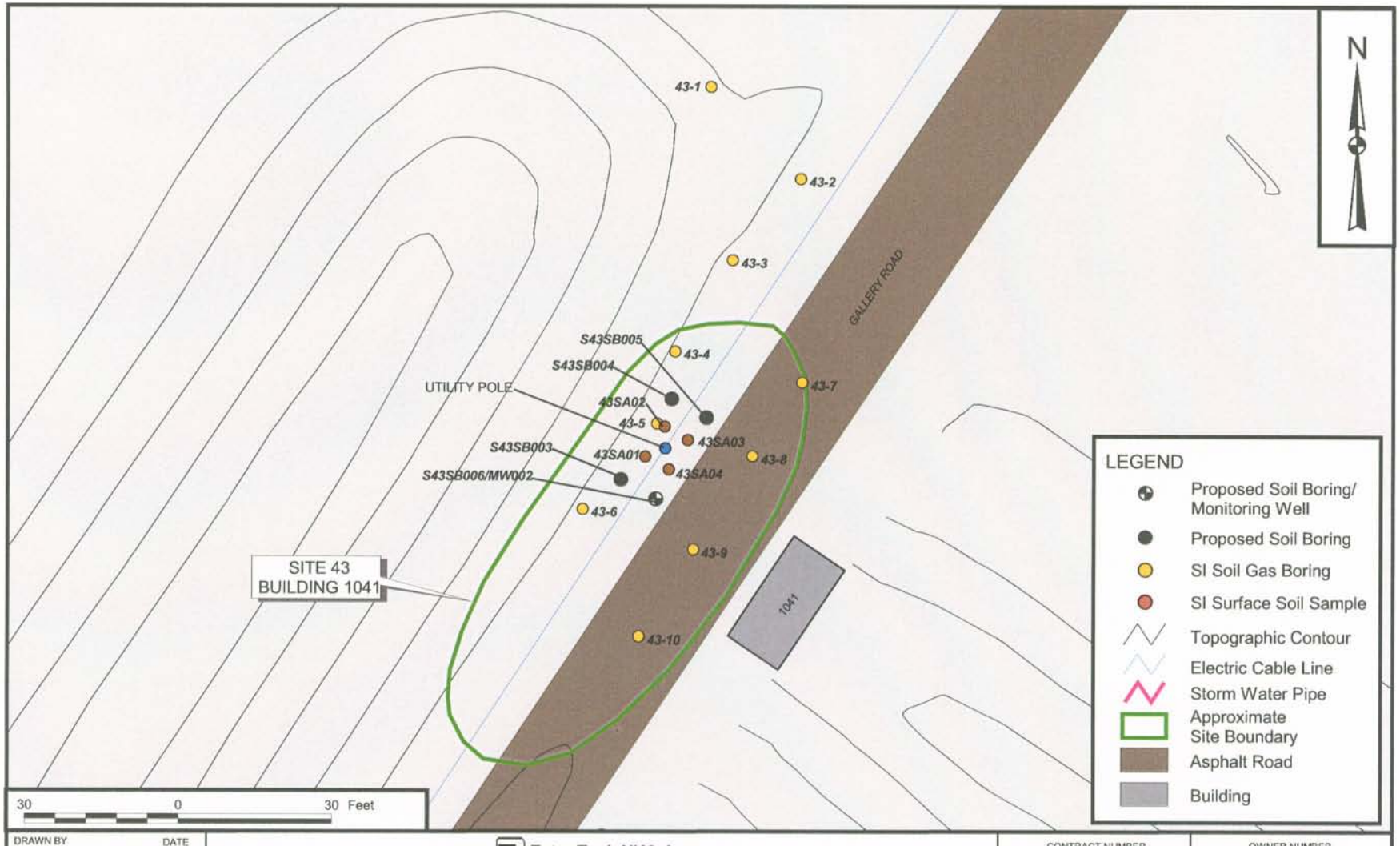

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COST/SCHEDULE-AREA		APPROVED BY: — — DATE: —	
SCALE: AS NOTED		DRAWING NO.: FIGURE 2-2	REV: 0

P:\GIS\INDIANHEAD_NSWC\APR\COMMUNITYRELATIONSPLAN.APR SITE 43 WORK PLAN LAYOUT 02/01/05 CF

3.0 FIELD OPERATIONS

A range of site evaluation techniques will be used to collect the data during the SSP investigation at Site 43. The Master FSP (TtNUS, 2004) that includes facility Standard Operating Procedures (SOPs) describes the general techniques used to collect the environmental samples and to document field activities.

This section provides specific field operations, methods, and procedures that will be conducted for this investigation.

3.1 MOBILIZATION/DEMOBILIZATION

During soil boring, monitoring well installation, and sampling, the field crew will consist of a field operations leader (FOL) and a qualified environmental technician. The FOL will be assigned the role of site safety officer for the field activities. Mobilization and demobilization operations will be performed as described in the Master FSP, Section 2.1.1. No work will commence without a Dig Permit from the Public Works Department and a Work Permit from the Safety Department.

The FOL will coordinate with facility personnel and with a TtNUS subcontractor for the utility clearance of soil boring locations. Utility clearance is required to obtain Dig and Work Permits.

Security badges will be required for all field crew members to gain access to the study area and will be obtained at the pass office (Building 1779). Prior to the arrival of the field crew at the facility main gate office, the TtNUS project manager will provide to the facility Environmental Division the TtNUS and subcontractor personnel information necessary to ensure that the security badges are obtained without delaying the project. This information will include the name, social security number, place of birth, date of birth, and citizenship for each individual and the name of the company for which they work.

The field crew will be required to attend a hazard control briefing administered by the Environmental Division Point of Contact.

3.2 SOIL BORING INSTALLATION

Soil borings will be advanced using hand augers, hollow-stem augers (HSA), or direct-push drilling (DPD). Additional guidance for advancing soil borings can be found in the Master FSP, Sections 2.2.1 and 2.2.3, and facility SOP SA-1.3.

3.3 MONITORING WELL INSTALLATION

Groundwater samples may be obtained from a monitoring well or using DPD techniques. Monitoring wells will be installed in accordance with Section 2.3 of the Master FSP and facility SOP GH-2.8. Collecting samples using DPD is described in Section 2.2.3 of the Master FSP and facility SOP SA-2.5.

3.4 SITE RESTORATION

If required as a result of the soil boring, monitoring well installation, and sampling activities during the field investigation, site restoration will be performed in accordance with procedures provided in Section 2.1.2 of the Master FSP.

3.5 DECONTAMINATION

Decontamination procedures will be conducted during the field investigation in accordance with procedures provided in Section 2.11 of the Master FSP and facility SOP SA-7.1.

3.6 INVESTIGATION-DERIVED WASTE HANDLING

The handling and disposal of investigation-derived waste (IDW) at the facility are discussed in detail in Section 2.12 of the Master FSP. The IDW that will be produced during this investigation includes borehole cuttings, decontamination fluids, personal protective equipment (PPE), and miscellaneous trash.

3.6.1 Borehole Cuttings

Borings advanced with a hand auger or HSA will be backfilled with the soil cuttings in accordance with Section 2.2.1 of the Master FSP.

3.6.2 Decontamination Fluids

Fluids generated during the decontamination of sampling equipment will be containerized in Department of Transportation (DOT) approved drums separately from solid materials for subsequent disposal in accordance with Master FSP Section 2.12. The drums will be DOT 1A1, Steel Drums with Non-Removable Heads.

3.6.3 Personal Protective Equipment and Miscellaneous Trash

PPE and any miscellaneous trash will be disposed in accordance with Master FSP Section 2.12.

3.7 SURVEYING

A registered land surveyor licensed to practice in the State of Maryland will survey the soil boring and monitoring well locations in accordance with Master FSP Section 2.10. Horizontal locations will be surveyed to Maryland State Plane coordinates [North American Datum (NAD) 1983]. Vertical elevations will be surveyed to National Geodetic Vertical Datum, 1929 (NGVD29).

If DPD techniques are used to obtain groundwater samples and monitoring wells are not installed, TtNUS personnel will determine horizontal locations using a global positioning system (GPS) survey in accordance with Master FSP Section 2.10.

4.0 FIELD SAMPLING PROCEDURES

This section describes the procedures for sampling and sample handling.

4.1 SAMPLING PROCEDURES

This section describes the field sampling procedures for the SSP investigation at Site 43. General field sampling procedures are described in the Master FSP and facility SOPs.

4.1.1 Surface Soil Sampling

Surface soil samples will be collected using procedures described in Master FSP Section 3.1.3 and facility SOP SA-1.3.

4.1.2 Subsurface Soil Sampling

Subsurface soil samples will be collected using procedures described in Master FSP Section 3.1.4 and facility SOP SA-1.3.

4.1.3 Groundwater Sampling

Groundwater samples will be collected using low-flow sampling procedures described in Master FSP Section 3.1.1 and facility SOP SA-1.1.

4.1.4 Quality Assurance/Quality Control Samples

To assure data obtained during the investigation are accurate, various quality assurance/quality control (QA/QC) requirements have been established for fieldwork, laboratory analysis of collected samples, and validation of analytical results obtained from the laboratory. Detailed information regarding this subject is presented in the Master QAPP. Information relevant to this work is presented in the site-specific QAPP in Appendix B.

The field QC samples consist of field duplicates, field blanks, trip blanks, and equipment (rinsate) blanks. Each of these types of field QC samples will undergo the same preservation, analysis, and reporting procedures as the related environmental samples. A detailed description of each type of sample is presented in the Master QAPP in Section 3.6. The frequencies and types of field QA/QC samples to be collected for this investigation are as follows:

Type of Sample	Collection Frequency
Field Duplicate	1 per 10 samples per medium
Field Blank	1 per source per sampling event
Trip Blank	1 per cooler containing samples for VOC analysis
Equipment Rinsate Blank	1 per 20 per sampling equipment

The QC measures that the laboratory needs to follow are outlined in detail during the procurement process. It is necessary to collect additional volume for laboratory matrix spike/matrix spike duplicate (MS/MSD) analysis of aqueous samples. All other internal checks will be conducted using the samples provided. One MS/MSD will be analyzed for very 20 or fewer investigative samples.

Validation of the analytical results is discussed in detail in Section 9.0 of the Master QAPP. One hundred percent of the data for the SSP investigation activities shall be validated in a limited fashion. The validation will be formulated to address only gross non-compliances resulting in the rejection of data and the elimination of false positives in accordance with the EPA National Functional Guidelines for Organic and Inorganic Data Review (1993 and 1994) as described in Section 9.2 in the Master QAPP.

4.2 SAMPLE HANDLING

This section details sample-handling procedures including field-related considerations concerning sample containers, preservatives, and allowable holding times for requested analyses. In addition, sample identification, packaging, and shipping will be addressed in this section.

4.2.1 Field Documentation

Field documentation will be conducted as described in the Master FSP Section 3.2.1 and facility SOP SA-6.3. Completed chain-of-custody forms will be faxed to the TtNUS project manager on a daily basis.

4.2.2 Sample Nomenclature

Each sample collected will be assigned a unique sample tracking number consisting of a 12-digit alphanumeric code conforming to facility SOP CT-04. Any other pertinent information regarding sample identification will be recorded in the field logbooks and on the sample log sheets.

The alphanumeric code to be used in the sample identification system is as follows:

Character Type:

A	=	Alpha
N	=	Numeric
E	=	Either alpha or numeric

(ANN)	(AA)	(EEE)	(NN)	(NN)
[Site]	[Sample Type]	[Location]	[Depth]	[Round]

No dashes are to be used in the sample number.

Site: S43

Sample Type:

MW	=	Monitoring well groundwater sample
SS	=	Surface soil sample
SB	=	Subsurface soil sample
TW	=	Temporary well groundwater sample

This field may also be used for QA/QC designation:

FB	=	Field blank
FD	=	Field duplicate
RB	=	Rinsate blank
TB	=	Trip blank

Sample Location:

EEE	=	Assigned number for each sample location of a particular medium; QA/QC samples will be numbered sequentially in the order of collection beginning with 001.

The first rinsate blank collected during the first field effort would be labeled as follows:

S43RB0010001

Sample Depth:

NN = Numbered sequentially in the order the sample is collected from a single location and representing a unique sampling depth at that location starting with 00.

Sampling Round:

NN = The sampling round can range from 01 to 99.

Field duplicate samples will be reported blind to the laboratory. The three-digit sample location identifier field will be assigned with the designation DUP. The sample depth field will be assigned the duplicate number collected for that specific matrix. The time designated on the sample label and chain-of-custody form shall be 0000 hours. The location at which the duplicate is collected will be noted on the sample log sheet and in the field notebook.

For example, the first surface soil duplicate sample collected during the first field effort would be labeled as follows:

S43SSDUP0101

Additional guidance is provided in facility SOP CT-04.

4.2.3 Sample Containers, Preservatives, and Holding Times

The EPA User's Guide to the Contract Laboratory Program (EPA, 1986) and the Federal Register (October 26, 1984) address the topics of containers and sample preservations. Table 4-1 provides a summary of the analyses, methodologies, bottle requirements, preservation requirements, and holding times for the sampling to be submitted for fixed-base laboratory analysis. A comparison of the analytical method detection limits to the screening levels that will be used is provided in Tables 1-1 and 1-2 of the QAPP (Appendix B).

4.2.4 Sample Packaging and Shipping

Samples will be packaged in accordance with the Master FSP Section 3.2.4 and facility SOP SA-6.1. When the samples are containerized, they will be placed on ice in a cooler and within a reasonable period of time delivered to a local Federal Express office. Sample containers provided by the laboratory are pre-preserved. The FOL will be responsible for completion of the following forms:

- Sample labels
- Chain-of-custody forms
- Chain-of-custody labels

4.3 SAMPLE CUSTODY

Custody of samples must be maintained and documented at all times. Chain of custody begins with the collection of the samples in the field. The Master FSP Section 3.3 and facility SOP SA-6.3 provide additional guidance for sample custody procedures.

TABLE 4-1

SUMMARY OF FIXED-BASE LABORATORY ANALYSES, METHODOLOGIES, BOTTLE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
SITE 43 – TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Analysis	Analytical Method	Quantity of Samples[1]	Quantity of Containers per Sample	Container Type	Preservation Requirements	Holding Times[2]
SOIL						
TCL VOCs	CLP SOW OLM04.3	12	3	EnCore Samplers	Cool to 4°C	48 hours to lab preservation; 14 days to analysis
TAL Metals	CLP SOW ILM04.1	12	1	8-oz. wide-mouth glass	Cool to 4°C	6 months to analysis; 28 days for mercury
Explosives	SW-846 8330	12	1	8-oz. wide-mouth glass	Cool to 4°C	14 days to extraction; analysis within 40 days of extraction
Nitroguanidine/ Nitrocellulose	USATHAMA	12	1	8-oz. wide-mouth glass	Cool to 4°C	14 days to extraction; analysis within 40 days of extraction
Nitroglycerin	SW-846 8332	12	1	8-oz. wide-mouth glass	Cool to 4°C	14 days to extraction; analysis within 40 days of extraction
GROUNDWATER						
TCL VOCs (low concentration)	CLP SOW OLC03.2	2	3	40 ml glass; phenolic plastic screw cap; Teflon-lined septum	Cool to 4°C; HCL to pH < 2; zero headspace	14 days
TAL Metals	CLP SOW ILM 04.1	2	1	1,000-mL polyethylene	Cool to 4°C; HNO_3 to pH <2	6 months to analysis; 28 days for mercury
Explosives	SW-846 8330	2	1	1,000-mL amber glass; Teflon-lined cap	Cool to 4°C	7 days to extraction; analysis within 40 days of extraction

TABLE 4-1

SUMMARY OF FIXED-BASE LABORATORY ANALYSES, METHODOLOGIES, BOTTLE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
SITE 43 – TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Analysis	Analytical Method	Quantity of Samples[1]	Quantity of Containers per Sample	Container Type	Preservation Requirements	Holding Times[2]
Nitroguanidine/ Nitrocellulose	USATHAMA	2	1	1,000-mL amber glass; Teflon-lined cap	Cool to 4°C	7 days to extraction; analysis within 40 days of extraction
Nitroglycerin	SW-846 8332	2	1	1,000-mL amber glass; Teflon-lined cap	Cool to 4°C	7 days to extraction; analysis within 40 days of extraction

NOTES:

CLP	Contract Laboratory Program.
HCl	Hydrochloric acid.
HNO_3	Nitric acid.
SOW	Statement of Work.
TAL	Target Analyte List.
TCL	Target Compound List.
USATHAMA	United States Army Toxic and Hazardous Materials Agency.
VOCs	Volatile organic compounds.

1 Number does not include QA/QC samples to be analyzed.
2 All holding times are determined from date of collection.

REFERENCES

E/A&H (Ensafe/Allen & Hoshall), 1994. Final Site Inspection Report, Phase II, Indian Head Division, Naval Warfare Center. Memphis, Tennessee.

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EPA, 1993. USEPA National Functional Guidelines for Inorganic Data Review as modified for use in USEPA Region 3.

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EPA, 2000. Guidance for the Data Quality Objectives Process, EPA QA/G-4. EPA/600/R-96/055. Washington, D.C.

NEESA (Naval Energy and Environmental Support Activity), 1992. Preliminary Assessment Report, Naval Ordnance Station, Indian Head, Maryland. Port Hueneme, California.

TtNUS (Tetra Tech NUS, Inc.), 2004. Master Plans for Installation Restoration Program Environmental Investigations at Naval District Washington, Indian Head, Indian Head, Maryland. King of Prussia, Pennsylvania.

APPENDIX A

PROJECT-SPECIFIC HEALTH AND SAFETY PLAN

Health and Safety Plan

For

Site 43 – Toluene Disposal

Naval District Washington
Indian Head

Indian Head, Maryland

Naval Facilities
Engineering Command Washington
Northern Division Contract No. N62472-03-D-0057
Contract Task Order 0006

June 2005

HEALTH AND SAFETY PLAN
FOR

SITE 43 – TOLUENE DISPOSAL

NAVAL DISTRICT WASHINGTON, INDIAN HEAD
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Washington
1314 Harwood Street, S.E.
Washington, D.C. 20374-5018

Submitted by:
Tetra Tech NUS, Inc.
600 Clark Avenue, Suite 3
King of Prussia, PA 19406-1433

NORTHERN DIVISION CONTRACT NO. N62472-03-D-0057
CONTRACT TASK ORDER 0006

June 2005

PREPARED UNDER THE SUPERVISION OF:

Kim Turnbull

KIM TURNBULL
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TETRA TECH NUS, INC.
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APPROVED FOR SUBMITTAL BY:

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1.0 INTRODUCTION

The objective of this Health and Safety Plan (HASP) is to provide the minimum safety practices and procedures for Tetra Tech NUS, Inc. (TtNUS) and subcontractor personnel engaged in the Site Screening Process Investigation that is to be conducted at the Site 43 Toluene Disposal at the Naval District Washington, Indian Head (NDW-IH), Indian Head, Maryland.

In order to accomplish the objective, this HASP has been constructed using the latest available information regarding known or suspected chemical contaminants and potential and foreseeable physical hazards associated with the proposed work at the sites identified at the NDW-IH. This HASP has been designed to be used in accordance with the TtNUS Health and Safety Guidance Manual. The Guidance Manual provides detailed information pertaining to procedures to be performed on site as directed by the HASP, as well as TtNUS standard operating procedures. Both the HASP and the Health and Safety Guidance Manual must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.120.

This HASP has been written to support proposed tasks and techniques associated with the scope of work as presented in Section 4.0. Should the proposed work site conditions and/or suspected hazards change, or if new information becomes available, this document will be modified. Changes to the HASP will be made with the approval of the TtNUS CLEAN Health and Safety Manager (HSM) and the Project Manager (PM). The PM will notify the affected personnel of the changes.

The elements of this HASP are in compliance with the requirements established by OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER).

1.1 AUTHORITY

This Contract Task Order (CTO) 0006 and the requirements setforth represent an integral part of an overall effort conducted under the Comprehensive Long - Term Environmental Action Navy (CLEAN) contract, administered through the U.S. Navy Northern Division Naval Facilities Engineering Command, as defined under Contract No. N62472-03-D-0057.

1.2 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in on site activities. Personnel assigned to these positions shall exercise the primary

responsibility for the on site health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures.

- The TtNUS Project Manager (PM) is responsible for the overall direction and implementation of health and safety for this project.

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of this HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the work plan, and enforces safety procedures, as applicable to the work plan.

- The SSO supports site activities by advising the FOL on the aspects of health and safety on site. These duties may include the following:

    - Coordinates health and safety activities with the FOL.
    - Selects, inspects, implements, and maintains personal protective equipment.
    - Establishes work zones and control points.
    - Directs and assists in the development of decontamination areas and procedures.
    - Implements air monitoring program in support of on site activities.
    - Verifies training and medical status of on site personnel status in relation to site activities.
    - Implements hazard communication, respiratory protection, and other associated safety and health programs, as necessary.
    - Provides site-specific training for on site personnel.

- Compliance with these requirements is monitored by the Project Health and Safety Officer (PHSO) and is coordinated through the Health and Safety Manager.

1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval District Washington Indian Head (NDW-IH) **Address:** Indian Head, Maryland

Site Point of Contact: Shawn Jorgensen **Phone Number:** (301) 744-2263

Scheduled Activities: Site Screening Process Investigation (See Section 4.0)

Proposed Dates of Work: Spring/Summer 2005

Project Team:

TtNUS Management Personnel:	Discipline/Tasks Assigned:
Kim C. Turnbull	Project Manager (PM)
TBD	Field Operations Leader (FOL)
TBD	Field Geologist
Matthew M. Soltis, CIH, CSP	Health and Safety Manager (HSM)
TBD	Site Safety Officer (SSO)
Clyde J. Snyder	Project Health and Safety Officer (PHSO)

Non-TtNUS Personnel	Affiliation/Discipline/Tasks Assigned

Hazard Assessment (for purposes of 29 CFR 1010.132) for HASP preparation has been conducted by:
Clyde J. Snyder

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. Site activities will be coordinated with the client contact, Shawn Jorgensen. In the event of an emergency which cannot be mitigated using onsite resources, personnel will evacuate to a safe place of refuge and the appropriate emergency response agencies will be notified. It has been determined that the majority of potential emergency situations would be better supported by outside emergency responders. Based on this determination, TtNUS and subcontractor personnel will not provide emergency response support beyond the capabilities of onsite response. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. Navy contact Shawn Jorgensen will be notified anytime outside response agencies are contacted. This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(l)(1)(ii).

TtNUS will, through necessary services, provide the following emergency action measures:

- Initial stage fire fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations such as confined space entry
- Initial medical support for injuries or illnesses requiring basic first-aid
- Site control and security measures as necessary

2.2 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, it is anticipated that emergencies resulting from chemical, physical, or fire hazards are unlikely given the nature of site activities.

Nonetheless, to minimize and eliminate the potential for any emergency situations, emergency planning activities will include the following (which are the responsibility of the FOL):

- Coordinating with Base Fire Protection and Emergency Services to notified of scheduled events and activities.

- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:

  - Chemical Inventory (of chemicals used onsite), with Material Safety Data Sheets.
  - Onsite personnel medical records (Medical Data Sheets).
  - A log book identifying personnel onsite each day.
  - Hospital route maps with directions (these should also be placed in each site vehicle).
  - Emergency Notification - phone numbers.

The TtNUS FOL will be responsible for the following tasks:

- Identifying a chain of command for emergency action.

- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

- Periodically performing practice drills to ensure site workers are familiar with incidental response measures.

- Providing the necessary equipment to safely accomplish identified tasks.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. To adequately recognize chemical exposures, site personnel must have a clear knowledge of signs and symptoms of exposure associated with site contaminants. This information is provided in Table 6-1. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in detail in Sections 5.0 and 6.0. Additionally, early recognition of hazards will be supported by periodic site surveys to identify any situation predisposed to an emergency. The FOL will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Survey findings will be documented by the FOL in the site logbook, however, site personnel will be responsible for reporting hazardous situations.

Where potential hazards exist, TtNUS will initiate control measures to prevent adverse effects to human health and the environment.

The above actions will provide early recognition for potential emergency situations, and allow TtNUS to initiate necessary control measures. However, if the FOL determines that control measures are not sufficient to eliminate the hazard, TtNUS will withdraw from the site and notify the appropriate response agencies listed in Table 2-1.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by following this HASP, the Health and Safety Guidance Manual, and applicable OSHA regulations. Periodic site surveys of work areas and correction of any identified deficiencies prior to the commencement of that day's activities by the FOL will also assist in prevention of illness/injuries when hazards are recognized early and control measures initiated.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety or welfare of site workers. Specific examples of conditions that may initiate an evacuation include, but are not limited to the following: severe weather conditions; fire or explosion; and evidence of personnel overexposure to potential site contaminants.

In the event of an emergency requiring evacuation, personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the TtNUS FOL. Safe places of refuge will be identified prior to the commencement of site activities by the FOL and will be conveyed to personnel as part of the pre-activities briefing session. This information will be reiterated during daily safety meetings and indicated on the Safe Work Permits. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the TtNUS FOL or the on-site Incident Commander of the Emergency Response Team. The FOL will perform a head count at this location to account for and to confirm the location of site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel. The FOL will document the names of personnel onsite (on a daily basis) in the site Health and Safety Logbook. This information will be utilized to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site and away from water bodies.

2.5 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

TtNUS personnel will likely be working in close proximity to each other during planned site activities. Site personnel will initiate emergency notification to onsite personnel by voice commands, hand signals, vehicle horns, or line of site communication to alert site personnel of an emergency. When project tasks are performed simultaneously on different sites, radios will be used to communicate emergency situations and request assistance. The Fire Department will provide rescue services, if needed, during confined space entry operations. The details for notification must be documented in the permit.

If an emergency warranting evacuation occurs, the following procedures are to be initiated:

- Initiate the evacuation via appropriate and/or available communication method (hand signals, voice commands, etc.).
- Report to the designated refuge point.
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the FOL (serving as the Incident Coordinator) pertinent incident details.

In the event that site personnel cannot mitigate the hazardous situation, the FOL will enact emergency notification procedures to secure additional assistance in the following manner:

Contact pertinent emergency contacts listed in Table 2-1 and report the incident. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

2.6 EMERGENCY CONTACTS

Prior to initiating field activities, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted where it is readily available to site personnel. Facility maps should also be posted showing potential evacuation routes and designated meeting areas.

TABLE 2-1
EMERGENCY REFERENCE
SITE 43 – INDIAN HEAD DIVISION - NSWC

AGENCY	TELEPHONE
EMERGENCY (fire, ambulance, rescue, police)	(301) 744-4333
Site Point of Contact Shawn Jorgensen	(301) 744-2263
Navy Remedial Project Manager Joeseph Rail	(202) 685-3279
Hospital: Civista Medical Center	(301) 609-4000
Hospital: to Fort Washington Hospital	(301) 292-7000
National Capital Poison Center	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
TtNUS, Pittsburgh Office	(412) 921-7090
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Manager Kim C. Turnbull	(412) 921-8945
Project Health and Safety Officer Clyde J. Snyder	(412) 921-8904

2.7 EMERGENCY ROUTES TO HOSPITALS

The closest hospital to the NDW-IH is the Civista Medical Center in La Plata, Maryland. The alternate hospital is Fort Washington Hospital in Fort Washington, Maryland. Maps showing the proximity of the NDW-IH to both of the hospitals are included as Figure 2-1 and 2-1.1. Directions and maps to both Civista Medical Center and Fort Washington Hospital are provided below:

Civista Medical Center
701 East Charles Street,
La Plata, MD 20646
(301) 609-4000

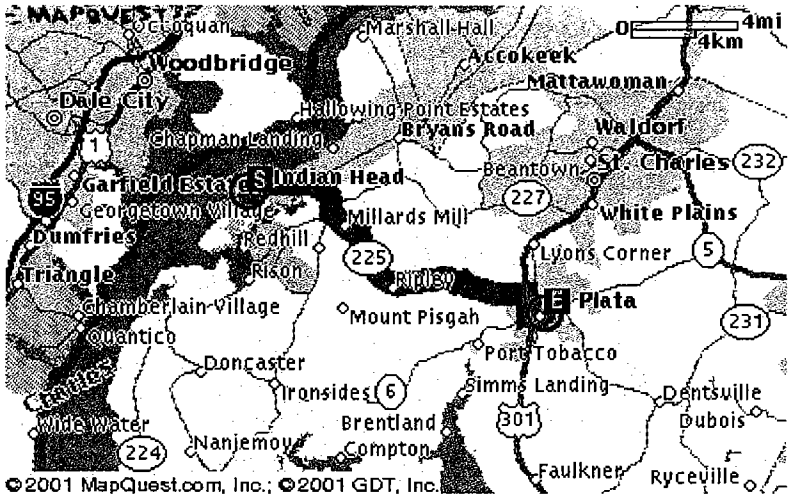
- Exit the facility and proceed east on MD Route 210 (Indian Head Highway) for 0.4 miles.
- Turn RIGHT on Route 228 (Hawthorne Road) and follow the road for 10.4 miles.
- Turn RIGHT on Route 301 South (Crane Highway) and follow the road for 0.7 mile.
- Turn LEFT on Route 6 (Charles Street) and follow the road for 0.6 mile.
- Turn RIGHT into the hospital.

Fort Washington Hospital
11711 Livingston Road
Fort Washington, MD 20744
(301) 292-7000

- Exit the facility and proceed east on MD Route 210 (Indian Head Highway) for 14.5 miles.
- Turn LEFT on Swan Creek Road East (Hawthorne Road) and follow the road for less than 0.1 mile.
- Turn RIGHT on Livingston Road and follow the road for 0.2 mile.
- Turn LEFT into the hospital.

FIGURE 2-1

Route To Civista Medical Center



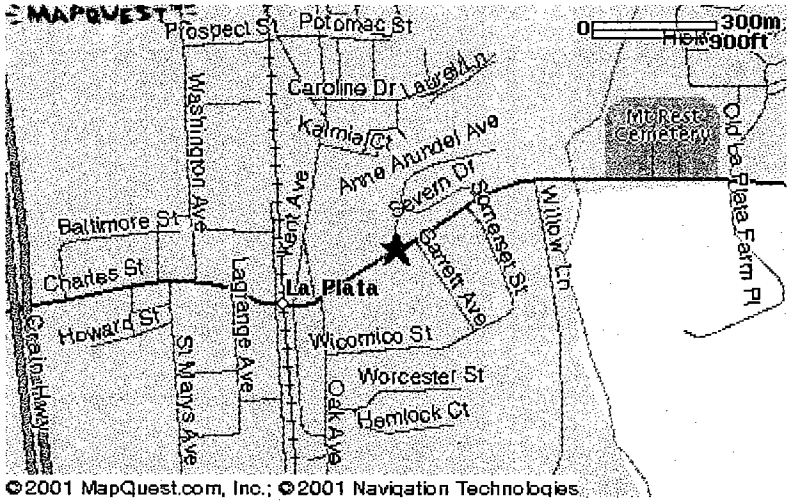
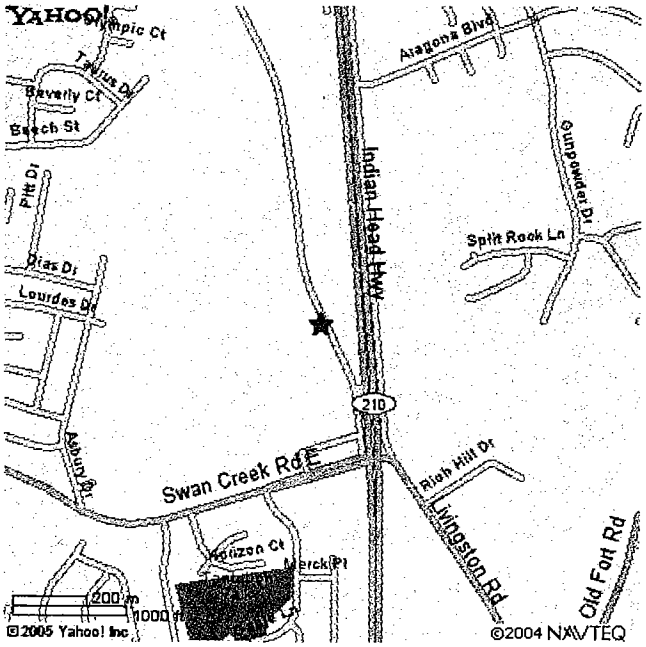


Figure 2-1.1

Route To Fort Washington Hospital Center



2.8 DECONTAMINATION PROCEDURES / EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will not be performed if the incident warrants immediate evacuation. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. Attachment I provides the procedure to follow when reporting an injury/illness, and the form to be used for this purpose. If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.

2.9 INJURY AND ILLNESS REPORTING

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical service personnel. This information is listed on Medical Data Sheets filed onsite (see Attachment II) If an exposure to hazardous materials has occurred, provide hazard information from Table 6-1 to medical service personnel. As soon as possible, Navy contact Shawn Jorgensen must be informed of any incident or accident that requires medical attention.

2.10 PPE AND EMERGENCY EQUIPMENT

A first-aid kit, eye wash units (or bottles of disposable eyewash solution) and a fire extinguisher will be maintained onsite and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office or site vehicle. Personnel identified within the field crew with bloodborne pathogen and first-aid training will be the only personnel permitted to offer first-aid assistance.

FIGURE 2-2

EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations.
In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109 or follow the voice prompt for after hours and weekend notification and be prepared to provide the following:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) and Human Resources Department (Marilyn Duffy) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare. WorkCare will compile the results of data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)
WORKCARE

POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known):_____

_____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing?_____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was their skin contact? _____

Was the exposing agent inhaled?_____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicated: _____ Physician Treated: _____

3.0 SITE BACKGROUND

3.1 FACILITY HISTORY

The NDW-IH is located in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, DC. The NDW-IH is a military facility consisting of the main area on the Cornwallis Neck Peninsula and the Annex on Stump Neck. The main area is bounded by the Potomac River to the northwest, west, and south, Mattawoman Creek to the south and east, and the town of Indian Head to the northeast. Stump Neck Annex is located across Mattawoman Creek. The Stump Neck Annex is not contiguous with the main area and is operated by a tenant. The primary mission of NDW-IH is to provide services in energetics, ordnance devices and components, and other related ordnance engineering standards, including chemicals, propellants, and their propulsion systems, explosives, pyrotechnics, warheads, and simulators. The United States Environmental Protection Agency (EPA) added NDW-IH to the National Priorities List (NPL) in September 1995, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. There are 48 sites at the main facility currently included in the NDW-IH Installation Restoration (IR) Program. Activities conducted under this HASP will occur at Site 43 Toluene Disposal.

3.2 SITE 43 - TOLUENE DISPOSAL

Site 43 includes two separate areas in the southwestern portion of the Main Area. The first is located near a utility pole approximately 30 feet northwest of and across the road from Building 1041, and the second is the northern cormer of Building 1040. It is estimated that, for a period of more than 2 years during parts-cleaning operations, unknown quantities of spent solvents were improperly disposed in the drainage ditch outside the door (northeast) of Building 1040 (acetone) and at the base of the pole by Building 1041 (acetone and toluene).

4.0 SCOPE OF WORK

This section of the HASP addresses proposed activities that are to be conducted at Site 43. Table 5-1, provides information related to each of these tasks that are to be performed as part of the scope of work. If other tasks, other than those identified, are to be performed at the site, this HASP will be modified. Specific tasks to be performed include:

- Mobilization/demobilization
- Soil Boring using hand augering, Hollow-Stem Augers (HSA) or Direct Push Technology (DPT)
- Multi-media sampling
  - Surface Soil
  - Subsurface Soil
  - Groundwater
- Decontamination of sampling equipment and Drill/DPT Rig
- Geographical surveying

Table 5-1, provides information related to each of these tasks that are to be performed as part of the scope of work. If other tasks, other than those identified, are to be performed at the site, this HASP will be modified.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section summarizes the potential hazards, by task, and their associated control measures for the work addressed by this site specific HASP. This table is intended to assist project personnel in the recognition of hazards and recommended procedures necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which personal protective equipment (PPE) and decontamination procedures to be used, as well as, appropriate air monitoring techniques and other requirements/restrictions. The evaluation of each task provides detailed information including anticipated hazards, recommended control measures, air monitoring recommendations, required PPE, and decontamination measures. This table will be updated if the scope of work, contaminants of concern, or pertinent conditions change.

This HASP, including Table 5-1, are meant to be used in conjunction with the TtNUS Health and Safety Guidance Manual. This manual is designed to further explain supporting elements for any site-specific operations as required by 29 CFR 1910.120. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of TtNUS's SOPs are also provided in the Guidance Manual.

Safe Work Permits will be issued (See Section 10.10 and Attachment III). The FOL and/or the SSO will use the elements defined in Table 5-1 as the primary reference. The Safe Work Permit is used to add additional site-specific information. In situations where the Safe Work Permit is more conservative than the direction provided in Table 5-1 due to the incorporation of site-specific elements, the Safe Work Permit will be followed.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1, follow these safe work practices when conducting work involving known and unknown site hazards. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Eating, drinking, chewing gum or tobacco, or taking medication, is permitted in the support zone only.
- Smoking is prohibited within the NDW-IH restricted area

- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.

- Avoid contact with potentially contaminated substances by walking around puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces.

- Avoid contact with unknown or unidentified objects. Remember UXO concerns can still be an issue at this site. Pin Flag and seek assistance in the identification of any articles of this nature that may impact the established work area.

- Be familiar with and adhere to the instructions in the site-specific HASP.

- Be aware of the location of the nearest telephone and emergency telephone numbers.

- Only approved communication devices (including cell phones) are permitted within the NDW-IH restricted area.

- Attend briefings on anticipated hazards, equipment requirements, Safe Work Permits, emergency procedures, and communication methods before going on site.

- Rehearse unfamiliar operations prior to implementation.

- Maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.

- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Safety Officer (SSO).

- Observe coworkers for signs of toxic exposure and heat or cold stress.

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 SOIL BORING SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when performing intrusive operations and when working in or around drilling or DPT Operations. Prior to intrusive investigation techniques check the SOP for Utility Locating and Excavation Clearance found in Attachment IV of this HASP.

5.2.1 Before Drilling/DPT

- Identify underground utilities and buried structures before performing intrusive activities including (augering, drilling and DPT activities).

- A Competent Person (the SSO or designee) will inspect rigs, prior to the acceptance of the equipment at the site and prior to the use of the equipment. Repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment V. Inspection frequencies will be once every shift or following repairs.

- The work area around the point of operation will surveyed to the extent possible to remove any trip hazards.

- The drill rig/DPT operator helper will establish an equipment staging and lay-down plan in order to keep the work area clear of clutter and slips, trips, and fall hazards.

- Potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.

- Prior to the start of boring operations, one individual will be designated as the person responsible for immediate activiation of the emergency stop device (if applicable) in the event of an emergency. This individual will be communicated to the field crew and will be responsible for visually checking the work area and verbally alerting personnel in the vicinity of boring operations prior to engaging the equipment.

5.2.2 During Drilling/DPT

- Secure frayed or loose clothing, hair, and jewelry when working with drilling/DPT equipment.
- Minimize contact to the extent possible with contaminated tooling and environmental media.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the rig of the height of the mast plus five feet to remove these activities from within physical hazard boundaries.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill/DPT rig.
- Minimize contact with potentially contaminated tools and media and to minimize lifting hazards, multiple personnel should move auger flights and other heavy tooling.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted.

5.2.3 After Drilling/DPT

- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determined cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.
- Motorized equipment will be fueled prior to the commencement of the days activities. During fueling operations the equipment will be shutdown and bonded to the fuel provider.
- When not in use rigs will be shutdown, emergency brakes set, and wheels chocked.
- Areas will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. Where these hazards cannot be removed the areas will be barricaded to minimize the impact on field crews working in the area.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INDIAN HEAD DIVISION NAVAL SURFACE WARFARE CENTER

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Air Monitoring Type/Action Levels	Personal Protective Equipment	Decontamination Procedures
Mobilization/ Demobilization Geographical surveying activities are also included in this task since similar hazards are likely to be encountered.	***Chemical hazards:*** 1) Exposure to potential site contaminants is not anticipated during this activity. However, chemicals brought on site in support of field activities are to be identified, logged, accompanied by an appropriate MSDS, properly stored, and evaluated for purposes of hazard communication. ***Physical hazards:*** Potential physical hazards associated with this task may include: 2) Lifting (muscle strains and pulls) 3) Pinches and compressions 4) Slip, trips, and falls 5) Contact/entanglement with moving machinery 6) Vehicular and foot traffic 7) Noise ***Natural hazards*** 8) Insect/animal bites or stings, poisonous plants, etc.	1)To eliminate potential chemical hazards associated with this task ensure the following: - A chemical inventory list is generated for chemicals brought on site (Complete Section 5.0 of the Tetra Tech NUS Health and Safety Guidance Manual). - Material Safety Data Sheets must be available for chemicals brought on site. - Materials are stored in accordance with recommended practices and according to compatibility (See MSDS for storage and compatibility recommendations). The FOL and/or the SSO will preview work locations in an effort to identify, barricade, and/or remove physical and biological hazards prior to the commitment of any personnel, equipment, or other resources. 2) Use machinery or multiple personnel for heavy lifts. - Use proper lifting techniques. - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. In determining whether you can lift an item several factors must be considered, these are as follows: - Maximum weight lifted by a single person should not exceed 70 pounds. Items over 70 pounds or the amount you feel you can confidently lift up to 70 pounds should define a point where assistance in the lift is sought. - Level of demand – Weight + frequency & duration. - Area available to maneuver the lift. - Area of the lift – Work place clutter, slippery surfaces - Overall physical condition 3) Use pinch bars or other equipment to keep hands from the point of operation. 4) Preview and prepare work locations where unstable/uneven terrain exists. Barricade hazards or steep embankments to restrict access. 5) Equipment to be used on site will be - Inspected in accordance with OSHA, and manufacturers design. The inspection will include the completion of the Equipment Inspection Checklist (Attachment V) documenting the review and acceptance/failure of safety devices, guards, emergency. - Operated by certified operators, and knowledgeable ground crew, as applicable. - Establish safe zones of approach. - Secure loose articles to avoid possible entanglement. 6) Identify access/egress routes and locations to within established areas of operation. - Work areas will be demarcated and proper signage placed in accordance with Site Control provisions stated in Section 9.1. - Equipment capable of self-propelled movement will be equipped with movement alarms as applicable. 7) As a general rule of thumb, if you need to raise your voice to be heard while engaged in conversation with someone who is within 2 feet of your position you may be exposed to excessive noise levels and should employ hearing protection. 8) Avoid insect nesting areas, employ repellents. Report potential hazards to the SSO. Frequently inspect clothing and persons during and after activities in wooded areas for ticks and other vectors	Not required during mobilization/demobilization.	Mobilization/demobilization activities is intended to initiate and proceed in Level D protection Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants; or coveralls) - Steel toe safety shoes - Safety glasses - *Hardhat (when overhead hazards exists, or identified as an operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario.* **Note:** The Safe Work Permit(s) (See Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	As potential site contaminants are not anticipated as part of this task, personal decontamination is not required. Equipment arriving/leaving the site will be inspected prior to permitting this equipment to enter or exit the site. The SSO will inspect the equipment and give the clearance to allow the equipment to pass. Failure to pass inspection will prohibit entering or exiting the site as applicable. Equipment which fails the inspection will have to be decontaminated again to a level acceptable to the SSO prior to passage on or off site. Equipment permitted to pass on/off site will be documented using an Equipment Inspection Checklist (Attachment V) indicating the equipment serial number, description, brief history of the other sites the equipment has been on, and the results of the inspection.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INDIAN HEAD DIVISION NAVAL SURFACE WARFARE CENTER

Tasks/Operation\ Location	Anticipated Hazards	Recommended Control Measures	Air Monitoring	Personal Protective Equipment *(Items in italics are optional as the FOL or SSO require)*	Decontamination Procedures
Soil Boring using DPT, Hand Auger or HSA techniques.	***Chemical hazards:*** 1) Potential site contaminants include various VOCs including toluene and acetone. See Table 6-1 for more information on these specific contaminants of concern. 2) Transfer of contamination into clean areas or onto persons ***Physical hazards:*** 3) Contact/entanglement with rotating equipment 4) Noise 5) Contact with underground or overhead utilities 6) Lifting 7) Slips, trips, and falls 8) Vehicular and foot traffic ***Natural hazards:*** 9) Insect/animal bites or stings, poisonous plants, etc.	1) Use real-time monitoring instrumentation, action levels, personal sampling, and identified PPE to control exposures to potentially contaminated media (e.g., air, water, soils, etc.). Any generation of dusts should be minimized to the greatest extent possible. If airborne dusts are observed, area wetting methods will be used. If area wetting methods are not feasible, upgraded levels of protection or termination of activities will be used to minimize exposure to excessive airborne dusts. 2) Decontaminate equipment and supplies between drilling events as well as prior to leaving the site. 3) All equipment will be: - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design, as applicable. All inspections will be documented using the Equipment Inspection - Checklist (for Drill Rigs) found in (See Attachment V) of this HASP. - Operated and supported by knowledgeable operators and ground crew. - Personnel not directly supporting this operation will remain at least 35-feet for HSA Rigs and 25 feet for DPT rigs from the point of operation or the height of the mast plus 5-feet, whichever is greater. - All personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then daily) to ensure its operational status. - One person will be designated as the Emergency Shut Off Device Operator. Prior to engaging the augers, the driller will announce, loud enough for all to hear that he is engaging the augers. He will visually confirm that all personnel are removed from the rotating equipment then engage the augers. - Areas will be inspected prior to the movement of the direct push rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - See additional safe work procedures for drilling in Section 5.2 of this HASP as well as in Section 4.0 of the Health & Safety Guidance Manual. 4) Excessive noise levels will be mitigated through the use of hearing protection. Any piece of equipment or operation that has the potential to generate excessive noise levels (You must raise your voice to speak to someone within two feet of where you are standing) will require hearing protection. 5) Utility clearances shall be obtained in writing prior to subsurface activities. The locations of underground utilities will be identified and marked prior to subsurface investigations. Where the clearance cannot be obtained in a reasonable period, or not located, drilling shall proceed with extreme caution using a magnetometer for periodic downhole measurements to at least a depth of 6 feet. 6) Employ machinery or multiple personnel for heavy lifts. - Use proper lifting techniques. Use proper lifting techniques. - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. - Minimize the horizontal distance to the center of the lift to your center of gravity. Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. In determining whether you can lift an item several factors must be considered, these are as follows: - Maximum weight lifted by a single person should not exceed 70 pounds. Items over 70 pounds or the amount you feel you can confidently lift up to 70 pounds should define a point where assistance in the lift is sought. 7) Preview work locations for unstable/uneven terrain. 8) Traffic and equipment considerations are to include the following: - All equipment shall be equipped with movement warning systems. - Employees (on foot) exposed to the hazard of vehicular traffic shall wear reflective bright colored vests. - Flaggers shall be used at locations on a work site where barricades and warning signs cannot control the moving traffic. - For work where employees are exposed to traffic hazards on a roadway, a Traffic Control Zone shall be established with the following minimum elements: -- A warning sign shall be placed at 75-125 feet before the work area (depending on sight distance on the road) . -- A tapered line of cones shall be established beginning 55 feet before the work area to redirect traffic away from personnel performing work. Cones shall be at least 18 inches tall and shall be spaced approximately 4 feet apart. -- Traffic lanes shall be maintained a minimum of 10 feet wide. -- Situate a site vehicle with 4-way flashers immediately before the work area to form a protective barrier between workers and oncoming traffic. - Use safety belts and follow the site traffic rules. 9) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison ivy, poison oak, etc.). When feasible and necessary use commercially available insect repellants. Refer to the Health and Safety Guidance Manual for additional information regarding ticks and Lyme's disease.	**It is anticipated that potential contaminant concentrations at sample locations will not represent an inhalation hazard.** A Photoionization Detector w/ 10.2 eV UV lamp source, or a Flame Ionization Detector, will be used to monitor for applicable site contaminants. Source (borehole and monitoring well) monitoring will be conducted at regular intervals determined by the SSO. The SSO will also monitor the breathing zone (BZ) of potentially affected employees, with the following guidance: - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 100 ppm in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to below 100 ppm. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides.	Subsurface operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection - Standard field attire (Sleeved shirt; long pants) - Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire. - Surgical style nitrile gloves - Steel toe safety shoes - Safety glasses - Hardhat - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas, as directed by the SSO.* **Excessive chemical contaminant concentrations impacting field crews during this task are not anticipated.** **Note:** The Safe Work Permit(s) (See Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task. A separate safe work permit is written for the HRC	**Personnel Decontamination** will consist of a soap/water wash and rinse of outer protective equipment. This decontamination function may be subdivided into two locations: -Gross contamination of outer boots and outer gloves will be removed at a satellite location near the operation. -Final wash and rinse will take place at the centralized decontamination pad. The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Decon personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands **Equipment Decontamination** - Heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. Site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity. The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INDIAN HEAD DIVISION NAVAL SURFACE WARFARE CENTER

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Air Monitoring Type/Action Levels	Personal Protective Equipment *(Items in italics are optional as the FOL or SSO require)*	Decontamination Procedures
Multi-media sampling including surface/subsurface soils, ground water and Investigative Derived Waste (IDW) sampling.	***Chemical hazards:*** 1) Potential site contaminants include various VOCs including toluene and acetone See Table 6-1 for more information on these specific contaminants of concern. 2) Transfer of contaminants into clean areas or onto persons ***Physical hazards:*** 3) Noise 4) Lifting (muscle strains and pulls) 5) Pinches and compressions 6) Slip, trips, and falls 7) Vehicular and foot traffic ***Natural hazards:*** 8) Insect/animal bites or stings, poisonous plants, etc.	1) Use real-time monitoring instrumentation, action levels, personal sampling, and identified PPE to control exposures to potentially contaminated media (e.g., air, water, soils, etc.). Although not anticipated, generation of any dusts should be minimized to the greatest extent possible. If airborne dusts are observed, area wetting methods will be used. If area wetting methods are not feasible, upgraded levels of protection or termination of activities will be used to minimize exposure to excessive airborne dusts. 2) Restrict the cross use of equipment and supplies between sampling locations without first going through a suitable decontamination. 3) Due to operational and contributory activities in and about work areas, generated noise levels may be excessive. Noise control will be facilitated through the use of hearing protection. -As a general rule of thumb, anytime you must raise your voice to speak to someone to be heard within 2 feet of where you are standing the potential exists that sound pressure levels may be excessive. 4) Employ machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 5) Use pinch bars or other equipment to remove hands from the point of operation, when acquiring samples. 6) Preview work locations for unstable/uneven terrain. 7) Traffic and equipment considerations are to include the following: - Establish safe zones of approach - Personnel working in high equipment traffic areas are required to wear reflective vests for high visibility. - Employ safety belts and follow the site traffic rules. 8) Avoid insect nesting areas. Use insect repellents when necessary. Report potential hazards to the SSO.	**It is anticipated that potential contaminant concentrations at sample locations will not represent an inhalation hazard.** A direct reading Photoionization Detector (PID) with a 10.2 eV lamp, or a Flameionization Detector (FID), will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions: - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 100 ppm in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to below 100 ppm. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides.	Level D protection will be utilized for the initiation of sampling activities. Level D - (Minimum Requirements) - Standard field attire (long sleeve shirt; long pants) - Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists. - Nitrile surgical style gloves for sampling activities - Steel toe safety shoes - Safety glasses - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario.* **Excessive chemical contaminant concentrations impacting field crews during this task are not anticipated.** **Note:** The Safe Work Permit(s) (See Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personal decontamination** will vary based on the type of sampling conducted. These are as follows: Supporting subsurface investigations at the drill/DPT rig. Decontamination will be the same as prescribed for the drilling activity Upon completion of the sampling dedicated trowels, tubing, etc. will be bagged for transport back to the central decontamination area. PPE (gloves) will be removed and also bagged for disposal. Handi-Wipes or similar product will be used to clean hands prior to moving to the next location. **Equipment Decontamination** Equipment used in remote sampling locations will be brought back to the central decontamination area for decontamination and re-use or decontamination and gross removal of contamination prior to disposal. **Sampling Equipment Decontamination** Sampling equipment will be decontaminated as per the requirements in the Work Plan. Equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. Equipment used at Site 1 will be require a radiological survey (using the procedure provided in Section 7.1.3.) to verify that equipment is clean and free of any radiological material. **Note:** Field screening instruments will be wrapped to minimize the necessary decontamination except for wiping down parts which are necessary to expose to the external environment. The equipment reference above is largely directed at hand tools. Decontamination of equipment (sampling and hand tools) will proceed as indicated in the Work Plan.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INDIAN HEAD DIVISION NAVAL SURFACE WARFARE CENTER

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Air Monitoring	Personal Protective Equipment	Decontamination Procedures
Decontamination of sampling and heavy equipment	***Chemical hazards:*** 1) Potential site contaminants include various VOCs including toluene and acetone. See Table 6-1 for more information on these specific contaminants of concern. - Decontamination fluids - Liquinox (detergent), nitric acid, isopropanol. ***Physical hazards:*** 3) Lifting (muscle strains and pulls) 4) Noise 5) Flying projectiles 6) Vehicular and foot traffic 7) Slips, trips, and falls	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination solvents used onsite. Use appropriate PPE as identified on MSDS. Chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication section of the Health and Safety Guidance Manual (Section 5). 3) Use multiple persons where necessary for lifting and handling sampling equipment for decontamination purposes. - Stacks (drill flights) will be secured to prevent falling during decontamination and drying activities. 4) Wear hearing protection when operating pressure washer. 5) Use appropriate eye and face protective equipment (safety glasses underneath a face shield) when operating pressure washer. Other personnel must be restricted from the area. 6) Traffic and equipment considerations are to include the following: - Establish safe zones of approach - Secure loose articles to avoid possible entanglement. - Equipment shall be equipped with movement warning systems. - Use safety belts and follow the site traffic rules. 7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in Section 4 of the TtNUS Health and Safety Guidance Manual. 8) Preview work locations for unstable/uneven terrain.	Use visual observation, and real-time monitoring instrumentation to ensure equipment has been properly cleaned of contamination and dried. After decon is completed, screen equipment with a PID/FID If any elevated readings (I.e., above background) are observed, perform decon again and rescreen. Repeat until no elevated PID/FID readings are noted.	For Heavy *Equipment.* Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Steel toe safety shoes - Chemical resistant boot covers - Nitrile rubber or natural rubber gloves - Safety glasses If using pressure washer, or steam cleaning wash and rinse procedures, add the following to the above PPE: - PVC Rainsuits or PE or PVC coated Tyvek - Splash shield over safety glasses For sampling equipment the following PPE is required Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Steel toe safety shoes - Nitrile rubber or natural rubber gloves - Safety glasses underneath a splash shield In the event of overspray of chemical decontamination fluids employ PVC Rainsuits or PE or PVC coated Tyvek as necessary. **Note:** The Safe Work Permit(s) (See Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). This decontamination function may be subdivided into two locations. Gross contamination of outer boots and outer gloves will be removed at a satellite location near the operation. Final wash and rinse will take place at the centralized decontamination pad. The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Decon personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands **Equipment Decontamination** - Heavy equipment decontamination will take place at a centralized decontamination pad utilizing a pressure washer. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. Site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity. **Sampling Equipment Decontamination** Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan. Equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation. **NOTE:** Equipment used at Site 1 will be require a radiological survey (using the procedure provided in Section 7.1.3.) to verify that equipment is clean and free of any radiological material.

6.0 HAZARD ASSESSMENT

This section provides information regarding the chemical and physical hazards associated with the proposed work sites including Site 43 of the NDW-IH and the activities that are to be conducted as part of the scope of work. Table 6-1 provides various information related to the chemical contaminants that may be present at the site. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are also discussed in that table.

6.1 CHEMICAL HAZARDS

The potential health hazards associated with Site 43 include inhalation, ingestion, and dermal contact with various contaminants which may be present at the site in the soil. Prior sampling activities identified toluene and actone in concentrations that could be potentially hazardous to human health.

Information on the toxicological, chemical, and physical properties of other potential contaminants of concern is addressed in Table 6-1 of this HASP. It is anticipated that the greatest potential for exposure to site contaminants is during activities in which contact with potential contaminated media exists (soil boring, monitoring well installations, sampling activities, etc.).

6.2 PHYSICAL HAZARDS

In addition to the chemical hazards discussed above, the following physical hazards may be present during the performance of site activities.

- Slips, trips, and falls.
- Heavy equipment hazards.
- Noise in excess of 85 decibels (dBA).
- Inclement weather.
- Natural hazards (contact with poisonous plants and disease carrying animals and insects).
- Other physical hazards associated with ongoing facility operations (proximity to heavy equipment and machinery, vehicular traffic, etc.).

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL DISTRICT WASHINGTON, INDIAN HEAD, Site 43

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Acetone	67-64-1	PID: I.P. 9.69 eV, high response with PID and 10.2 eV lamp. FID: 60 % relative response ratio with FID.	Air sample using a charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol shall proceed in accordance with OSHA Method #69, 07 or NIOSH Method #1300.	OSHA: 1000 ppm ACGIH: 750 ppm, 1000 ppm STEL NIOSH: 250 ppm IDLH: 2500 ppm	Adequate - Can use air purifying respirator with organic vapor cartridge up to 2500 ppm. Recommended glove: Natural rubber	**Boiling Pt:** 133°F; 56°C **Melting Pt:** -139°F; -95°C **Solubility:** Miscible **Flash Pt:** 0°F; -18°C **LEL/LFL:** 2.5% **UEL/UFL:** 13% **Vapor Density:** Not available **Vapor Pressure:** 180 mmHg **Specific Gravity:** 0.79 **Incompatibilities:** Oxidizers, acids **Appearance and odor:** Colorless liquid with a fragrant mint-like odor.	Exposure to this chemical may result in irritation to the eyes, nose, throat. Overexposure may cause headache, dizziness. Contact with the skin may cause dermatitis. Target organs are listed as the respiratory system (lungs) and skin.
Toluene	108-88-3	PID: I.P 8.82 eV, High response with PID and 10.2 eV lamp. FID: 110% response with FID.	Air sample using charcoal tube; carbon disulfide desorption. Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1500.	OSHA: 200 ppm 300 ppm (Ceiling) ACGIH: 50 ppm (skin) NIOSH: 100 ppm 150 ppm STEL IDLH: 500 ppm	Adequate - Odor threshold 1.6 ppm is considered good. Can use air-purifying respirator with organic vapor cartridge up to 1,000 ppm. **Recommended gloves:** Teflon >15.00 hrs; Viton >16.00 hrs; silver shield >6,00 hrs; supported nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection); PV alcohol >25.00 hrs	**Boiling Pt:** 232°F; 111°C **Melting Pt:** -139°F; -95°C **Solubility:** 0.05% (61°F;16°C) **Flash Pt:** 40°F; 4°C **LEL/LFL:** 1.2% **UEL/UFL:** 7.1% **Vapor Density:** 3.14 **Vapor Pressure:** 20 mmHg @ 65°F; 18° C **Specific Gravity:** 0.87 **Incompatibilities:** Strong oxidizers **Appearance and odor:** Colorless liquid with a sweet pungent aromatic odor.	Overexposure to this substance may result in mild to moderate irritation at all points of contact, and CNS changes including euphoria, confusion, nervousness, and possibly paresthesia characterized by an abnormal burning sensation, pricking, or numbness. At 200-500 ppm exposure has resulted in headaches, nausea, eye irritation, loss of appetite, bad taste, impair coordination, fatigue, and weariness. Chronically, toluene overexposure may result in dermatitis, liver, and kidney damage.

These physical hazards and their applicability to each site task are discussed in detail in Table 5-1. Additionally, each of these physical hazards is discussed in detail in the TtNUS Health and Safety Manual.

6.2.1 Slip, Trip and Fall Hazards

Various potential slip, trip, and fall hazards may be encountered during the performance of planned site activities. These hazards are associated with working out doors where uneven or wet terrain may be encountered, or near the edge of bodies of water, as well as on boat decks and docks. To minimize the potential for worker injury from these hazards, the following requirements must be observed:

- Maintain proper housekeeping in work areas.
- Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. In outdoor locations, pay particular attention to sink holes or other depressions that may be encountered.
- Any work that is to be done on structures that are more than 6-feet above floor or ground level will require fall protection training and the use of 100% fall protection equipment.
- Cover, guard, barricade, and/or place warning postings over/at holes or openings that personnel may fall or step into.
- For traversing steep, slippery, or sloped terrain establish rope ladders to control ascent and descent to sampling areas or use alternative pathways.
- Maintain 5 foot distance from excavation.

6.2.2 Strains/Muscle Pulls

To prevent injuries due to improper lifting and carrying methods estimate the weight and configuration of the load (i.e., is it bulky or hard to safely grasp/lift/control). If it appears to be too heavy or bulky to safely handle alone, either use a mechanical lifting device or obtain help from another employee to lift the load. The use of mechanical lifting devises is always preferable over manual lifting. Use the following practices:

- Bend at the knees (not at the waist) when attempting a lift.
- Get a firm hold is obtained, and keep the load as close to the body as possible.
- Lift the load using your legs, and not the back.

- Avoid turning or twisting while holding a load.
- Preview the path of travel to identify and eliminate tripping hazards.
- Do not carry loads that obstruct the line of sight.
- When setting a load down use the leg muscles and do not bend at the waist.
- Diuvide heavier loads into smaller amounts.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. In general, avoidance of areas of known infestation or growth will be the preferred exposure control for insects/animals and poisonous plants. Specific discussion on principle hazards of concern follows:

6.3.1 Insect Bites and Stings

Insect bites and stings are difficult to control given the climate and environmental setting of NDW-IH. However, in an effort to minimize this hazard the following control measures will be implemented where possible.

- Commercially available bug sprays and repellents will be used whenever possible – Pesticides analytical screening includes chlordane, endrin, lindane, methoxychlor, toxaphene and heptachlor. Commercially available repellants may be used. Products such as DEET should not be applied directly to the skin due to potential irritation. This product, when permitted for use, should be applied over clothing articles.

- Where possible, loose-fitting and light-colored clothing with long sleeves should be worn. This will also aid in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be secured to the work-boots using duct tape to prevent access by ticks. Mosquito nets are also recommended for use when commercially available repellents are not permitted.

- Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting heavily vegetated areas. Workers should perform a more detailed check of themselves when showering in the evening. Ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations.

- The FOL/SSO will preview access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to site personnel.

- The FOL/SSO must determine if site personnel (through completion of Medical Data Sheets), suffer allergic reactions to bee and other insect stings and bites. Field crew members who are allergic to bites should have their emergency kit containing antihistamine and a preloaded syringe of epinephrine readily available.

Any allergies (insect bites, bee stings, etc.) must be reported on the Medical Data Sheet and to the SSO.

Tick-Borne Disease

During warm months (spring through early fall), tick-borne lyme disease may pose a potential health hazard in Maryland which is listed as an area for lyme disease. The longer a disease carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots). Performing frequent body checks will prevent the tick from attaching for the long term. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures, and symptoms of exposure consult the health and safety guidance manual.

Mosquito-Borne Illness

The Maryland Department of Health is urging people to take precautions to avoid potentially dangerous mosquitoes. Mosquitoes in Maryland may carry diseases including St. Louis encephalitis, Eastern Equine encephalitis, La Crosse encephalitis and West Nile virus.

The Maryland Department of Health, along with a variety of agencies, routinely conducts testing in mosquitoes and birds to monitor for possible mosquito-borne viruses. Mosquitoes become infected after biting infected birds. The symptoms for mosquito-borne illnesses may include headache, moderate to high fever, stiff neck and confusion. In serious cases coma, seizures or paralysis can result. Symptoms usually appear between 5 to 15 days after exposure to infected mosquitoes. Mosquito-borne illnesses may be mild or serious and can lead to death.

Precautions include:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.

- Avoid standing water
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Apply insect repellent according to manufacturers instruction to exposed skin.
- Spray clothing with repellents containing permethrin or DEET
- Mosquitoes may bite through thin clothing.
- An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide).
- Avoid products containing more than 30% DEET.

6.3.2 Snakes and Other Wild Animals

Indigenous animals including snakes (only two poisonous and approximately 27 non-poisonous varieties in Maryland), raccoons, and other animals native to the region may be present at the site. These animals may be encountered if work locations encroach on nesting or territories claimed by these animals.

There are two poisonous snakes indigenous to the State of Maryland, the Northern Copperhead and the Timber Rattlesnake. Only the Northern Copperhead is indigenous to this part of the state. It is important to remember that snakes are rarely aggressive towards humans. If you encounter a snake simply maintain a safe distance and move away from it, or allow it to move away.

6.3.3 Poisonous Plants

Various plants which can cause allergic reactions may be encountered during field work. These include, poison ivy, poison oak, and poison sumac. Contact with these plants may occur when clearing vegetation for access to work areas, or as a result of movement through these plants. An irritating, allergic reaction can occur after direct contact with the plant or indirect contact through some piece of equipment or clothing article. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next.

Protective measures to control and minimize the effects of this hazard may include, but not be limited to, the following:

- Identify plants for field personnel.
  - Poison Ivy - Characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.
  - Poison Sumac - Characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with axillary clusters of white fruit: However, these white fruits and berries may exist only during pubescent stages.

- Poison oak - Characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.

- Protective measures may include wearing disposable garments such as Tyvek when clearing brush. These may be carefully removed and disposed of along with any oils accumulated from the plants.

- Personal Hygiene - The oils obtained from the plants will only elicit an allergic response when the person's bare skin layer is contacted. This can be aggravated when skin pores are open (perspiring), or through breaks in the skin such as cuts, nicks, scratches, etc. This can also be accomplished when using excessively hot water for cleaning the skin, which also causes pores to open. Prior to break time, lunchtime, etc. personnel should wash with cool water and soap to remove as much of the oils as possible. In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to prevent the oils from accessing and penetrating the skin.

These plants present an airborne sensitization hazard when burned. This is not to occur as part of this scope of work and therefore will not be addressed.

6.3.4 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors and near water. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, hurricanes, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.3.5 Vehicular and Equipment Traffic

Hazards associated with vehicular and equipment traffic are likely to exist during various site activities and whenever site personnel performed work on or near roadways. To minimize the potential for injuries associated with these hazards, traffic control measures will be instituted to protect site workers and the public. This will be accomolished through the use of:

- A warning sign shall be placed at 75-125 feet before the work area (depending on sight distance on the road) .
- A tapered line of cones shall be established beginning 55 feet before the work area to redirect traffic away from personnel performing work. Cones shall be at least 18 inches tall and shall be spaced approximately 4 feet apart.
- Traffic lanes shall be maintained a minimum of 10 feet wide.

- Situate a site vehicle with 4-way flashers immediately before the work area to form a protective barrier between workers and oncoming traffic.

Additionally, site personnel will be instructed to maintain awareness of traffic and moving equipment when performing site activities. When working near roadways, site personnel will wear high visibility vests. During movement of machinery, spotters will be used to safely facilitate equipment movement, during this movement site personnel will maintain visibility with equipment operators at all times. Additionally, site equipment will be subject to routine equipment inspections to ensure guards, emergency stops, and safety devices are present and operational.

7.0 AIR MONITORING

Direct reading instruments will be used at each site to detect and evaluate the presence of site contaminants and other potentially hazardous conditions and to screen sample media. Specific air monitoring measures and requirements are established in Table 5-1 pertaining to the hazards and tasks of an identified operation. Additionally Section 1.0, the Health and Safety Guidance Manual contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points (borings, sample locations, etc.) and worker breathing zone areas while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector and Flame Ionization Detector

A Photoionization Detector (PID) with a lamp energy of 10.2 electron volts (eV) or higher will be used to evaluate the presence of potential VOCs of concern. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during site activities (particularly during intrusive operations such as drilling and sampling). The PID has been selected because it is capable of detecting the organic vapors of concern (Note: A Flame Ionization Detector [FID] may be used as an alternative to the PID).

Before starting any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (weather, temperature, humidity, etc.), and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 Hazard Monitoring Procedure and Frequency

The following section and information provided in Table 5-1 presents the procedure and frequencies in which hazard monitoring will be performed as well as the action levels that will initiate the use of elevated levels of protection. The SSO may decide to increase the frequency of monitoring based on instrument responses and site observations. The frequency in which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

The PID/FID will be used to initially screen source areas at each sample or boring location. Any elevated readings at a source area will require that worker breathing zones in the work area be monitored to

determine if any VOCs are present that may create an inhalation exposure hazard. Readings obtained in worker breathing zones will be compared to the established action level. Any readings greater than 50 ppm in a workers breathing zone will be considered a potentially hazardous condition that will require personnel to leave the area and report to an unaffect area until readings subside to background levels.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager or the selected equipment vendor. Operational checks and field calibration will be performed on the instruments each day before use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer SOP (copies of which can be found in the Health and Safety Guidance Manual that will be maintained onsite for reference). Calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

7.3 DOCUMENTING INSTRUMENT READINGS

The SHSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SHSO is also responsible for ensuring that the instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. This includes the requirement for documenting instrument readings that indicate no elevated readings above noted daily background levels (i.e., no-exposure readings). At a minimum, the SHSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained

- Instrument used (e.g., PID, FID, LEL/0_2 meter, etc.)
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SHSO (such as weather conditions, possible instrument interferences, etc.)

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: _____ PROJECT NO.:_____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for both TtNUS and subcontractor personnel participating in site activities.

8.1.1 Requirements for TtNUS Personnel

TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the NDW-IH facility. Additionally, TtNUS personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training in the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120 (e)(4) will be required for site supervisory personnel.

Documentation of TtNUS introductory, supervisory, and refresher training as well as site-specific training will be maintained at the project. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.1.2 Requirements for Subcontractors

TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120 (e). Additionally, personnel who have had the introductory training more than 12 months ago, are required to have 8 hours of refresher training meeting the requirements of 29 CFR 1910.120 (e)(8) prior to performing field work at the NDW-IH facility if required. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided as in Figure 8-1 and by providing copies of certificates for subcontractor personnel participating in site activities.

FIGURE 8-1

OSHA TRAINING CERTIFICATION

The following statements must be typed on company letterhead and signed by an officer of the company and accompanied by copies of personnel training certificates:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Kim C. Turnbull
Project Manager
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Training

Dear Mr. Turnbull:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with the applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 1926.

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires appropriate level of training for certain employees engaged in hazardous waste operations. In this regard, I hereby state that the following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as requested by 29 CFR 1910.120(e) and have had 8 hours of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

Enclosed: Training Certificates

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to TtNUS employees and subcontractor personnel who will perform work on this project. Site-specific training will also be provided to other personnel (U.S. Department of Defense, EPA, etc.) who may enter the site to perform functions that may or may not be directly related to site operations. Site-Specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

Site-specific documentation will be established through the use of Figure 8-2. Site personnel and visitors must sign this document upon receiving site-specific training.

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS Personnel

TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office and made available, as necessary.

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing remedial investigation activities at Indian Head Division, Naval Surface Warfare Center and that I have received site-specific training which included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
    - Review of the use of Safe Work Permits

I have been given the opportunity to ask questions and my questions have been answered to my satisfaction. The dates of my training and medical surveillance indicated below are accurate.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

8.3.2 Medical Surveillance Requirements for Subcontractors

Subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" provided in Figure 8-3 shall be used to satisfy this requirement, providing it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute "Subcontractor Medical Approval Form" (See Figure 8-3) with a letter, on company letterhead, containing the information in the example letter presented in Figure 8-4 of this HASP.

8.3.3 Other Requirements for Field Personnel

Each field team member (including subcontractors) and visitors entering the Exclusion Zone(s) shall be required to complete and submit a copy of Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

Subcontractors who will not enter the Exclusion Zone during intrusive operations, and whose activities involve no potential for exposure to site contaminants, will not be required to meet the requirements for training/medical surveillance other than those stated for site-specific training (See Section 8.2).

FIGURE 8-3

SUBCONTRACTOR MEDICAL APPROVAL FORM

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f), and was found to be medically -

   ( ) qualified to perform work at the NDW-IH including Site 43
   ( ) not qualified to perform work at the NDW-IH including Site 43 and,

2. Undergone a physical examination in accordance with OSHA 29 CFR 1910.134(b)(10) and was found to be medically -

   ( ) qualified to wear respiratory protection
   ( ) not qualified to wear respiratory protection

3. My evaluation has been based on the following information, as provided to me by the employer.

   ( ) A copy of OSHA Standard 29 CFR 1910.120 and appendices.
   ( ) A description of the employee's duties as they relate to the employee's exposures.
   ( ) A list of known/suspected contaminants and their concentrations (if known).
   ( ) A description of any personal protective equipment used or to be used.
   ( ) Information from previous medical examinations of the employee that is not readily available to the examining physician.

Part B

I, _____, have examined _____
Physician's Name (print) Participant's Name (print)

and have determined the following information:

FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

   _____
   _____
   _____

2. Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health:

   _____
   _____
   _____

3. Recommended limitations upon the employee's assigned work:

   _____
   _____
   _____

I have informed this participant of the results of this medical examination and any medical conditions which require further examination of treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NDW-IH at Site 43, this participant

( ) may
( ) may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

NOTE: Copies of test results are maintained and available at:

_____
Address

FIGURE 8-4

MEDICAL SURVEILLANCE LETTER

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Kim C. Turnbull
Project Manager
Tetra Tech NUS, Inc.
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: Medical Surveillance for Naval District Washington, Indian Head

Dear Mr. Turnbull:

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR), Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response: Final Rule." I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a licensed physician, to perform hazardous waste site work and to wear positive- and negative- pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working at the NDW-IH Site 43 work site.

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555.

Sincerely,

(Name and Title of Company Officer)

9.0 SITE CONTROL

This section outlines the means by which TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site, including an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. It is also anticipated that this control measure will be used to control access to site work areas. Use of such controls will restrict the general public, minimize potentials for the spread of contaminants and to protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of active operations plus an established safety zone, depending on the task. the following represent the exclusion zone boundaries for the identified tasks:

- Soil Borings and Monitoring Well Installation – The boundary perimeter will be established by determining the height of the mast, plus 5 feet. therefore, a 35-foot mast plus 5 feet equals a 40-foot boundary surrounding the point of operation.
- Surface Soil– 10 feet surrounding sampling location.
- Groundwater Sampling – 10 feet surrounding the well head.
- Decontamination (heavy equipment – steam/pressure washers) – 35 feet surrounding the point of operation. this opeation will take place at a centralized location.

Where appropriate and necessary to direct facility personnel, this area will be delineated using barrier tape, cones and/or drive poles, and postings.

9.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) will be a buffer area between the Exclusion Zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting Exclusion Zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. Equipment potentially contaminated will be bagged and taken to that location for decontamination.

9.3 SUPPORT ZONE

The Support Zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. The Support Zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. Partially completed Permits for the work to be performed are included in Attachment III. The daily meetings conducted at the site will further support these work permits. This effort will ensure site-specific considerations and changing conditions are incorporated into the planning effort. Permits will require the signature of the FOL and SSO. Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

FIGURE 9-1
SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** _____

II. **Primary Hazards:** Potential hazards associated with this task include _____

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes	☐ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☐ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type –_____)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☐ No
Steel toe Work shoes or boots	☐ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☐ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: _____

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412) 921-7090

X. **Special instructions, precautions:** _____

Permit Issued by: _____ Permit Accepted by: _____

9.5 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (DOD, OSHA, DEP, etc.)
- Northern Division Navy Personnel
- Other authorized visitors

It is not anticipated that this operation will result in a large number of site visitors. However, as some visitors can reasonably be expected, the following requirements will be enforced:

- Site visitors will be routed to the FOL, who will sign them in to the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), who they represent, and purpose for the visit.

- Site visitors will be required to produce the necessary information supporting clearance onto the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Northern Division Navy personnel) and medical surveillance, as stipulated in Section 8 of this document. In addition to enter the site's operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this document.

NOTE: Site visitors will be escorted while at the site.

Following this, the site visitor will be permitted to enter the site and applicable operational areas. Visitors are required to observe the protective equipment and site restrictions in effect at the area of their visit. Visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause onsite activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the NDW-IH contact, if necessary.

9.6 SITE SECURITY

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. Exclusion Zone barriers, and any existing barriers at the site will be used to restrict the general public. The second line of security will take place at the work site referring interested parties to the FOL or designee. The FOL will serve as a focal point for non-project interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. When possible, these maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of personnel involved in this operation.

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS and subcontractor personnel will provide MSDSs for the chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of the chemicals used on site will be developed using the Health and Safety Guidance Manual. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.10 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crews members will not be necessary. External communication will be accomplished by using the telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities, the FOL will determine and arrange for telephone communications.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be handled at any given time, or that any cylinders or containers will be unearthed, as part of this scope of work. It is also not anticipated that such spillage of Investigative Derived Wastes (IDW) would constitute a danger to human health or the environment. However, as the job progresses, the potential may exist for accumulating (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters, in a central staging area. Once these fluids and other materials have been characterized, they can be removed from this area and properly disposed.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment.

It is anticipated that the IDW generated as a result of this scope of work will be containerized, labeled, and staged to await further analyses. The results of these analyses will determine the method of disposal.

10.3 LEAK AND SPILL DETECTION

During coring operations absorbent socks will be placed around coring location to contain water run-off.

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums or in the resource deployment area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the contents will be transferred, using a hand pump, into a new vessel. The leak will be collected and contained using absorbents such as Oil-Dry, vermiculite, or sand, which are stored at the vulnerable areas in a conspicuously marked drum. This used material, too, will be containerized for disposal pending analysis. Inspections will be documented in the project logbook.

It is not anticipated that any cylinders or containers will be unearthed during site activities. Should a cylinder or container be uncovered, however, work will immediately be stopped and personnel will retreat to a safe area until directed by the FOL or SSO.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

Personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and the SSO will serve as the Spill Response Coordinators for this operation, should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that may be maintained (depending on anticipated need) at the staging areas for the purpose of supporting this Spill Prevention/Containment Program.

- Sand; clean fill, vermiculite, or other non-combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 17-E or 17-H)
- Shovels, rakes, and brooms
- Absorbent Socks (for water containment during coring operations

10.5.1 PPE for Spill Control

Minimal PPE for spill control will be employed as needed. These materials may include:

- Nitrile work and inner gloves
- Tyvek coveralls
- Hard Hat
- Steel toed shoes with neoprene boot covers

10.6 SPILL CONTROL PLAN

This section describes the procedures the TtNUS field crewmembers will use upon the detection of a spill or leak.

- Notify the SSO or FOL immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove non-essential personnel.

- Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

- Re-containerize spills, including top cover impacted by the spill. Await test results for treatment or disposal options.

It is not anticipated that a spill will occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SSO in accordance with the procedures discussed in Section 2.0 of this HASP.

11.0 CONFINED-SPACE ENTRY

Personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces. A confined space is defined as an area that has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, manholes, sewers, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

Additionally, a Permit-Required Confined Space may also have one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly caving walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space operations, consult the Health and Safety Guidance Manual or call the HSM. Any activity that may be considered a confined-space entry shall require modifications of this HASP and shall result in the immediate notification of the Project Health and Safety Officer. This determination shall be made by the FOL and SSO.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets (multiple copies)
- Material Safety Data Sheets for the chemicals brought on site, including decon solutions, fuels, lime, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (See Attachment VI)
- Training/Medical Surveillance Documentation Form (Blank) (multiple copies)
- Emergency Reference Information (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting of these documents is not feasible (such as no office trailer), these documents should be filed in a transportable file container and immediately accessible. The file should remain in the FOL's possession.

Chemical Inventory Listing (posted) - This list represents the chemicals brought on site, including decontamination solutions, sample preservatives, fuel, calibration gases, etc.. This list should be posted in a central area.

Material Safety Data Sheets (MSDSs) (maintained) - The MSDSs should also be in a central area accessible to site personnel. These documents should match the listings on the chemical inventory list for

substances employed on site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - This poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. See Attachment VI of this HASP.

Site Clearance (maintained) - This is found within the training section of the HASP (See Figure 8-1). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance and indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (maintained) - This list of emergency numbers and hospital directions will be maintained at phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by onsite personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to personnel to be carried on their person.

Investigative Derived Waste Inventory Log (maintained) – The FOL and/or the SSO shall log collected containers of IDW. An updated inventory will be submitted to the Base POC at the termination of each shift.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
CSE	Confined Space Entry
CSP	Certified Safety Professional
CTO	Contract Task Order
dBA	Decibels average
DOD	Department of Defense
DOT	Department of Transportation
DPT	Direct Push Technology
EPA	Environmental Protection Agency
eV	electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HSA	Hollow Stem Auger
HSM	Health and Safety Manager
IDW	Investigative Derived Waste
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
N/A	Not Available
NDW-IH	Naval District Washington, Indian Head
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PE	Professional Engineer
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photo Ionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
RAC	Remedial Action Contractor

SOP	Standard Operating Procedure
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
TBD	To Be Determined
TtNUS	Tetra Tech NUS, Inc.
TWA	Time Weighted Average
UEL	Upper Explosive Limit
UST	Underground Storage Tank
UV	Ultraviolet

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- Stop work as needed to ensure no further harm is done.
- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an Injury/Illness Report. You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at https://go2.tetratech.com under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : **www.esis.com.** These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types of injuries or illnesses covered and the amount of

benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies are not covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

cc: _____
Workers Compensation Administrator

Project name: _____

Project number: _____

Prepared by: _____

Position: _____

Office: _____

Telephone number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____ Office: _____

Home address: _____ Gender: M ☐ F ☐ No. of dependents: _____

_____ Marital status: _____

Home telephone number: _____ Date of birth: _____

Occupation (regular job title): _____ Social security number: _____

Department: _____

Date of Accident: _____ **Time of Accident:** _____ a.m. ☐ p.m. ☐

Time Employee Began Work: _____ ☐ Check if time cannot be determined

Location of Incident

Street address: _____

City, state, and zip code: _____

County: _____

Was place of accident or exposure on employer's premises? Yes ☐ No ☐

Information About the Incident

What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes ☐ No ☐ Date of death: _____

Was employee performing regular job duties? Yes ☐ No ☐

Was safety equipment provided? Yes ☐ No ☐ Was safety equipment used? Yes ☐ No ☐

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? ☐ Yes ☐ No ☐ First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? ☐ Yes ☐ No

Was the employee hospitalized over night as an in-patient? ☐ Yes ☐ No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ **Time of Report:** _____

I have reviewed this investigation report and agree, to the best of my recollection, with its contents.

_____ _____

Printed Name of Injured Employee Telephone Number

_____ _____

Signature of Injured Employee Date

The signatures provided below indicate that appropriate personnel have been notified of the incident.

Title	Printed Name	Signature	Telephone Number	Date
Office Manager				
Project Manager				
Site Safety Coordinator or Office Health and Safety Representative				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

[ ] Injury [ ] Illness

Result of Incident:

[ ] First aid only

[ ] Days away from work

[ ] Remained at work but incident resulted in job transfer or work restriction

[ ] Incident involved days away and job transfer or work restriction

[ ] Medical treatment only

No. of days away from work:

Date employee left work:

Date employee returned to work:

No. of days placed on restriction or job transfer:

OSHA Recordable Case Number:

To Be Completed by Human Resources

Social security number:

Date of hire: Hire date for current job:

Wage information: $ per [ ] Hour [ ] Day [ ] Week [ ] Month

Position at time of hire:

Current position: Shift hours:

State in which employee was hired:

Status: [ ] Full-time [ ] Part-time Hours per week: Days per week:

Temporary job end date:

To Be Completed during Report to Workers Compensation Carrier

Date reported: Reported by:

Confirmation number:

Name of contact:

Field office of claims adjuster:

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

ATTACHMENT II

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

_____

Age _____ Height _____ Weight _____

Name of Next Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals _____

_____

_____

_____

What medications are you presently using? _____

_____

_____

_____

Do you have any medical restrictions? _____

_____

_____

_____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

_____

I am the individual described above. I have read and understand this HASP.

_____ _____

Signature Date

ATTACHMENT III

SAFE WORK PERMITS

Rev. 1
June 2005

SAFE WORK PERMIT
NDW-IH INDIAN HEAD, MARYLAND – SITE 43

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Mobilization/Demobilization and non hazardous waste related tasks (i.e., surveying).

II. **Primary Hazards:** Potential hazards associated with this task include lifting; pinches and compression; slip, trip, and fall hazards, contact with moving machinery; excessive noise levels, vehicle and foot traffic; and natural hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒
Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None Anticipated			

Primary Route(s) of Exposure/Hazard: Contaminants are not anticipated to be encountered during these tasks. Refer to manufacturer MSDS to determine necessary protective measures for any chemical brought on site in support of site activities.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☐ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type –_____)	☐ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☒ Yes ☐ No
Safety Shower/Eyewash	☒ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: PPE selection is largely dependent upon conditions and tasks being performed. Other PPE items (work gloves, hard hats, hearing protection, rain gear, rubber boots, etc.) may be required.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting practices identified in Table 5-1 and avoid contact with media that may be contaminated. Inspect the site and identify and potential physical/natural hazards, (pits, holes, steep terrain, objects, debris, etc.).

Permit Issued by: _____ Permit Accepted by: _____

Rev. 1
June 2005

SAFE WORK PERMIT
NDW-IH INDIAN HEAD, MARYLAND – SITE 43

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Soil boring using DPT or HSA methods.

II. **Primary Hazards:** Potential hazards associated with this task include chemical contact; contact/entanglement with rotating equipment; noise; contact with underground or overhead utilities; lifting; slip, trip, and falls; vehicular and foot traffic and natural hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Acetone and toluene	PID w 10.2 lamp or FID	sustained readings >1min	Assume cont – decon
	Visual observation	>100 ppm in breathing zone	Retreat to unaffected area
		or visual observation of dust	Use area wetting methods

Primary Route(s) of Exposure/Hazard: Contaminants are not anticipated to be present at concentrations that pose a health threat to site workers. Any observed PID/FID readings in worker breathing zones will indicate an unexpected condition that will require notification of the PHSO.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☒ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Nitrile surgical style)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☒ Yes ☐ No
Safety Shower/Eyewash	☒ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: PPE selection is largely dependent upon conditions and tasks being performed. Other PPE items may be required by the FOL/SSO.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting practices identified in Table 5-1 and avoid contact with media that may be contaminated. Inspect the site and identify and potential physical/natural hazards, (pits, holes, steep terrain, objects, debris, etc.). Inspect site equipment (DPT, HSA rig) using the Equipment Inspection Checklist in Attachment V. Ensure emergency stop devices are functioning properly (if applicable) and that all safe drilling/boring procedures listed in Section 5.2 are followed. Verify that all utilities in the investigation area have been identified and located prior to beginning intrusive operations. Be aware of potential power lines when moving equipment. Institute traffic control procedures as outlined in Table 5-1 for work conducted on base roadways.

Permit Issued by: _____ Permit Accepted by: _____

Rev. 1
June 2005

SAFE WORK PERMIT
NDW-IH INDIAN HEAD, MARYLAND – SITE 43

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Multi media sampling including surface/subsurface soils, groundwater, sediment, surface water, and IDW.

II. **Primary Hazards:** Potential hazards associated with this task include noise; lifting; pinches and compressions; slips, trips, and falls; vehicular and foot traffic and natural hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒
Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Acetone and toluene	PID w 10.2 lamp or FID	sustained readings >1min	Assume cont – decon
	Visual observation	>100 ppm in breathing zone	Retreat to unaffected area
		or visual observation of dust	Use area wetting methods

Primary Route(s) of Exposure/Hazard: Contaminants are not anticipated to be present at concentrations that pose a health threat to site workers. Any observed PID/FID readings in worker breathing zones will indicate an unexpected condition that will require notification of the PHSO

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☐ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile surgical style)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☒ Yes ☐ No
Safety Shower/Eyewash	☒ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: PPE selection is largely dependent upon conditions and tasks being performed. Other PPE items (hard hats, hearing protection, rain gear, rubber boots, etc.) may be required.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting practices identified in Table 5-1 and avoid contact with media that may be contaminated. Inspect the site and identify and potential physical/natural hazards, (pits, holes, steep terrain, objects, debris, etc.).

Permit Issued by: _____ Permit Accepted by: _____

Rev. 1
June 2005

SAFE WORK PERMIT
NDW-IH INDIAN HEAD, MARYLAND – SITE 43

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Decontamination of sampling and heavy equipment.

II. **Primary Hazards:** Potential hazards associated with this task include lifting; noise; flying projectiles; vehicle and foot traffic; slip, trip, and fall hazards, and natural hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Acetone and toluene	PID w 10.2 lamp or FID	sustained readings >1min	Assume cont – decon
	Visual observation	>100 ppm in breathing zone	Retreat to unaffected area
		or visual observation of dust	Use area wetting methods

Primary Route(s) of Exposure/Hazard: Contaminants are not anticipated to be present at concentrations that pose a health threat to site workers. Any observed PID/FID readings in worker breathing zones will indicate an unexpected condition that will require notification of the PHSO.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☐ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☒ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile surgical style)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☒ Yes ☐ No
Safety Shower/Eyewash	☒ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: PPE selection is largely dependent upon conditions and tasks being performed. Other PPE items (hard hats, hearing protection, rain gear, rubber boots, etc.) may be required. Face shields are required when operating pressure washers.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting practices identified in Table 5-1 and avoid contact with media that may be contaminated. Inspect the site and identify and potential physical/natural hazards, (pits, holes, steep terrain, objects, debris, etc.).

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT IV

TtNUS SOP FOR UTILITY CLEARANCE

TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number HS-1.0	Page 1 of 15
		Effective Date 12/03	Revision 2
		Applicability Tetra Tech NUS, Inc.	
		Prepared Health & Safety	
Subject UTILITY LOCATING AND EXCAVATION CLEARANCE		Approved D. Senovich	

TABLE OF CONTENTS

1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of this policy, to present the acceptable procedures pertaining to utility locating and excavation clearance activities, and to present requirements and restrictions relevant to these types of activities. This SOP must be reviewed by any employee potentially involved with underground or overhead utility locating and avoidance activities.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of typical methods used to determine the presence and avoidance of contact with utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to the initiation of any such activities on a specific project. This SOP is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the methods presented may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer – A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey – A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal Detection – A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer – A magnetometer equipped with two sensors that are vertically separated by a fixed distance. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure.

Site Manager (SM)/Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved SOPs or as otherwise directed by the approved project plan(s).

Site Health & Safety Officer (SHSO) – Responsible to provide technical assistance and verify full compliance with this SOP. The SHSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager (HSM) and to the PM/TOM.

Health & Safety Manager (HSM) – Responsible for preparing, implementing, and modifying corporate health and safety policy and this SOP.

Site Personnel – Responsible for performing their work activities in accordance with this SOP and the TtNUS Health and Safety Policy.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed individually from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown or incorrectly known on client properties. This procedure must be followed prior to beginning any subsurface probing or excavation that might potentially be in the vicinity of underground utility services. In addition, the Utility Clearance Form (Attachment 3) must be completed for every location or cluster of locations where intrusive activities will occur.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM/TOM is responsible for arranging for the procurement of a qualified, experienced, utility locating subcontractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.

2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scares and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.

4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.

5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.

7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.

8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly though conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

Nominal Voltage	Minimum Clearance
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

A variety of supplemental utility locating approaches are available and can be applied when additional assurance is needed. The selection of the appropriate method(s) to employ is site-specific and should be tailored to the anticipated conditions, site and project constraints, and personnel capabilities.

6.1 Geophysical Methods

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic induction, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

Electromagnetic Induction (EMI) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A typical example of this type of geophysical equipment is an EM-61.

EMI locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced surveys, simple magnetic locating, and traced nonmetallic surveys.

When access can be gained inside a conduit to be traced, a flexible insulated trace wire can be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's), steel utility lines, and buried electrical lines. A typical example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Non-ferrous lines are often located by using a typical plumbing tool (snake) fed through the line. A signal is then introduced to the snake that is then traced.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone); hence, verification may be necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines or gas lines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting

debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand Excavation

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities. The minimum hand-excavation depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand excavation depths must be at least to the frost line depth (see Attachment 2) plus two (2) feet, but never less than 4 feet below ground surface (bgs). For hand excavation, the hole created must be reamed large enough to be at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand excavation. It is important to note that a post-hole digger must not be used in this type of hand excavation activity.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

7.0 INTRUSIVE ACTIVITIES SUMMARY

The following list summarizes the activities that must be performed prior to beginning subsurface activities:

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.

2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

   Note: Drawings with confirmed locations should be provided to the property owner and/or client as soon as possible to reduce potential time delays.

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.

4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

5. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

8.0 REFERENCES

OSHA Letter of Interpretation, Mr. Joseph Caldwell, Attachment 4
OSHA 29 CFR 1926(b)(2)
OSHA 29 CFR 1926(b)(3)
TtNUS Utility Locating and Clearance Policy
TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction
TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys
TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES

American Public Works Association
2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2625
Phone (816) 472-6100 • Fax (816) 472-1610
Web www.apwa.net • E-mail apwa@apwa.net

ONE-CALL SYSTEMS INTERNATIONAL CONDENSED DIRECTORY

Alabama
Alabama One-Call
1-800-292-8525

Alaska
Locate Call Center of Alaska, Inc.
1-800-478-3121

Arizona
Arizona Blue Stake
1-800-782-5348

Arkansas
Arkansas One Call System, Inc.
1-800-482-8998

California
Underground Service Alert North
1-800-227-2600
Underground Service Alert of Southern California
1-800-227-2600

Colorado
Utility Notification Center of Colorado
1-800-922-1987

Connecticut
Call Before You Dig
1-800-922-4455

Delaware
Miss Utility of Delmarva
1-800-282-8555

Florida
Sunshine State One-Call of Florida, Inc.
1-800-432-4770

Georgia
Underground Protection Center, Inc.
1-800-282-7411

Hawaii
Underground Service Alert North
1-800-227-2600

Idaho
Dig Line Inc.
1-800-342-1585
Kootenai County One-Call
1-800-428-4950
Shoshone - Benewah One-Call
1-800-398-3285

Illinois
JULIE, Inc.
1-800-892-0123
Digger (Chicago Utility Alert Network)
312-744-7000

Indiana
Indiana Underground Plant Protection Service
1-800-382-5544

Iowa
Iowa One-Call
1-800-292-8989

Kansas
Kansas One-Call System, Inc.
1-800-344-7233

Kentucky
Kentucky Underground Protection Inc.
1-800-752-6007

Louisiana
Louisiana One Call System, Inc.
1-800-272-3020

Maine
Dig Safe System, Inc.
1-888-344-7233

Maryland
Miss Utility
1-800-257-7777
Miss Utility of Delmarva
1-800-282-8555

Massachusetts
Dig Safe System, Inc.
1-888-344-7233

Michigan
Miss Dig System, Inc.
1-800-482-7171

Minnesota
Gopher State One Call
1-800-252-1166

Mississippi
Mississippi One-Call System, Inc
1-800-227-6477

Missouri
Missouri One-Call System, Inc.
1-800-344-7483

Montana
Utilities Underground Protection Center
1-800-424-5555
Montana One Call Center
1-800-551-8344

Nebraska
Diggers Hotline of Nebraska
1-800-331-5666

Nevada
Underground Service Alert North
1-800-227-2600

New Hampshire
Dig Safe System, Inc.
1-888-344-7233

New Jersey
New Jersey One Call
1-800-272-1000

New Mexico
New Mexico One Call System, Inc.
1-800-321-2537
Las Cruces- Dona Ana Blue Stakes
1-888-526-0400

New York
Dig Safely New York
1-800-962-7962
New York City- Long Island One Call Center
1-800-272-4480

North Carolina
The North Carolina One-Call Center, Inc.
1-800-632-4949

North Dakota
North Dakota One-Call
1-800-795-0555

Ohio
Ohio Utilities Protection Service
1-800-362-2764
Oil & Gas Producers Underground Protect'n Svc
1-800-925-0988

Oklahoma
Call Okie
1-800-522-6543

Oregon
Oregon Utility Notification Center/One Call Concepts
1-800-332-2344

Pennsylvania
Pennsylvania One Call System, Inc.
1-800-242-1776

Rhode Island
Dig Safe System, Inc.
1-888-344-7233

South Carolina
Palmetto Utility Protection Service Inc.
1-888-721-7877

South Dakota
South Dakota One Call
1-800-781-7474

Tennessee
Tennessee One-Call System, Inc.
1-800-351-1111

ATTACHMENT 1 (Continued)

Texas
Texas One Call System
1-800-245-4545
Texas Excavation Safety System, Inc.
1-800-344-8377
Lone Star Notification Center
1-800-669-8344

Utah
Blue Stakes of Utah
1-800-662-4111

Vermont
Dig Safe System, Inc.
1-888-344-7233

Virginia
Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

Washington
Utilities Underground Location Center
1-800-424-5555
Northwest Utility Notification Center
1-800-553-4344
Inland Empire Utility Coordinating Council
509-456-8000

West Virginia
Miss Utility of West Virginia, Inc.
1-800-245-4848

Wisconsin
Diggers Hotline, Inc.
1-800-242-8511

Wyoming
Wyoming One-Call System, Inc.
1-800-348-1030
Call Before You Dig of Wyoming
1-800-849-2476

District of Columbia
Miss Utility
1-800-257-7777

Alberta
Alberta One-Call Corporation
1-800-242-3447

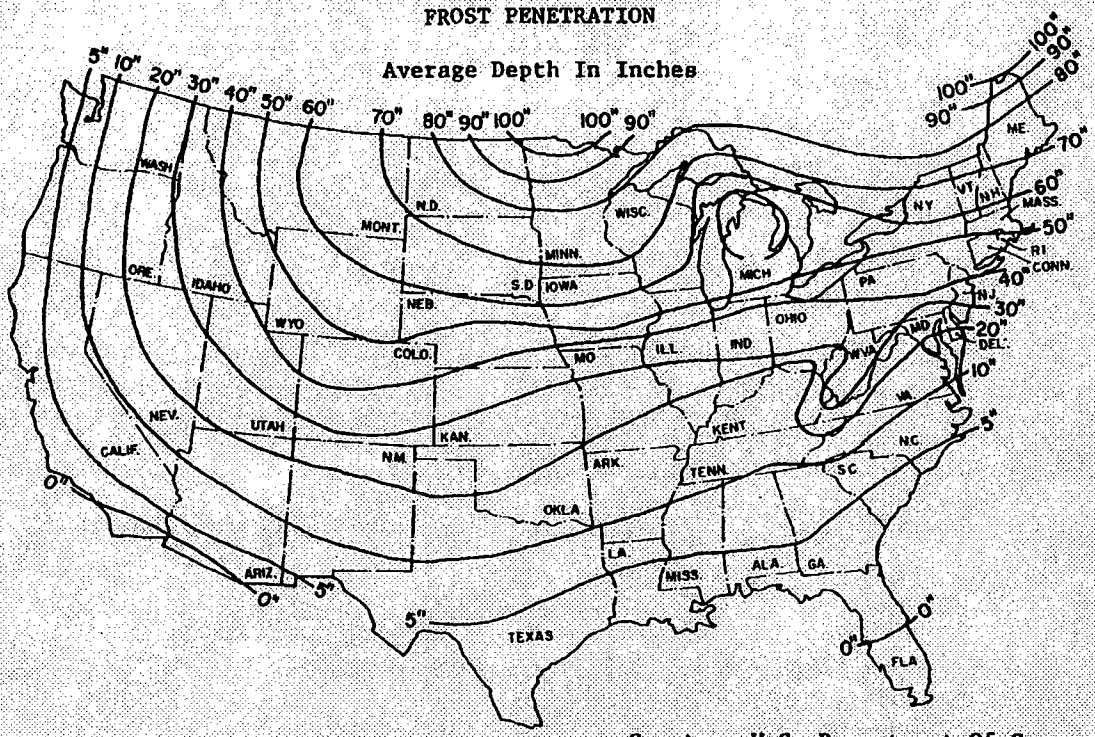
British Columbia
BC One Call
1-800-474-6886

Ontario
Ontario One-Call System
1-800-400-2255

Quebec
Info-Excavation
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

ATTACHMENT 3
UTILITY CLEARANCE FORM

Client: _____ Project Name: _____

Project No.: _____ Completed By: _____

Location Name: _____ Work Date: _____

Excavation Method/Overhead Equipment: _____

		Circle One
1.	Underground Utilities	
a)	Review of existing maps?	yes no N/A
b)	Interview local personnel?	yes no N/A
c)	Site visit and inspection?	yes no N/A
d)	Excavation areas marked in the field?	yes no N/A
e)	Utilities located in the field?	yes no N/A
f)	Located utilities marked/added to site maps?	yes no N/A
g)	Client contact notified Name _____ Telephone: _____ Date: _____	yes no N/A
g)	State One-Call agency called? Caller: _____ Ticket Number: _____ Date: _____	yes no N/A
h)	Geophysical survey performed? Survey performed by: _____ Method: _____ Date: _____	yes no N/A
i)	Hand excavation performed (with concurrent use of utility detection device)? Completed by: _____ Total depth: _____ feet Date: _____	yes no N/A
j)	Trench/excavation probed? Probing completed by: _____ Depth/frequency: _____ Date: _____	yes no N/A

		Present Absent
2.	Overhead Utilities	
a)	Determination of nominal voltage	yes no N/A
b)	Marked on site maps	yes no N/A
c)	Necessary to lockout/insulate/re-route	yes no N/A
d)	Document procedures used to lockout/insulate/re-route	yes no N/A
e)	Minimum acceptable clearance (SOP Section 5.2): _____	

3. Notes:

_____

_____

_____

Approval:

_____ _____

Site Manager/Field Operations Leader Date

c: PM/Project File
Program File

ATTACHMENT 4
OSHA LETTER OF INTERPRETATION

Mr. Joseph Caldwell
Consultant
Governmental Liaison
Pipeline Safety Regulations
211 Wilson Boulevard
Suite 700
Arlington, Virginia 22201

Re: Use of hydro-vacuum or non-conductive hand tools to locate underground utilities.

Dear Mr. Caldwell:

In a letter dated July 7, 2003, we responded to your inquiry of September 18, 2002, regarding the use of hydro-vacuum equipment to locate underground utilities by excavation. After our letter to you was posted on the OSHA website, we received numerous inquiries that make it apparent that aspects of our July 7 letter are being misunderstood. In addition, a number of industry stakeholders, including the National Utility Contractors Association (NUCA), have provided new information regarding equipment that is available for this work.

To clarify these issues, we are withdrawing our July 7 letter and issuing this replacement response to your inquiry.

Question: *Section 1926.651 contains several requirements that relate to the safety of employees engaged in excavation work. Specifically, paragraphs (b)(2) and (b)(3) relate in part to the safety of the means used to locate underground utility installations that, if damaged during an uncovering operation, could pose serious hazards to employees.*

Under these provisions, what constitutes an acceptable method of uncovering underground utility lines, and further, would the use of hydro-vacuum excavation be acceptable under the standard?

Answer

Background

Two sections of 29 CFR 1926 Subpart P (Excavations), 1926.651(Specific excavation requirements), govern methods for uncovering underground utility installations. Specifically, paragraph (b)(2) states:

> When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours * * * or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. (emphasis added).

Paragraph (b)(3) provides:

ATTACHMENT 4 (Continued)

> When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (emphasis added).

Therefore, "acceptable means" must be used where the location of the underground utilities have not been identified by the utility companies and detection equipment is not used.

Subpart P does not contain a definition of either "other acceptable means" or "safe and acceptable means." The preambles to both the proposed rule and the final rule discussed the rationale behind the wording at issue. For example, the preamble to the proposed rule, 52 Fed. Reg. 12301 (April 15, 1987), noted that a 1972 version of this standard contained language that specified "careful probing or hand digging" as the means to uncover utilities. The preamble then noted that an amendment to the 1972 standard later deleted that language "to allow other, *equally effective means* of locating such installations." The preamble continued that in the 1987 proposed rule, OSHA again proposed using language in section (b)(3) that would provide another example of an acceptable method of uncovering utilities that could be used *where the utilities have not been marked and detection equipment is not being used* – "probing with hand-held tools." This method was rejected in the final version of 29 CFR 1926. As OSHA explained in the preamble to the final rule, 54 Fed. Reg. 45916 (October 31, 1989):

> OSHA received two comments * * * and input from ACCSH [OSHA's Advisory Committee on Construction Safety and Health] * * * on this provision. All commenters recommended dropping 'such as probing with hand-held tools' from the proposed provision, because this could create a hazard to employees by damaging the installation or its insulation.

In other words, the commenters objected to the use of hand tools being used unless detection equipment was used in conjunction with them. OSHA then concluded its discussion relative to this provision by agreeing with the commentators and ultimately not including any examples of "acceptable means" in the final provision.

Non-conductive hand tools are permitted

This raises the question of whether the standard permits the use of hand tools alone – without also using detection equipment. NUCA and other industry stakeholders have recently informed us that non-conductive hand tools that are appropriate to be used to locate underground utilities are now commonly available.

Such tools, such as a "shooter" (which has a non-conductive handle and a snub nose) and non-conductive or insulated probes were not discussed in the rulemaking. Since they were not considered at that time, they were not part of the class of equipment that was thought to be unsafe for this purpose. Therefore, we conclude that the use of these types of hand tools, when used with appropriate caution, is an "acceptable means" for locating underground utilities.

ATTACHMENT 4 (Continued)

Hydro-vacuum excavation

It is our understanding that some hydro-vacuum excavation equipment can be adjusted to use a minimum amount of water and suction pressure. When appropriately adjusted so that the equipment will not damage underground utilities (especially utilities that are particularly vulnerable to damage, such as electrical lines), use of such equipment would be considered a "acceptable means" of locating underground utilities. However, if the equipment cannot be sufficiently adjusted, then this method would not be acceptable under the standard.

Other technologies

We are not suggesting that these are the only devices that would be "acceptable means" under the standard. Industry stakeholders have informed us that there are other types of special excavation equipment designed for safely locating utilities as well.

We apologize for any confusion our July 7 letter may have caused. If you have further concerns or questions, please feel free to contact us again by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Compliance Assistance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

NOTE: OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA=s interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

ATTACHMENT V

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

COMPANY:_____ **UNIT NO.**_____
FREQUENCY: Inspect at the initiation of the project, after repairs, once every 10-day shift.

Inspection Date: ____/____/____ Time: _____ Equipment Type:_____
(e.g., bulldozer, generator)

	Good	Need Repair	N/A
Tires or tracks	❒	❒	❒
Hoses and belts	❒	❒	❒
Cab, mirrors, safety glass	❒	❒	❒
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	❒	❒	❒
- Is the equipment equipped with audible back-up alarms and back-up lights?	❒	❒	❒
Horn and gauges	❒	❒	❒
Brake condition (dynamic, park, etc.)	❒	❒	❒
Fire extinguisher (Type/Rating -_____)	❒	❒	❒
Fluid Levels:			
- Engine oil	❒	❒	❒
- Transmission fluid	❒	❒	❒
- Brake fluid	❒	❒	❒
- Cooling system fluid	❒	❒	❒
- Windshield wipers	❒	❒	❒
- Hydraulic oil	❒	❒	❒
Oil leak/lube	❒	❒	❒
Coupling devices and connectors	❒	❒	❒
Exhaust system	❒	❒	❒
Blade/boom/ripper condition	❒	❒	❒
Access-ways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	❒	❒	❒
Power cable and/or hoist cable	❒	❒	❒
Steering (standard and emergency)	❒	❒	❒

Safety Guards:	**Yes**	**No**
– Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?_____	❒	❒
– Hot pipes and surfaces exposed to accidental contact?_____	❒	❒
– All emergency shut offs have been identified and communicated to the field crew?_____	❒	❒
– Have emergency shutoffs been field tested? _____	❒	❒
– Results?_____	❒	❒
– Are any structural members bent, rusted, or otherwise show signs of damage?_____	❒	❒
– Are fueling cans used with this equipment approved type safety cans?_____	❒	❒

- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?_____ ❒ ❒

Portable Power Tools:

- Tools and Equipment in Safe Condition?_____ ❒ ❒
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)?_____ ❒ ❒
- Portable electric tools properly grounded?_____ ❒ ❒
- Damage to electrical power cords?_____ ❒ ❒
- Blade guards in place?_____ ❒ ❒
- Components adjusted as per manufacturers recommendation?_____ ❒ ❒

Cleanliness:

- Overall condition (was the decontamination performed prior to arrival on-site considered acceptable)?_____
- Where was this equipment used prior to its arrival on site?_____
- Site Contaminants of concern at the previous site?_____
- Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls?_____

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)?_____
- Does the operator, understand the equipment's operating instructions?_____
- Is the operator experienced with this equipment? _____
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner?_____
- Is the operator 21 years of age or more?_____

Identification:

- Is a tagging system available, for positive identification, for tools removed from service?_____

Additional Inspection Required Prior to Use On-Site

	Yes	No
– Does equipment emit noise levels above 90 decibels?	❒	❒
– If so, has an 8-hour noise dosimetry test been performed?	❒	❒

- Results of noise dosimetry:_____
- Defects and repairs needed:_____
- General Safety Condition: _____
- Operator or mechanic signature:_____

Site Safety Officer Signature:_____

Approved for Use: ❒ Yes ❒ No

ATTACHMENT VI

OSHA JOB SAFETY POSTER

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act.*
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act),* P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act.* The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

APPENDIX B

PROJECT-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

(To be used in conjunction with the Master Quality Assurance Project Plan)

060403/P

QUALITY ASSURANCE PROJECT PLAN
FOR
SITE SCREENING PROCESS INVESTIGATION

AT
SITE 43 - TOLUENE DISPOSAL

NAVAL DISTRICT WASHINGTON, INDIAN HEAD
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Washington
1314 Harwood Street, SE
Washington Navy Yard, D.C. 20374-5018

Submitted by:
Tetra Tech NUS, Inc.
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433

CONTRACT NUMBER N62472-03-D-0057
CONTRACT TASK ORDER 0006

FEBRUARY 2005

PREPARED UNDER THE DIRECTION OF:

Kim C. Turnbull

KIM C. TURNBULL
PROJECT MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMISSION BY:

Kelly A Carper

KELLY A. CARPER
QUALITY ASSURANCE MANAGER
TETRA TECH NUS, INC.
KING OF PRUSSIA, PENNSYLVANIA

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TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
CTO	Contract Task Order
DQO	Data Quality Objective
EPA	Environmental Protection Agency
FOL	Field Operations Leader
LCS	laboratory control sample
MDL	method detection limit
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NDW-IH	Naval District Washington, Indian Head
PARCC	precision, accuracy, representativeness, comparability, and completeness
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
%R	percent recovery
RDL	required detection limit
RPD	relative percent difference
RPM	Remedial Project Manager
SOP	Standard Operating Procedure
SOW	Statement of Work
SSP	Site Screening Process
TAL	Target Analyte List
TCL	Target Compound List
TtNUS	Tetra Tech NUS, Inc.
USATHAMA	United States Army Toxic and Hazardous Materials Agency
VOC	volatile organic compound
µg/kg	microgram per kilogram

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This project-specific Quality Assurance Project Plan (QAPP) for a Site Screening Process (SSP) investigation at the Naval District Washington, Indian Head (NDW-IH), Indian Head, Maryland, was prepared by Tetra Tech NUS, Inc. (TtNUS) in response to Contract Task Order (CTO) 0006 under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-03-D-0057.

This document is intended to be used in conjunction with the accompanying Work Plan for Site Screening Process Investigation (SSP Work Plan) and the Master QAPP (TtNUS, 2004) and is limited to the sections and information specific to Site 43 – Toluene Disposal.

1.1.1 Overall Project Objectives

The Master QAPP provides general quality assurance (QA) guidelines common to multiple site investigations to be conducted at the facility. It outlines QA issues for what are expected to be the most common types of field efforts and analyses during environmental investigations. Specific project objectives are identified in the project-specific work plans. Additional QA issues are addressed in addenda to the Master QAPP as necessary and are to be provided as appendices to the project-specific work plans.

Important companion documents to the Master QAPP and the project-specific work plan include the Master Plans for Installation Restoration Program Environmental Investigations (TtNUS, 2004), which includes facility Standard Operating Procedures (SOPs).

1.1.2 QAPP Preparation Guidelines

This project-specific QAPP and accompanying SSP Work Plan have been prepared to be used in conjunction with the Master QAPP to fulfill the general requirements outlined in United States Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans, EPA QA/R-5 (EPA, 2001) and Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA, 2002).

1.2 FACILITY DESCRIPTION

A facility description, including the location and general description, history, land use, water sources and usage, population, physiography and topography, geology, soils, hydrogeology, hydrology, ecology, and meteorology, is provided in the Master Work Plan.

1.3 PROJECT TARGET PARAMETERS AND INTENDED DATA USES

This section discusses typical laboratory analytical information to be generated during the course of the SSP investigation at Site 43.

Laboratory parameters will include Target Compound List (TCL) volatile organic compounds (VOCs), Target Analyte List (TAL) metals, and explosives. Tables 1-1 (solid samples) and 1-2 (aqueous samples) provide a summary of all target laboratory analytes and associated required detection limits (RDLs) for organics, metals, and explosives along with a comparison to various screening criteria.

1.4 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are discussed in the SSP Work Plan.

1.5 SAMPLE NETWORK DESIGN AND RATIONALE

Sample network design and rationale are provided in the SSP Work Plan.

1.6 PROJECT SCHEDULE

The project schedule has not been determined to date and will be provided as an addendum to the SSP Work Plan.

TABLE 1-1

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - SOLID SAMPLE MATRIX (MG/KG)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits [1]		EPA Region III Soil RBC [2]		EPA Generic SSL Inhalation [3]	EPA Region III SSLs Migration to Groundwater [2]		EPA Region III BTAG Screening Levels [4]
	MDL/IDL	CRQL/ CRDL	Industrial	Residential		DAF = 1	DAF = 20	Soil
TCL Volatile Organic Compounds - CLP OLM04.3								
1,1,1-TRICHLOROETHANE	TBD	0.01	290000	22000	1200	3	60	0.3[5]
1,1,2,2-TETRACHLOROETHANE	TBD	0.01	14	3.2	0.57	0.000034	0.00068	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	TBD	0.01	31000000	2300000	930	120	2300	
1,1,2-TRICHLOROETHANE	TBD	0.01	50	11	0.98	0.000039	0.00078	0.3[5]
1,1-DICHLOROETHANE	TBD	0.01	100000	7800	1300	0.23	4.5	0.3
1,1-DICHLOROETHENE	TBD	0.01	51000	3900	300	0.15	2.9	
1,2,4-TRICHLOROBENZENE	TBD	0.01	10000	780	180	0.014	0.28	0.1[6]
1,2-DIBROMO-3-CHLOROPROPANE	TBD	0.01	2	0.46	23	0.000044	0.00087	
1,2-DIBROMOETHANE	TBD	0.01	0.034	0.0075	0.28	0.00000043	0.0000085	5
1,2-DICHLOROBENZENE	TBD	0.01	92000	7000	600	0.23	4.6	0.1
1,2-DICHLOROETHANE	TBD	0.01	31	7	0.36	0.000052	0.001	870
1,2-DICHLOROPROPANE	TBD	0.01	42	9.4	15	0.0001	0.0021	0.3
1,3-DICHLOROBENZENE	TBD	0.01	31000	2300		0.15	2.9	
1,4-DICHLOROBENZENE	TBD	0.01	120	27	11000	0.00036	0.0071	0.1
2-BUTANONE	TBD	0.01	610000	47000	24000	1.5	29	
2-HEXANONE	TBD	0.01						
4-METHYL-2-PENTANONE	TBD	0.01			2700	2.9	59	100
ACETONE	TBD	0.01	920000	70000		1.1	22	
BENZENE	TBD	0.01	52	12	0.84	0.000095	0.0019	0.1
BROMODICHLOROMETHANE	TBD	0.01	46	10		0.000054	0.0011	450
BROMOFORM	TBD	0.01	360	81	53	0.0033	0.067	1147
BROMOMETHANE	TBD	0.01	1400	110	9.5	0.0021	0.041	
CARBON DISULFIDE	TBD	0.01	100000	7800	720	0.95	19	
CARBON TETRACHLORIDE	TBD	0.01	22	4.9	0.33	0.00011	0.0021	0.3
CHLOROBENZENE	TBD	0.01	20000	1600	130	0.04	0.8	0.1
CHLORODIBROMOMETHANE	TBD	0.01	34	7.6		0.000041	0.00083	
CHLOROETHANE	TBD	0.01	990	220	1200	0.00096	0.019	
CHLOROFORM	TBD	0.01	10000	780	0.28	0.000045	0.00091	0.3
CHLOROMETHANE	TBD	0.01			2.1	0.046	0.93	
CIS-1,2-DICHLOROETHENE	TBD	0.01	10000	780		0.017	0.35	0.3
CIS-1,3-DICHLOROPROPENE	TBD	0.01	29[7]	6.4[7]	1.1[8]	0.00016[7]	0.0031[7]	0.3[7]
CYCLOHEXANE	TBD	0.01			8240000000			
DICHLORODIFLUOROMETHANE	TBD	0.01	200000	16000	250	0.55	11	
ETHYLBENZENE	TBD	0.01	100000	7800	400	0.75	15	0.1
FLUOROTRICHLOROMETHANE	TBD	0.01	310000	23000	1100	1.1	23	
ISOPROPYLBENZENE	TBD	0.01	100000	7800	850	3.2	64	
METHYL ACETATE	TBD	0.01	1000000	78000		1.2	25	
METHYL TERT-BUTYL ETHER	TBD	0.01	720	160	8700	0.00059	0.012	
METHYLCYCLOHEXANE	TBD	0.01			490			
METHYLENE CHLORIDE	TBD	0.01	380	85	13	0.00095	0.019	0.3
STYRENE	TBD	0.01	200000	16000	14000	2.9	57	0.1

TABLE 1-1

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - SOLID SAMPLE MATRIX (MG/KG)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits [1]		EPA Region III Soil RBC [2]		EPA Generic SSL Inhalation [3]	EPA Region III SSLs Migration to Groundwater [2]		EPA Region III BTAG Screening Levels [4]
	MDL/IDL	CRQL/ CRDL	Industrial	Residential		DAF = 1	DAF = 20	Soil
TCL Volatile Organic Compounds - CLP OLM04.2 (Continued)								
TETRACHLOROETHENE	TBD	0.01	5.3	1.2	11	0.00023	0.0047	0.3
TOLUENE	TBD	0.01	200000	16000	650	0.44	8.8	0.1
TRANS-1,2-DICHLOROETHENE	TBD	0.01	20000	1600		0.041	0.82	0.3
TRANS-1,3-DICHLOROPROPENE	TBD	0.01	29[7]	6.4[7]	1.1[8]	0.00016[7]	0.0031[7]	0.3[7]
TRICHLOROETHENE	TBD	0.01	7.2	1.6	0.071	0.000013	0.00026	0.3
VINYL CHLORIDE	TBD	0.01	4	0.09[9]	0.28	0.0000062[9]	0.00012[9]	0.3
XYLENES, TOTAL	TBD	0.01	200000	16000	710[10]	0.15	3	0.1
TAL Metals (plus Cyanide) - CLP ILM04.1								
ALUMINUM	TBD	40.0	1000000	78000	6860000			1
ANTIMONY	TBD	4.0	410	31		0.66	13	0.48
ARSENIC	TBD	2.0	1.9	0.43	745	0.0013	0.026	328
BARIUM	TBD	40.0	72000	5500	686000	110	2100	440
BERYLLIUM	TBD	1.0	2000	160	1330	58	1200	0.02
CADMIUM	TBD	1.0	510[12]	39[13]	1780	1.4[14]	27[14]	2.5
CALCIUM	TBD	1000						
CHROMIUM (TOTAL)	TBD	2.0	3100[15]	230[16]	267[17]	2.1[17]	42[17]	0.0075
COBALT	TBD	10.0	20000	1600	1140			100
COPPER	TBD	5.0	41000	3100		530	11000	15
CYANIDE	TBD	1.0	20000	1600		7.4	150	0.005
IRON	TBD	20.0	310000	23000				12
LEAD	TBD	1.0	800[18]	400[19]				0.01
MAGNESIUM	TBD	1000						4400
MANGANESE	TBD	3.0	20000[20]	1600[21]	68600	48[22]	950[22]	330
MERCURY	TBD	0.03	310[23]	23[23]	2.9			0.058
NICKEL	TBD	8.0	20000	1600				2
POTASSIUM	TBD	1000						
SELENIUM	TBD	1.0	5100	390		0.95	19	1.8
SILVER	TBD	2.0	5100	390		1.6	31	0.00001
SODIUM	TBD	1000						
THALLIUM	TBD	2.0	72	5.5		0.18	3.6	0.001
VANADIUM	TBD	10.0	1000	78		37	730	0.5
ZINC	TBD	4.0	310000	23000		680	14000	10
Explosives - SW-846 8330								
1,3,5-TRINITROBENZENE	TBD	0.25	31000	2300				
1,3-DINITROBENZENE	TBD	0.25	100	7.8		0.0018	0.037	
2,4,6-TRINITROTOLUENE (TNT)	TBD	0.25	95[11]	21[11]				
2,4-DINITROTOLUENE	TBD	0.25	2000	160		0.029	0.57	
2,6-DINITROTOLUENE	TBD	0.26	1000	78		0.012	0.25	
2-AMINO-4,6-DINITROTOLUENE	TBD		200	16				
2-NITROTOLUENE	TBD	0.25	12	2.8				
3-NITROTOLUENE	TBD	0.25	20000	1600				

TABLE 1-1

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - SOLID SAMPLE MATRIX (MG/KG)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits [1]		EPA Region III Soil RBC [2]		EPA Generic SSL Inhalation [3]	EPA Region III SSLs Migration to Groundwater [2]		EPA Region III BTAG Screening Levels [4]
	MDL/IDL	CRQL/ CRDL	Industrial	Residential		DAF = 1	DAF = 20	Soil
Explosives - SW-846 8330 (Continued)								
4-AMINO-2,6-DINITROTOLUENE	TBD							
4-NITROTOLUENE	TBD	0.25	170	38				
HMX	TBD	2.2	51000	3900				
NITROBENZENE	TBD	0.26	510	39	91	0.0012	0.023	
RDX	TBD	1	26	5.8				
TETRYL	TBD	0.65	10000	780				
Explosives - USATHAMA								
NITROCELLULOSE	TBD							
NITROGUANIDINE	TBD							
Explosives - SW-846 8332								
NITROGLYCERIN	TBD	5	200	46				

BTAG	Biological Technical Assistance Group	OSWER	Office of Solid Waste and Emergency Response
CLP	Contract Laboratory Program	RBC	Risk-Based Concentration
CRDL	Contract Required Detection Limit	RfD_o	Oral Reference Dose
CRQL	Contract Required Quantitation Level	SSL	Soil Screening Level
DAF	Dilution Attenuation Factor	TAL	Target Analyte List
EPA	Environmental Protection Agency	TBD	To Be Determined
IDL	Instrument Detection Limit	TCL	Target Compound List
MDL	Method Detection Limit	USATHAMA	United States Army Toxic and Hazardous Materials Agency

Blank cells indicate criterion is not available.
The CRQL/CRDL and specific criterion/standard are shaded if the CRQL/CRDL exceeds the criteria/standard.

1 MDLs willl be provided when a laboratory is selected.
2 EPA, Region III, 2004.
3 EPA, 2004.
4 EPA Region III, 1995.
5 Trichloroethane.
6 Trichlorobenzene.
7 The EPA Region III RBCs, AWQCs for 1,3-dichloropropene have been used as surrogates for cis- and trans-1,3-dichloropropene.
8 Value for 1,3-dichloropropene used.
9 Residential RBC and SSL values are based on CSF for exposures by a child. Industrial ingestion RBC is based on CSF for exposures by an adult.
10 Value reported is for xylene, mixture.
11 10 percent of noncarinogenic RBC/PRG is less then the carcinogenic RBC/PRG.
12 The RBC for industrial land use calculated using the RfDo for cadmium water is presented. The RBC for industrial land use calculated using the RfDo for cadmium food is 1000 mg/kg.
13 The RBC for residential land use calculated using the RfDo for cadmium water is presented. The RBC for residential land use calculated using the RfDo for cadmium food is 78 mg/kg.
14 The RBC for cadmium water is presented. The RBC based on cadmium food is 2.7 for a DAF of 1 and 55 for a DAF of 20.
15 The RBC for industrial land use for hexavalent chromium is presented. The RBC for industrial land use for trivalent chromium is 1,500,000 mg/kg.
16 The RBC for residential land use for hexavalent chromium is presented. The RBC for residential land use for trivalent chromium is 120,000 mg/kg.

TABLE 1-1

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - SOLID SAMPLE MATRIX (MG/KG)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits [1]		EPA Region III Soil RBC [2]		EPA Generic SSL Inhalation [3]	EPA Region III SSLs Migration to Groundwater [2]		EPA Region III BTAG Screening Levels [4]
	MDL/IDL	CRQL/ CRDL	Industrial	Residential		DAF = 1	DAF = 20	Soil

17 Screening criteria for hexavalent chromium is presented.
18 Recommended soil screening level for industrial land use. Value was developed using the USEPA Technical Review Workgroup adult exposure to lead model (USEPA, December 1996).
19 OSWER soil screening level for residential land use (USEPA, July 1994). Value was developed using the USEPA Integrated Exposure Uptake Biokinetic Model (IEUBK) (USEPA, February 1994).
20 The RBC for industrial land use calculated using the RfDo for manganese nonfood is presented. The RBC for industrial land use calculated using the RfDo for manganese food is 140,000 mg/kg.
21 The RBC for residential land use calculated using the RfDo for manganese nonfood is presented. The RBC for residential land use calculated using the RfDo for manganese food is 11,000 mg/kg.
22 The SSL for nonfood is presented. The SSL based on food is 330 for a DAF of 1 and 6700 for a DAF of 20.
23 The value for mercuric chloirde have been used as a surrogate for mercury.

TABLE 1-2

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - AQUEOUS SAMPLE MATRIX (ug/L)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits[1]		EPA Region III Tap Water RBC [2]	Federal MCL [3]
	MDL/IDL	CRQL/CRDL		
TCL Volatile Organic Compounds - CLP SOW OLC03.2				
1,1,1-TRICHLOROETHANE	TBD	0.5	3200	200
1,1,2,2-TETRACHLOROETHANE	TBD	0.5	0.053	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	TBD	0.5	59000	
1,1,2-TRICHLOROETHANE	TBD	0.5	0.19	5
1,1-DICHLOROETHANE	TBD	0.5	800	
1,1-DICHLOROETHENE	TBD	0.5	350	7
1,2,3-TRICHLOROBENZENE	TBD	0.5		
1,2,4-TRICHLOROBENZENE	TBD	0.5	7.2	70
1,2-DIBROMO-3-CHLOROPROPANE	TBD	0.5	0.047[4]	0.2
1,2-DIBROMOETHANE	TBD	0.5	0.00075	0.05
1,2-DICHLOROBENZENE	TBD	0.5	270	600
1,2-DICHLOROETHANE	TBD	0.5	0.12	5
1,2-DICHLOROPROPANE	TBD	0.5	0.16	5
1,3-DICHLOROBENZENE	TBD	0.5	180	
1,4-DICHLOROBENZENE	TBD	0.5	0.47	75
2-BUTANONE	TBD	5	7000	
2-HEXANONE	TBD	5		
4-METHYL-2-PENTANONE	TBD	5	6300	
ACETONE	TBD	5	5500	
BENZENE	TBD	0.5	0.34	5
BROMOCHLOROMETHANE	TBD	0.5		80
BROMODICHLOROMETHANE	TBD	0.5	0.17	80[5, 6]
BROMOFORM	TBD	0.5	8.5	80[5, 6]
BROMOMETHANE	TBD	0.5	8.5	
CARBON DISULFIDE	TBD	0.5	1000	

TABLE 1-2

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - AQUEOUS SAMPLE MATRIX (ug/L)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits[1]		EPA Region III Tap Water RBC [2]	Federal MCL [3]
	MDL/IDL	CRQL/CRDL		
TCL Volatile Organic Compounds - CLP SOW OLC03.2				
CARBON TETRACHLORIDE	TBD	0.5	0.16	5
CHLOROBENZENE	TBD	0.5	110	100
CHLORODIBROMOMETHANE	TBD	0.5	0.13	80[5, 6]
CHLOROETHANE	TBD	0.5	3.6	
CHLOROFORM	TBD	0.5	0.15	80[5, 6]
CHLOROMETHANE	TBD	0.5	190	
CIS-1,2-DICHLOROETHENE	TBD	0.5	61	70
CIS-1,3-DICHLOROPROPENE	TBD	0.5	0.44[7]	
CYCLOHEXANE	TBD	0.5	12000	
DICHLORODIFLUOROMETHANE	TBD	0.5	350	
ETHYLBENZENE	TBD	0.5	1300	700
FLUOROTRICHLOROMETHANE	TBD	0.5	1300	
ISOPROPYLBENZENE	TBD	0.5	660	
METHYL ACETATE	TBD	0.5	6100	
METHYL TERT-BUTYL ETHER	TBD	0.5	2.6	[8]
METHYLCYCLOHEXANE	TBD	0.5	6300	
METHYLENE CHLORIDE	TBD	0.5	4.1	5
STYRENE	TBD	0.5	1600	100
TETRACHLOROETHENE	TBD	0.5	0.1	5
TOLUENE	TBD	0.5	750	1000
TRANS-1,2-DICHLOROETHENE	TBD	0.5	120	100
TRANS-1,3-DICHLOROPROPENE	TBD	0.5	0.44[7]	
TRICHLOROETHENE	TBD	0.5	0.026	5
VINYL CHLORIDE	TBD	0.5	0.015[9]	2
XYLENES, TOTAL	TBD	0.5	210	10000

TABLE 1-2

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - AQUEOUS SAMPLE MATRIX (ug/L)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits[1]		EPA Region III Tap Water RBC [2]	Federal MCL [3]
	MDL/IDL	CRQL/CRDL		
TAL Metals (plus Cyanide) - CLP ILM04.1				
ALUMINUM	TBD	200	37000	
ANTIMONY	TBD	60	15	6
ARSENIC	TBD	10	0.045	10
BARIUM	TBD	200	2600	2000
BERYLLIUM	TBD	5	73	4
CADMIUM	TBD	5	18[10]	5
CALCIUM	TBD	5000		
CHROMIUM (TOTAL)	TBD	10	110[11]	100[12]
COBALT	TBD	50	730	
COPPER	TBD	25	1500	1300[13]
CYANIDE	TBD	10	730	200
IRON	TBD	100	11000	
LEAD	TBD	3	15[14]	15[13]
MAGNESIUM	TBD	5000		
MANGANESE	TBD	15	730[15]	
MERCURY	TBD	0.2	11[16]	2
NICKEL	TBD	40	730	
POTASSIUM	TBD	5000		
SELENIUM	TBD	5	180	50
SILVER	TBD	10	180	
SODIUM	TBD	5000		[8]
THALLIUM	TBD	10	2.6	2
VANADIUM	TBD	50	37	
ZINC	TBD	20	11000	

TABLE 1-2

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - AQUEOUS SAMPLE MATRIX (ug/L)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits[1]		EPA Region III Tap Water RBC [2]	Federal MCL [3]
	MDL/IDL	CRQL/CRDL		
Explosives - SW-846 8330				
1,3,5-TRINITROBENZENE	TBD	TBD	1100	
1,3-DINITROBENZENE	TBD	TBD	3.7	
2,4,6-TRINITROTOLUENE (TNT)	TBD	TBD	2.2[4]	
2,4-DINITROTOLUENE	TBD	TBD	73	
2,6-DINITROTOLUENE	TBD	TBD	37	
2-AMINO-4,6-DINITROTOLUENE	TBD	TBD	7.3	
2-NITROTOLUENE	TBD	TBD	0.046	
3-NITROTOLUENE	TBD	TBD	120	
4-AMINO-2,6-DINITROTOLUENE	TBD	TBD		
4-NITROTOLUENE	TBD	TBD	0.62	
HMX	TBD	TBD	1800	
NITROBENZENE	TBD	TBD	3.5	
RDX	TBD	TBD	0.61	
TETRYL	TBD	TBD	370	
Explosives - USATHAMA				
NITROCELLULOSE	TBD	TBD		
NITROGUANIDINE	TBD	TBD		
Explosives - SW-846 8332				
NITROGLYCERIN	TBD	TBD	4.8	

CLP	Contract Laboratory Program	RfD_o	Oral Reference Dose
CRDL	Contract Required Detection Limit	SDWA	Safe Drinking Water Act
CRQL	Contract Required Quantitation Limit	SOW	Statement of Work
EPA	Environmental Protection Agency	TAL	Target Analyte List
IDL	Instrument Detection Limit	TBD	To Be Determined

TABLE 1-2

ANALYTICAL DETECTION LIMITS VERSUS CRITERIA - AQUEOUS SAMPLE MATRIX (ug/L)
SITE 43 - TOLUENE DISPOSAL
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Laboratory Detection Limits[1]		EPA Region III Tap Water RBC [2]	Federal MCL [3]
	MDL/IDL	CRQL/CRDL		

MCL	Maximum Contaminant Level	TCL	Target Compound List
MDL	Method Detection Limit	USATHAMA	United States Army Toxic And Hazardous Materials Agency
RBC	Risk-Based Concentration		

The CRQL/CRDL and specific criterion/standard are shaded if the CRQL/CRDL exceeds the criteria/standard.
Blank cells indicate criterion is not available.

1	MDLs willl be provided when a laboratory is selected.
2	EPA Region III, 2004.
3	40 CFR 141.
4	10 percent of noncarinogenic RBC is less then the carcinogenic RBC.
5	MCL for disinfection byproducts (40 CFR Parts 9, 141, and 142; December 16, 1998).
6	Value is the total for trihalomethanes --- chloroform, bromodichloromethane, dibromochloromethane, and bromoform.
7	The EPA Region III RBC for 1,3-dichloropropene has been used as a surrogate for cis- and trans-1,3-dichloropropene.
8	Please see the 2004 Edition of the Drinking Water Standards and Health Advisories (Winter 2004) for additional health based, taste threshold, and/or threshold values for these chemicals
9	Tap water value is based on CSF for exposures by a child.
10	The RBC for tap water calculated using the RfDo for cadmium water is presented. The RBC for tap water calculated using the RfDo for cadmium food is 37 ug/L.
11	The RBC for tap water for hexavalent chromium is presented. The RBC for tap water for trivalent chromium is 55,000 ug/L.
12	Standard/criteria/screening value presented for Total chromium.
13	The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
14	No RBC is available. The Action Level promulgated under the SDWA is typically used for screening purposes.
15	The RBC for tap water calculated using the RfDo for manganese nonfood is presented. The RBC for tap water calculated using the RfDo for manganese food is 5,100 ug/L.
16	The value for mercuric chloirde have been used as a surrogate for mercury.

2.0 PROJECT ORGANIZATION

The project organization for the investigation activities is project specific and is provided in the project-specific Work Plan in Section 1.3. Personnel expected to be involved with the investigation activities at a programmatic level for the foreseeable future include the Navy Remedial Project Manager (RPM), the Facility Point of Contact, and the TtNUS Program Manager and Quality Assurance Manager, as follows:

Mr. Joseph Rail (Code C21EC)
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(412) 921-4040 (FAX)

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective for this project is to develop and implement procedures for field sampling, chain of custody, laboratory analysis, and reporting that will provide results that will be evaluated in the SSP Report to determine what, if any, future actions would be needed for Site 43. Specific procedures for sampling, chain of custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control (QC), audits, preventive maintenance of field equipment, and corrective action are described in other sections of the Master QAPP.

The PARCC parameters (precision, accuracy, representativeness, comparability, and completeness) are qualitative and/or quantitative statements regarding the quality characteristics of the data used to support project objectives and ultimately, environmental decisions. These parameters are discussed in the remainder of this section. Specific routine procedures used to assess the quantitative parameters (precision, accuracy, and completeness) are provided in Section 12.0 of the Master QAPP.

3.1 PRECISION

3.1.1 Definition

Precision is a measure of the amount of variability and bias inherent in a data set. Precision describes the reproducibility of measurements of the same parameter for samples under similar conditions. The equation for determining precision is provided in Section 12.2 of the Master QAPP.

3.1.2 Field Precision Objectives

Field duplicate precision monitors the consistency with which environmental samples were obtained and analyzed. Field duplicate results for solid matrix samples are considered to be precise if the relative percent difference (RPD) is less than or equal to 50 percent. Field duplicate results for aqueous matrix samples are considered to be precise if the RPD is less than or equal to 30 percent. Field precision is assessed through the collection and measurement of field duplicates at a rate of 1 duplicate per 10 environmental samples or one duplicate per sampling day per matrix, whichever is greater.

3.1.3 Laboratory Precision Objectives

Laboratory precision QC samples are analyzed at a frequency of 5 percent (i.e., 1 QC sample per 20 environmental samples). Laboratory precision is measured via comparison of calculated RPD values and Precision Control Limits specified in the analytical method or by the laboratory QA/QC Program.

The following analyses will be completed for environmental samples collected during the SSP Investigations for Site 43:

- TCL VOCs via Contract Laboratory Program (CLP) Statement of Work (SOW) OLM04.3 and OLC03.2
- TAL metals (plus cyanide) via CLP SOW ILM04.1
- Explosives via SW-846 8330, SW-846 8332, and United States Army Toxic and Hazardous Materials Agency (USATHAMA) methods

Precision for organic and explosives analyses will be measured via the RPDs for matrix spike (MS)/matrix spike duplicate (MSD) samples. Precision for inorganic analyses will be measured via RPDs for laboratory duplicates. RPDs should be statistically derived at the analytical laboratory. These limits will be provided in each analytical data package.

3.2 ACCURACY

3.2.1 Definition

Accuracy is the degree of agreement between two results that include an observed value and an accepted reference value. The equation for determining accuracy is provided in Section 12.1 of the Master QAPP.

3.2.2 Field Accuracy Objectives

Accuracy in the field is assessed through the use of field, equipment, and trip blanks and is ensured through adherence to all sample handling, preservation, and holding times requirements.

3.2.3 Laboratory Accuracy Objectives

Accuracy in the laboratory is measured through the comparison of a spiked sample result against a known or calculated value expressed as a percent recovery (%R). Percent recoveries are derived from the analysis of known amounts of compounds spiked into deionized water [i.e., laboratory control sample (LCS) analysis] or into actual samples (i.e., surrogate or MS analysis). These analyses measure the accuracy of laboratory operations as affected by matrix. LCS and/or MS analyses are performed with a frequency of 1 per 20 associated samples of like matrix. Surrogate spike analysis is performed for all organic analyses. Laboratory accuracy is assessed via comparison of calculated %R values with Accuracy Control Limits specified in the analytical method or by the contracted laboratory QA/QC Program.

Accuracy for VOC and explosives analyses will be measured via the %R values for surrogate spikes and MS/MSDs. Accuracy for metals analyses will be measured via %R values for MSs and LCSs. QC limits for matrix and surrogate spike recoveries are statistically derived by the analytical laboratory and will be provided in each analytical data package.

3.3 COMPLETENESS

3.3.1 Definition

Completeness is a measure of the amount of usable, valid, analytical data obtained compared to the amount expected to be obtained. Completeness is typically expressed as a percentage.

The ideal objective for completeness is 100 percent (i.e., every sample planned to be collected is collected, every sample submitted for analysis yields valid data). However, samples can be rendered unusable during shipping or preparation (e.g., bottles broken or extracts accidentally destroyed), errors can be introduced during analysis (e.g., loss of instrument sensitivity, introduction of ambient laboratory contamination), or strong matrix effects can become apparent (e.g., extremely low MS recovery). These instances result in data that do not meet QC criteria. Based on these considerations, 95 percent is considered an acceptable target for data completeness. If critical data points are lost, resampling and/or reanalysis may be required.

3.3.2 Field Completeness Objectives

Field completeness is a measure of the amount of valid field measurements obtained from all of the field measurements taken in the project. The equation for completeness is presented in Section 12.3 of the Master QAPP. Field data completeness for the Site 43 SSP investigation activities is expected to be 95 percent.

3.3.3 Laboratory Completeness Objectives

Laboratory completeness is a measure of the amount of valid laboratory measurements obtained from all of the laboratory measurements made in support of a given project. The equation for completeness is presented in Section 12.3 of the Master QAPP. Laboratory completeness for the Site 43 SSP investigation activities is expected to be at least 95 percent.

One hundred percent of the data for the SSP investigation activities will be validated in a limited fashion. The validation will be formulated to address only gross non-compliances resulting in the rejection of data and the elimination of false positives in accordance with the EPA National Functional Guidelines for Organic and Inorganic Data Review as modified for use by Region 3 (1993 and 1994b). The analytical

results for non-CLP parameters will be validated based on the analytical methods and will conform to these guidelines to the extent practicable. Data rejected as a result of the validation process will be treated as incomplete data.

3.4 REPRESENTATIVENESS

3.4.1 Definition

Representativeness is an expression of the degree to which the data accurately and precisely depict the actual characteristics of a population or environmental condition existing at an individual sampling point. Use of standardized sampling, handling, analytical, and reporting procedures ensures that the final data accurately represent actual site conditions.

3.4.2 Measures to Ensure Representativeness of Field Data

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the SSP Work Plan is followed and that the sampling techniques detailed are used.

3.4.3 Measures to Ensure Representativeness of Laboratory Data

Representativeness in the laboratory is ensured by using the proper analytical procedures, meeting sample holding times, and analyzing field duplicate samples.

3.5 COMPARABILITY

3.5.1 Definition

Comparability is defined as the confidence with which one data set can be compared to another (e.g., between sampling points, between sampling events). Comparability is achieved by using standardized sampling and analysis methods and data reporting formats including use of consistent units of measure and reporting of solid matrix sample results on a dry-weight basis (when practicable). Additionally, consideration is given to seasonal conditions and other environmental variations that could influence data results.

3.5.2 Measures to Ensure Comparability of Field Data

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the SSP Work Plan is followed and that proper sampling techniques are used.

3.5.3 Measures to Ensure Comparability of Laboratory Data

Analytical data will be comparable when similar sampling and analytical methods are used and documented. Results will be reported in units that ensure comparability with previous data and with current State and federal standards and guidelines. Organic chemicals will be reported in micrograms per liter (µg/L) for aqueous samples and micrograms per kilogram (µg/kg) for solid samples, except for explosives for which solid results will be reported as milligrams per kilogram (mg/kg). Metals will be reported as µg/L for aqueous samples and mg/kg for solid samples. Detection/reporting limits are discussed in Section 1.0 of this project-specific QAPP.

3.6 LEVEL OF QUALITY CONTROL EFFORT

Trip blank, equipment blank, field blank, method blank, duplicate, and MS samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs.

External QC samples (i.e., field QC samples) consist of field duplicates, field blanks, trip blanks, and equipment (rinsate) blanks. Each of these types of field QC samples undergoes the same preservation, analysis, and reporting procedures as the related environmental samples. Each type of field QC is discussed below.

Field duplicates are either two samples collected independently at a sampling location or a single sample homogenized and split into two portions. Where VOCs are to be analyzed, the VOC sample aliquots are containerized first to avoid loss of constituents and then the remaining sample matrix is homogenized. Field duplicates are collected and analyzed for chemical constituents to measure the precision of the sampling and analysis methods employed. The general level of the QC effort will be one field duplicate for every 10 or fewer investigative samples or one duplicate per matrix per sampling day, whichever is greater.

Trip blanks and field blanks (ambient condition blanks) consisting of distilled water will be submitted to the laboratories to provide the means to assess the quality of the data resulting from the field sampling program. Field blank samples are analyzed to check for background contamination at the facility (e.g., vapors or exhaust fumes) that may cause sample contamination. Field blanks will be collected based on conditions at the time of sampling at the discretion of the Field Operations Leader (FOL), with a minimum of one field blank being collected per site. Trip blanks pertain to VOCs only. Trip blanks are used to assess the potential for contamination of VOCs resulting from contaminant migration into sample bottles/jars during sample shipment and storage. Trip blanks are prepared by the laboratory prior to the sampling event, shipped to the site with the sample containers, and kept with the investigative samples throughout the sampling event. They are then packaged for shipment with other VOC samples and sent

for analysis. There should be one trip blank included in each sample shipping container that contains samples for VOC analysis. At no time after trip blank preparation are the trip blank sample containers opened before they reach the laboratory.

Equipment (rinsate) blanks are obtained under representative field conditions by collecting the rinse water generated by running analyte-free water through sample collection equipment after decontamination and prior to use. One rinsate blank will be collected per each type of sampling equipment used (e.g., hand auger, split-barreled samples) per day that sampling is conducted at a minimum frequency of 10 percent. A sampling event is matrix specific; therefore, an equipment blank must be collected for each matrix sampled. If pre-cleaned, dedicated, or disposable sampling equipment is used, one rinsate blank must be collected as a "batch blank." Rinsate blanks are analyzed for the same chemical constituents as the associated environmental samples.

Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures. Laboratory duplicate samples are analyzed for inorganic parameters to check for sampling and analytical reproducibility. MS samples provide information about the effect of the sample matrix on the digestion and measurement methodology. All MSs for organic analyses are performed in duplicate and are hereinafter referred to as MS/MSD samples. One MS/MSD will be analyzed for every 20 or fewer investigative samples. MS/MSD samples are investigative samples. Soil MS/MSD samples require no extra volume. However, aqueous MS/MSD samples must be collected at triple the volume for VOCs and double the volume for extractable organics.

The level of QC effort for testing of VOCs will conform to the CLP SOW OLM04.3 or OLC03.2. The level of QC effort for testing of metals will conform to the CLP SOW ILM04.1. The level of QC effort for explosive compounds will conform to those listed in the analytical method

4.0 SAMPLING PROCEDURES

Field sampling procedures for NDW-IH remedial investigation activities are discussed in detail in the facility SOPs. Specific sampling information contained in the facility SOPs and Project-Specific Work Plan is as follows:

- Field sampling by matrix
- Field QC sample collection/preparation procedures
- Sample containers, preservatives, and volume requirements
- Decontamination procedures
- Sample packaging and shipping procedures
- Mobilization/demobilization
- Monitoring well installation
- Monitoring well devleopment
- Soil sampling procedures
- Groundwater sampling procedures
- Surveying
- Waste handling
- QC sample procedures
- Field measurements/screening
- Preventive maintenance procedures/schedule
- Sample disposal

5.0 CUSTODY PROCEDURES

Refer to Section 5.0 of the Master QAPP (TtNUS, 2004).

6.0 CALIBRATION PROCEDURES AND FREQUENCIES

Calibrations for the laboratory analyses detailed in the accompanying SSP Work Plan will be performed in accordance with laboratory SOPs.

7.0 ANALYTICAL AND MEASUREMENT PROCEDURES

Refer to Section 7.0 of the Master QAPP (TtNUS, 2004).

7.1 LABORATORY ANALYTICAL AND MEASUREMENT PROCEDURES

TCL VOCs and TAL metals will be analyzed in accordance with the analytical procedures set forth in CLP SOW OLM04.3 (or OLC03.2) and SOW ILM04.1, respectively.

7.1.1 List of Project Target Compounds and Detection Limits

A complete list of the target compounds/analytes and required quantitation and detection limits is provided in Tables 1-1 (solid samples) and 1-2 (aqueous samples). Data generated through the use of the CLP SOWs will be reported to the Contract Required Quantitation Limit (CRQL) for organic analysis and the Contract Required Detection Limit (CRDL) for inorganic analysis. Analytes that are positively identified and quantified at concentrations less than the CRQLs/CRDLs will be reported as specified in the appropriate CLP SOW. Data generated through the use of non-CLP methods will be reported to the analytes practical quantitation limit (PQL). The PQL is an expression of the method detection limit (MDL) with consideration given to required adjustments to ensure that the precision and accuracy of the method are attainable.

All solid sample results will be reported on a dry-weight basis except for explosives. Quantitation and detection limits will also be adjusted, as necessary, based on dilutions and sample volume. Results for explosives are reported on a wet-weight basis for safety reasons.

7.1.2 List of Associated Quality Control Samples

In addition to the field QC samples (duplicates, trip blanks, rinsate blanks, etc.) discussed in Section 3.0 of the Master QAPP, laboratory QC samples including MS/MSD samples, method blanks, preparation blanks, etc. will be analyzed as required by the CLP and non-CLP methods. Laboratory QC samples are discussed in additional detail in Section 8.0 of the Master QAPP.

8.0 INTERNAL QUALITY CONTROL CHECKS

Refer to Section 8.0 of the Master QAPP (TtNUS, 2004).

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

Refer to Section 9.0 of the Master QAPP (TtNUS, 2004).

10.0 PERFORMANCE AND SYSTEM AUDITS

Refer to Section 10.0 of the Master QAPP (TtNUS, 2004).

11.0 PREVENTIVE MAINTENANCE PROCEDURES

Refer to Section 11.0 of the Master QAPP (TtNUS, 2004).

12.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

Refer to Section 12.0 of the Master QAPP (TtNUS, 2004).

13.0 CORRECTIVE ACTION

Refer to Section 13.0 of the Master QAPP (TtNUS, 2004).

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Refer to Section 14.0 of the Master QAPP (TtNUS, 2004).

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