N60234.AR.000097
NAS SAUFLEY FIELD
5090.3a

SAMPLING AND ANALYSIS PLAN FOR SITE CHARACTERIZATION STUDY INSTALLATION RESTORATION SITES 4 AND 5 NAVAL EDUCATION AND TRAINING PROFESSIONAL DEVELOPMENT AND TECHNICAL CENTER (NETPDTC) NAS SAUFLEY FIELD FL

11/10/2005

TETRA TECH

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
11/10/05

Sampling and Analysis Plan
for
Site Characterization Study
Installation Restoration Sites 4 & 5

NETPDTC Saufley Field

Naval Air Station Pensacola
Pensacola, Florida

Contract Task Order 0370

November 2005

NAVFAC
Naval Facilities Engineering Command
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

Rev. 1
11/10/05

SAMPLING AND ANALYSIS PLAN
FOR
SITE CHARACTERIZATION STUDY
INSTALLATION RESTORATION SITES 4 & 5

NETPDTC SAUFLEY FIELD
NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0370

NOVEMBER 2005

PREPARED UNDER THE SUPERVISION OF:

TERRY HANSEN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS ..... **v**

EXECUTIVE SUMMARY **ES-1**

1.0 INTRODUCTION **1-1**
1.1 PURPOSE OF THE SAP 1-1
1.2 FACILITY LOCATION AND SITE DESCRIPTION 1-1
1.3 SITE HISTORY AND OPERATIONS 1-3
1.4 ANTICIPATED SUBSURFACE CHARACTERISTICS 1-6
1.5 REGULATORY SETTING 1-6
1.6 REPORT ORGANIZATION 1-7

2.0 TECHNICAL APPROACH **2-1**
2.1 OVERVIEW 2-1
2.2 SCOPE OF PROPOSED ASSESSMENT 2-1
2.3 SITE CHARACTERIZATION STRATEGY 2-2
2.3.1 Soil Assessment 2-2
2.3.2 Groundwater Assessment, Phase I 2-9
2.3.3 Groundwater Assessment, Phase II 2-11
2.3.4 Monitoring Well Installation Methods 2-15
2.3.5 Groundwater Sampling 2-16
2.4 ENVIRONMENTAL SAMPLING SUMMARY 2-17

3.0 FIELD OPERATIONS **3-1**
3.1 HEALTH AND SAFETY 3-1
3.2 RECORD KEEPING 3-1
3.3 EQUIPMENT CALIBRATION AND MAINTENANCE 3-1
3.4 SOIL SAMPLING 3-2
3.5 GROUNDWATER SAMPLING 3-2
3.5.1 Screen Point Sampling 3-2
3.5.2 Monitoring Well Sampling 3-2
3.6 EQUIPMENT DECONTAMINATION 3-2
3.6.1 Major Equipment 3-3
3.6.2 Sampling Equipment 3-3
3.7 DATA QUALITY REQUIREMENTS 3-3
3.7.1 Laboratory Analyses and Quality Assurance/Quality Control Samples 3-3
3.8 SAMPLE NOMENCLATURE 3-5
3.8.1 Phase I Grab Samples 3-5
3.8.2 Monitoring Well Identification and Sample Designation 3-6
3.8.3 Sample Containers, Preservation, Holding Times, and Analyses 3-7
3.8.4 Sample Packaging and Shipping 3-7
3.9 SAMPLE CUSTODY 3-7
3.10 WASTE HANDLING 3-12
3.11 SURVEYING 3-12
3.12 SITE MANAGEMENT AND BASE SUPPORT 3-13

4.0 DATA VALIDATION AND SITE CHARACTERIZATION REPORT **4-1**

5.0 PROJECT SCHEDULE **5-1**

REFERENCES **R-1**

APPENDICES

A HEALTH AND SAFETY PLAN
B FIELD FORMS
C STANDARD OPERATING PROCEDURES – SOP SA-7.1 – DECONTAMINATION OF FIELD EQUIPMENT

TABLES

NUMBER **PAGE**

2-1 Field Investigation Site 4 – Analytical Summary for Soil Sampling at Waste Oil/Solvent, Kerosene and Gasoline Tanks 2-3
2-2 Field Investigation Site 4 – Analytical Summary for Soil Sampling at Aircraft Wash Rack Areas 2-6
2-3 Field Investigation Site 5 – Analytical Summary for Soil Sampling at AVGAS Pipeline and Bowsers 2-8
2-4 Field Investigation – Analytical Summary for Soil Sampling at Background Locations 2-10
2-5 Field Investigation Site 4 – Analytical Summary for Groundwater Sampling at Waste Oil/Solvent, Kerosene and Gasoline Tanks 2-12
2-6 Field Investigation Site 4 – Analytical Summary for Groundwater Sampling at Aircraft Wash Rack Area 2-13
2-7 Field Investigation Site 5 – Analytical Summary for Groundwater Sampling at AVGAS Pipeline and Bowsers 2-14
2-8 Field Investigation – Analytical Summary for Groundwater Sampling at Background Wells 2-18
2-9 Field Investigation – Drilling and Monitoring Well Installation Summary 2-19
2-10 Field Investigation Site 4 – Environmental Sample Summary: Two Waste Oil/Solvent, Two Kerosene, Two Gasoline Tanks 2-20
2-11 Field Investigation Site 4 – Environmental Sample Summary: Aircraft Wash Rack Area and Contingency Wells 2-21
2-12 Field Investigation Site 5 – Environmental Sample Summary: AVGAS Pipeline and Bowsers 2-22
2-13 Field Investigation – Environmental Sample Summary: Background Soil, Groundwater and SPLP Samples 2-23
3-1 Frequency of Field Quality Control Samples 3-4
3-2 Summary of Soil Anlytical Requirements, Fixed-base Laboratory 3-8
3-3 Summary of Groundwater Analytical Requirements 3-10

FIGURES

NUMBER **PAGE**

1-1 Base Location Map 1-2
1-2 Site Plan and Investigation Sites 1-4
2-1 Proposed DPT and Monitoring Well Locations 2-4

ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
AVGAS	Aviation Gas
bls	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
°C	Degrees Celsius
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
COC	Constituent of Concern
CTL	Cleanup Targel Levels
CTO	Contract Task Order
DCA	Dichloroethane
DPT	Direct-Push Technology
EDB	Ethylene Dibromide
EPA	United States Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	Flame Ionization Detector
FL-PRO	Florida Petroleum Range Organics
FOL	Field Operations Leader
GAG	Gasoline Analytical Group
GPS	Global Positioning System
HASP	Health and Safety Plan
HCl	Hydrochloric Acid
HNO_3	Nitric Acid
ID	Inside Diameter
IDW	Investigation-Derived Waste
IR	Installation Restoration
KAG	Kerosene Analytical Group
LNAPL	Light Non-aqueous Phase Liquid
mL	Milliliter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTBE	Methyl tertiary-butyl ether

ACRONYMS (CONTINUED)

NAAS	Naval Auxiliary Air Station
NAS	Naval Air Station
NAVFAC EFD SOUTH	Southern Division, Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NELAP	National Environmental Laboratory Accreditation Program
NETPDTC	Naval Education and Training Program Development and Technology Center
NETPMSA	Naval Educational and Training Program Management Support Activity
NGVD	National Geodetic Vertical Datum
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Unit
OLF	Outlying Landing Field
OVA	Organic Vapor Analyzer
oz	Ounce
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PPL	Priority Pollutant List
ppm	Parts per Million
PVC	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SPLP	Sythetic Precipitate Leaching Procedure
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TOM	Task Order Manager
TRPH	Total Recoverable Petroleum Hydrocarbon
TtNUS	Tetra Tech NUS, Inc.
USCS	Unified Soil Classification System
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VOH	Volatile Organic Halocarbon

1.0 INTRODUCTION

Tetra Tech NUS, Inc., (TtNUS), under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH) is submitting this Sampling and Analysis Plan (SAP) to complete a Site Characterization Study for Installation Restoration (IR) Sites 4 and 5 at Outlying Landing Field (OLF) Saufley (Saufley Field), Naval Air Station (NAS) Pensacola, Pensacola, Florida. This SAP was prepared under the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0370.

1.1 PURPOSE OF THE SAP

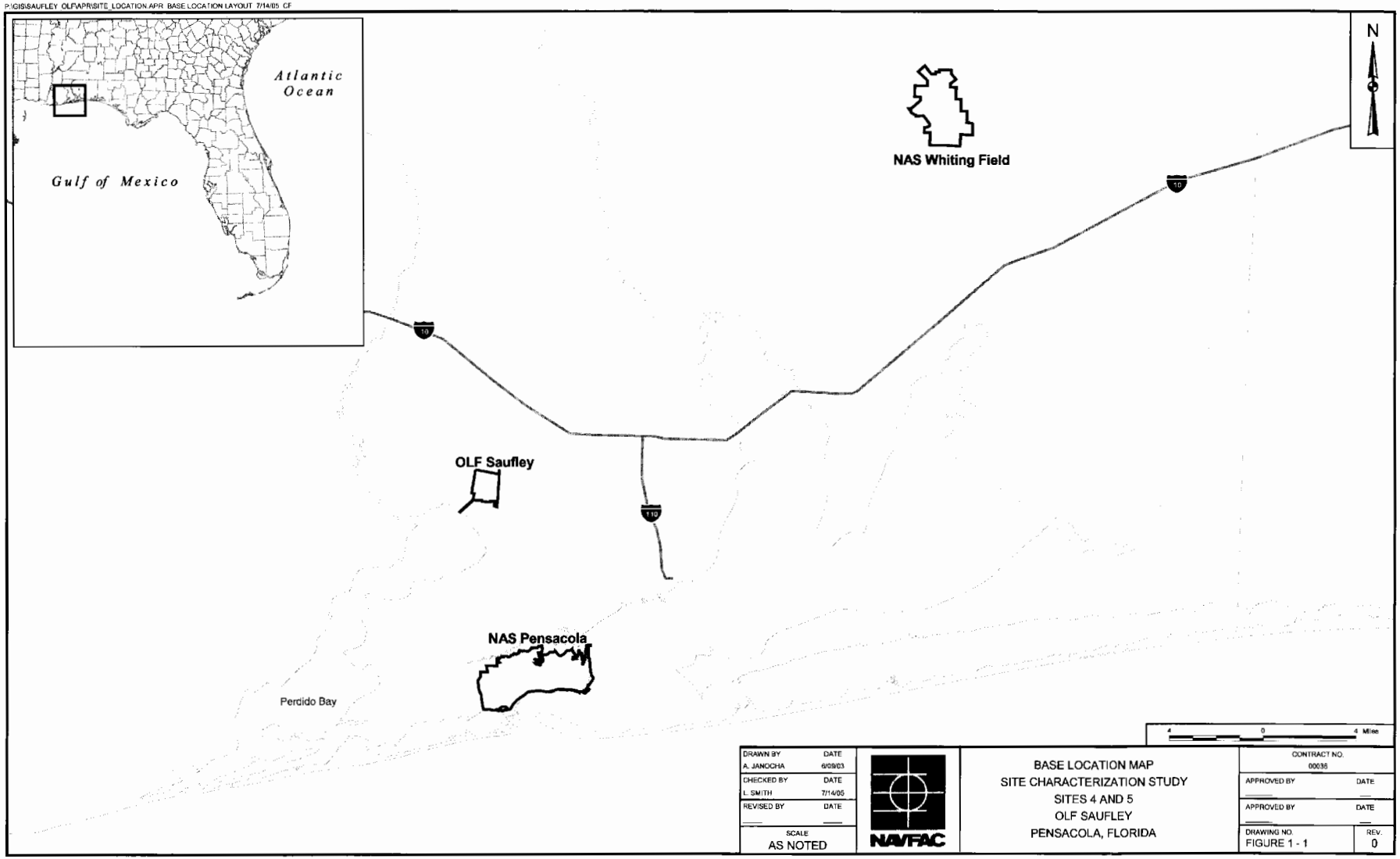
This SAP serves as a guide for the site characterization investigation activities to be conducted at IR Sites 4 and 5 and documents the procedures for field activities and sample analyses. The SAP specifies the sampling protocol and procedures for data collection, sample analysis and handling, locations and frequency of samples to be collected, sample nomenclature, sampling equipment, and handling of investigation-derived waste (IDW). This plan was prepared in accordance with the TtNUS Corporate Quality Assurance Program Manual, dated January 1, 2001, and the TtNUS Florida Regional Quality Assurance Program Manual, dated October 9, 2002.

The objective of this investigation is to identify and delineate areas of contamination, if present, at Sites 4 and 5. Site 4 is comprised of hangars, used oil/solvent tanks, gasoline and kerosene tanks, and aircraft wash racks. Site 5 is comprised of aviation gas (AVGAS) pipelines and bowsers (refueling pits) located on the ramp. The work will include collection and analysis of both environmental and background soil and groundwater samples. These samples will be submitted to a Florida Department of Environmental Protection (FDEP)-approved National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory for analysis, as well as other testing to meet either the FDEP requirements for Petroleum Storage Tank System Closure Assessments as defined in Chapter 62-761, Florida Administrative Code (F.A.C.) or a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI) Report. The investigation will require the installation of temporary and permanent groundwater sampling points. Depth to groundwater is estimated to be approximately 45 to 50 feet below land surface (bls).

1.2 FACILITY LOCATION AND SITE DESCRIPTION

Saufley Field is located in Escambia County, northwest Florida. The facility is situated between Interstate 10 and Perdido Bay approximately five miles northwest of Pensacola, Florida (see Figure 1-1). OLF Saufley

P:\GIS\SAUFLEY_OLF\APR\SITE_LOCATION\APR_BASE LOCATION LAYOUT_7/14/05_CF



DRAWN BY A. JANOCHA	DATE 6/09/03	BASE LOCATION MAP SITE CHARACTERIZATION STUDY SITES 4 AND 5 OLF SAUFLEY PENSACOLA, FLORIDA	CONTRACT NO. 00036
CHECKED BY L. SMITH	DATE 7/14/05		APPROVED BY / DATE
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 1 - 1 / REV. 0

consists of four airstrips. Currently, two airstrips are active. The base also has a number of support buildings and a Federal Prison located south of the airfield. OLF Saufley encompasses 866 acres with the majority of the area consisting of airstrips, grass covered fields, buildings, and woods.

Sites 4 and 5 comprise the hangar areas and former fuel distribution lines, respectively. Their locations are presented on Figure 1-2.

Site 4 consists of hangars 807, 808, 809, and 810 and the concrete and grass covered areas immediately surrounding them. The hangars are roughly located symmetrically about the control tower, Building 803. Based on a review of historic aerial photographs, these hangars were initially constructed with concrete pavement surrounding the structures on all sides with the exception of small grass covered areas surrounded by curbs located adjacent to administrative doorways. For this reason, investigation for spilled fuels, oils, and solvents near the hangars will be restricted to the locations of gasoline and used oil/solvent tanks and the wash racks (Figure 1-2).

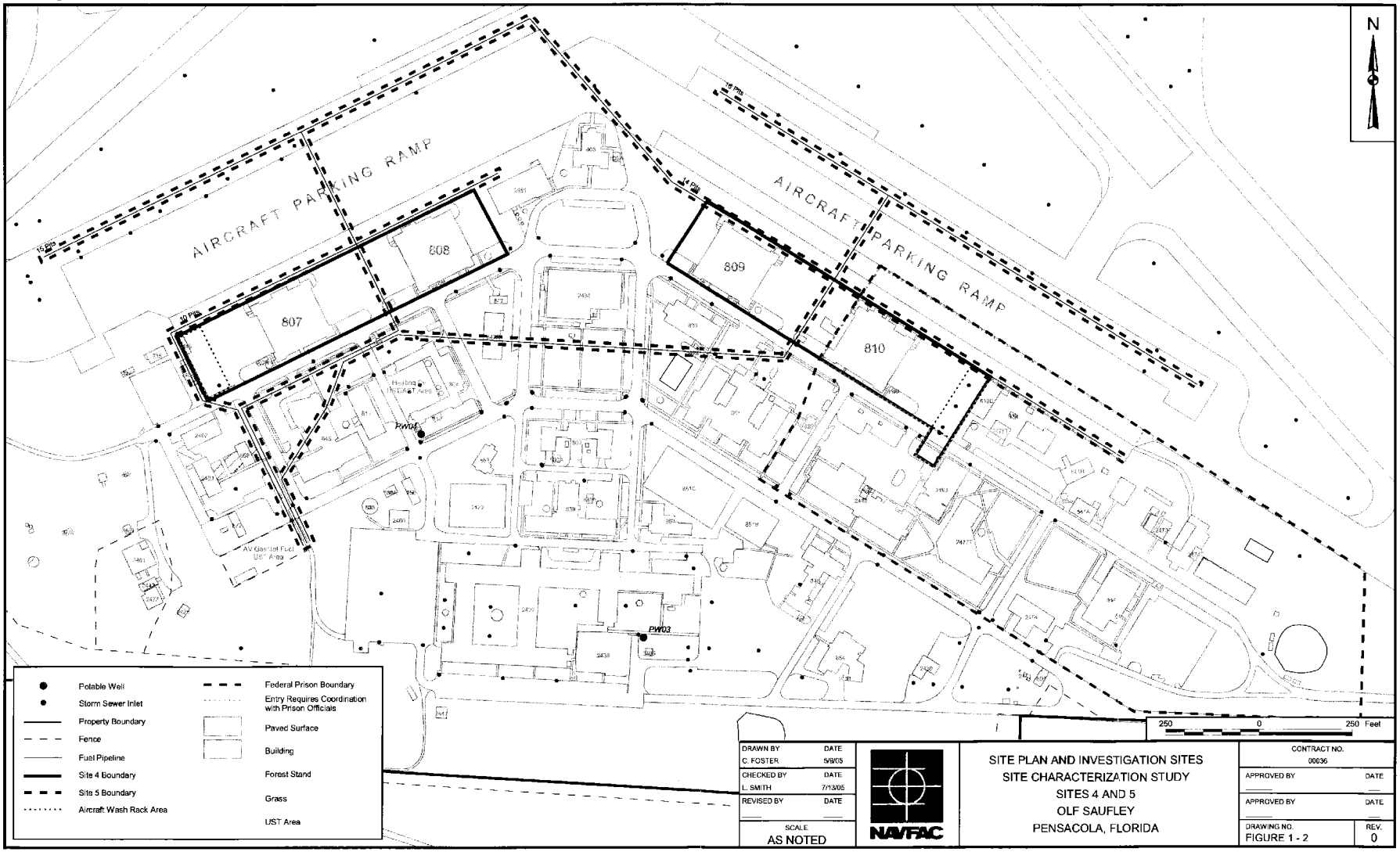
Site 5 consists solely of the AVGAS fuel distribution lines connecting the underground storage tank (UST) farm to the flight line and refueling pits or bowsers located along the aircraft parking ramp. The UST enclosure was located approximately 500 feet south of the westernmost hangar (Building 807) and consisted of six 25,000-gallon AVGAS USTs and one 15,000-gallon tank containing JP-4 jet fuel. This tank farm is now part of UST Site 2406, currently under investigation by TtNUS.

AVGAS was distributed through 4-inch, 8-inch, and 10-inch diameter steel underground lines connecting the USTs to the flight line bowsers as shown on Figure 1-2. There were 56 bowsers arrayed in two parallel lines (a south line and a north line) along the aircraft-parking ramp. The bowsers were numbered sequentially from 1 through 55 and, with some exceptions, were typically spaced 100 feet apart. One line of refueling bowsers was situated along south side of the innermost taxiway adjacent to the Site 4 hangars. This line of bowsers, located within 10 feet of the north side of the hangars, was divided into two segments: one trending southwest-to-northeast on the north side of Hangars 807 and 808 and extending to the southwest and the other trending northwest-to-southeast on the north side of Hangars 809 and 810 and extending to the southeast. The control tower (Building 803) is located at the center of the southern line of bowsers. Parallel lines of refueling bowsers were located on the opposite (north) side of the innermost taxiway approximately 250 feet to the north of the two segments described above (Figure 1-2).

1.3 SITE HISTORY AND OPERATIONS

OLF Saufley opened in 1940 as Naval Auxiliary Air Station (NAAS) Saufley. NAAS Saufley was used to train pilots during World War II and the Korean Conflict. In 1957, the mission at Saufley Field was changed

P:\GIS\SAUFLEY_OLF\APR\BASEMAP.APR -REMEDIAL INVESTIGATION WORKPLAN LAYOUT 7/13/05 CF



to basic training for naval aviators. NAAS Saufley was re-designated as a NAS in 1968 and retained this status until 1976 when NAS Saufley operations were discontinued and the facility was placed in caretaker status. Between 1976 and 1979, Saufley Field was used as an OLF for NAS Whiting Field. Currently, NAS Whiting Field pilots use two of the airstrips for touch and go landing exercises.

In 1979, the facility was reactivated as Naval Educational and Training Program Management Support Activity (NETPMSA). Saufley Field was renamed the Naval Education and Training Professional Development and Technical Center (NETPDTC) in 1996, and is now used primarily to train and educate naval personnel. At this time, approximately 10 percent of the base, including approximately 25 percent of Site 4 (primarily hangar 810 and the associated eastern aircraft wash rack area), was designated as a minimum security Federal Prison Camp housing male offenders. Working within the camp area requires modification of typical work practices (i.e., no phones, knives, cameras, or speaking with inmates, and a check-in/check-out procedure).

No environmental investigations involving sampling and analysis of environmental media have been performed at Sites 4 or 5. In May 1992, Naval Energy and Environmental Support Activity (NEESA) based in Port Hueneme, California submitted the "Preliminary Assessment Report, Naval Educational and Training Program Management Support Activity (NETPMSA), Saufley Field, Escambia County, Florida." In this document, NEESA made the following general statements or observations:

- Between 1942 and 1976, numerous types of solvents, oils, and fuels were used at Saufley Field to support air operations.
- By volume, more high octane AVGAS was used than any other hazardous material.
- Used solvent and used oil/solvents were the the majority of hazardous wastes generated.
- Toluene, carbon tetrachloride, and trichloroethane were a few of the solvents used.
- Exact usage rates of fuels, oils, and solvents at Saufley Field are unknown.
- During aerial operations between 1942 and 1977, 14 USTs and 2 aboveground storage tanks (ASTs) were in service.
- Most of the tanks were removed in late 1980.

Specific references to Site 4 are:

- Used oil/solvents were placed in two 2000-gallon capacity USTs designated tanks 807-B and 819-B located at Hangars 807 and 810, respectively.
- Waste solvents may also have been stored in these tanks.
- When the tanks were full, used oil/solvents were transported off base or burned by the base fire department at the fire fighting training pit north of the runways.

Additional tanks associated with Hangars 807 and 810 were 1000-gallon kerosene tanks (Tanks 807-C and 819-C) and 1000-gallon gasoline tanks (Tanks 807-D and 819-D). Currently, the exact locations of the six USTs associated with the hangars are unknown.

Specific references to Site 5 are:

- The seven aerial (read as AVGAS) refueling tanks (subject of UST Site 2406 investigation) were connected by over two miles of 10-inch and 8-inch diameter steel fuel lines to 55 refueling pits (bowsers) located on the aircraft parking platform (ramp).
- In late 1950, lightning ignited a row of refueling pits north of Hangars 807 and 808 causing minor damage to the pits involved. It is not known whether any damage was done to the fuel lines.
- The refueling pits were removed in early 1980. It is not known whether the underground piping associated with the fuel pits was removed.

1.4 ANTICIPATED SUBSURFACE CHARACTERISTICS

Based on lithologic descriptions and hydrologic information reported during the assessement at nearby UST Site 2406, sediments in the upper 120 feet underlying Sites 4 and 5 are expected to consist of sand, silt, and clay mixtures. The soil-water interface has typically been encountered in this area at depths ranging from 45 to 50 feet bls.

1.5 REGULATORY SETTING

The Navy IR Program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations, with the goal of expediting and improving environmental response actions while protecting human health and the environment. The IR program is conducted in accordance with Section 120 CERCLA (1980) as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires federal facilities to comply with the act,

both procedurally and substantively. Due to the nature of activies proposed at Site 4 (the four hangar areas, used oil/solvent tanks, and aircraft wash rack areas), the investigation will be conducted in general accordance with Chapter 62-777, F.A.C. and in general accordance with guidance provided in the Storage Tank System Closure Assessment Requirements of Chapter 62-761, F.A.C. and CERCLA guidance. Site 5 (the AVGAS pipelines and bowsers) is being investigated primarily under guidance provided in the Storage Tank System Closure Assessment Requirements of Chapter 62-761, F.A.C. Combining regulatory guidance allows for maximization of future options relative to possible remedial actions.

1.6 REPORT ORGANIZATION

This SAP is organized into five sections as follows:

- Section 1.0 – Presents the purpose, site location, description, history, and regulatory setting for the Site Characterization Study at Sites 4 and 5, OLF Saufley.
- Section 2.0 – Presents the technical approach to the sampling and analysis.
- Section 3.0 – Presents the procedures and methods for conducting the project-specific field investigation activities to be performed.
- Section 4.0 – Presents methods of Data Validation and Site Characterization Reporting
- Section 5.0 – Presents project schedule
- References – Lists all references used in preparing this planning document.
- Appendices – Provide relevant supporting data to material provided in text.

2.0 TECHNICAL APPROACH

2.1 OVERVIEW

The primary objective of this investigation is to determine if chemical constituents (primarily petroleum hydrocarbons and chlorinated solvents) used in past operations at Saufley Field are present in soils and/or groundwater at Sites 4 and/or 5 at concentrations representing a risk to human health or the environment or require remediation per regulatory screening guidelines. Soil and groundwater samples will be collected for field screening and for fixed-base laboratory analyses. Laboratory analytical results will be compared with Cleanup Target Levels (CTLs) specified in Chapter 62-777, F.A.C. Field activities, such as direct-push technology (DPT) advancement, drilling, and soil and groundwater sampling, will be conducted in accordance with the Site Specific Health and Safety Plan (HASP), included as Appendix A of this Work Plan, and the FDEP Standard Operating Procedures (SOPs) for Field Activities (2004). The investigation will include surface soil sampling, collection of subsurface soil and groundwater samples by DPT methods, soil boring advancement and monitoring well installation by truck-mounted drill rig, and fixed-base laboratory analyses of soil and groundwater samples. The investigation will be conducted in general accordance with guidance provided in the Storage Tank System Closure Assessment Requirements described in Chapter 62-761, F.A.C.; Chapter 62-770, F.A.C.; and CERCLA guidance. In the event the FDEP SOPs do not apply to a specific task, TtNUS will defer to the TtNUS Corporate SOPs (TtNUS, 2004).

2.2 SCOPE OF PROPOSED ASSESSMENT

The proposed scope of work will be performed in two phases. During the first phase (Phase I), soil samples will be collected from the vadose zone and screened for organic vapor content using an Organic Vapor Analyzer (OVA) equipped with a Flame Ionization Detector (FID). Subsurface soil samples and groundwater grab samples will be collected during Phase I by DPT methods. Select samples (soil and groundwater) will be submitted to a fixed-base laboratory for analysis of appropriate constituents. Data obtained during Phase I will determine the scope of work for Phase II field activities.

If constituents of concern (COCs) are identified in groundwater samples during Phase I, a network of permanent monitoring wells will be installed during Phase II to evaluate magnitude and extent of groundwater contamination identified during Phase I. If soil contamination is encountered in the vadose zone during Phase I, the magnitude and extent of such contamination will be determined in Phase II by supplemental OVA field screening and soil sampling for laboratory analysis in the impacted areas using DPT methods.

2.3 SITE CHARACTERIZATION STRATEGY

2.3.1 Soil Assessment

All borings at Site 4 and the majority of borings at Site 5 will be located in areas paved with concrete. Pilot holes will be advanced through the concrete pavement with a coring device. Each soil boring will be pre-probed with posthole diggers from the base of the concrete (or asphalt) cover to 4 feet bls to ensure underground utilities are not present. The soil hydrocarbon vapor assessment borings will likely be advanced using DPT. This method is usually preferred when performing soil vapor surveys in clastic terrains such as those anticipated in the proposed investigation area. If used, DPT will also minimize the amount of soil cuttings (IDW) generated during boring activities. If DPT is not used, conventional drilling processes involving collection of soil samples with stainless steel split spoon samplers will be used.

Potential COCs at Site 4 will likely be petroleum related compounds and solvents, whereas at Site 5, COCs will likely be limited to petroleum compounds. To achieve clarity, the following field assessment efforts are explained relative to possible site contaminants and applicable regulatory requirements.

Site 4

Site 4 consists of Hangars 807, 808, 809, and 810. Hangars 807 and 810 are associated with used oil/solvent, kerosene, and gasoline USTs as well as aircraft wash rack areas. TtNUS estimates it will require approximately five soil borings per tank for a total of 30 borings (Table 2-1) at Hangars 807 and 810 in Phase I of the UST investigation. Phase II will require the installation of a minimum six monitoring wells, one well per tank. The general tank locations are depicted on Figure 2-1. Estimates of the required number of soil borings is based on the minimum number of borings required by 62-761, F.A.C. for a UST tank. The former locations of these tanks are currently unknow. TtNUS is in the process of reviewing historical documents and blue prints to find their locations. The six UST locations will have to be determined prior to beginning the field investigation.

Soil samples associated with the six tanks will be collected from the surface at each of the selected boring locations and then at 1 foot vertical intervals to a depth of 10 feet bls. Samples will then be collected at 5-foot intervals to a depth of approximately 20 feet bls. If hydrocarbon vapors exceeding 10 parts per million (ppm) are not present, the boring will be terminated at 20 feet bls. If hydrocarbon vapors exceeding 10 ppm are encountered in the vadose zone, soil sampling will continue at 5-foot intervals until two consecutive clean samples (less than 10 ppm organic vapor) are collected or the water table is encountered (approximately 40 to 45 feet bls). Soil samples will be collected using either 2-feet or 4-feet long samplers.

TABLE 2-1

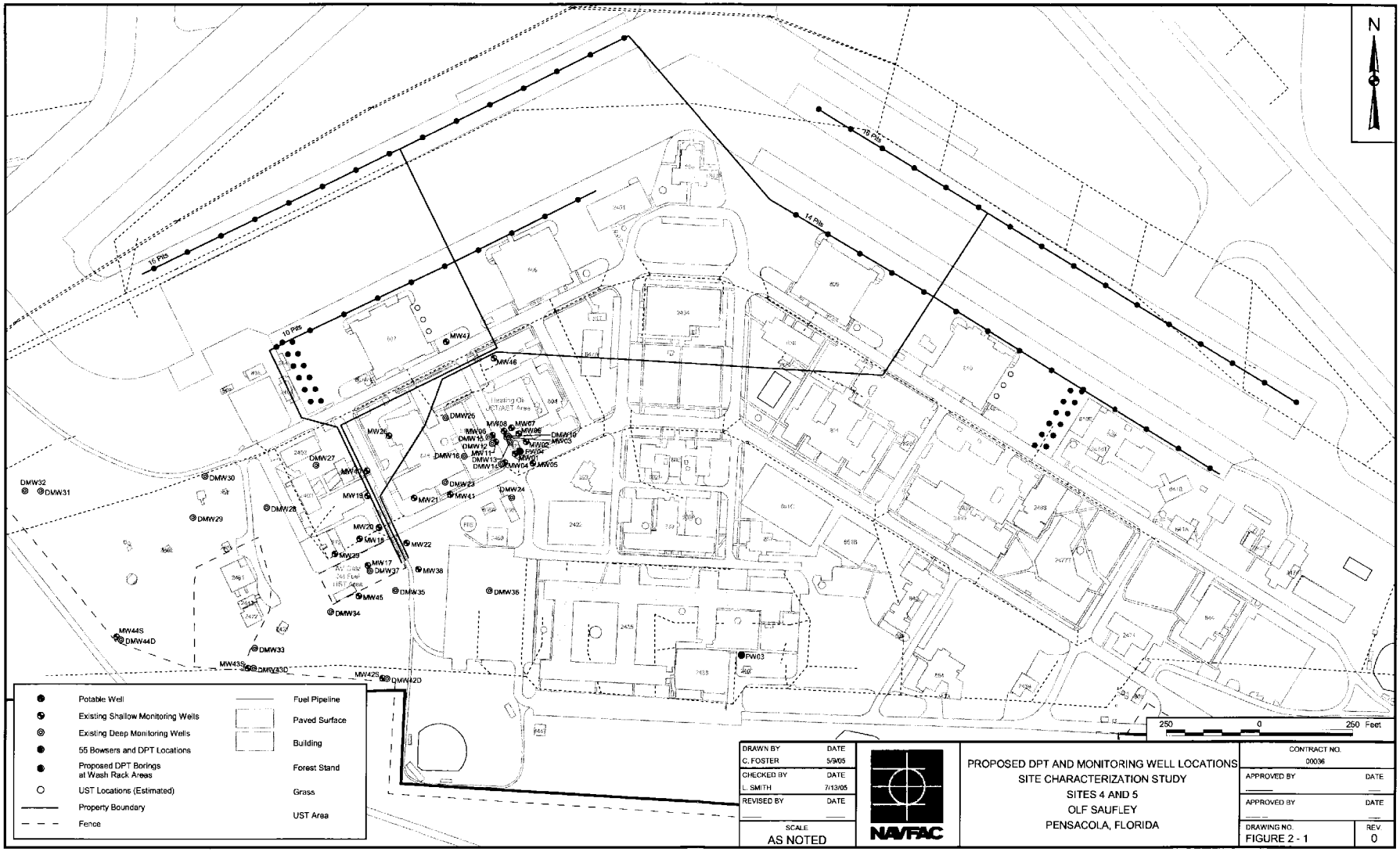
FIELD INVESTIGATION SITE 4
ANALYTICAL SUMMARY FOR SOIL SAMPLING AT WASTE OIL/SOLVENT, KEROSENE, AND GASOLINE TANKS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Soil									
PPL VOHs and BTEXM	8260B	10	1	1	1	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**13**
BTEX and MTBE	8260B	30	1	2	1				**34**
PAH	8310 or 8270C	30	1	2	1				**34**
PCBs	8280	10	1	1	1				**13**
TRPH	FL-PRO	30	1	2	1				**34**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	10	1	1	1				**13**

NOTES:

FL-PRO – Florida Petroleum Range Organics
IDW – Investigation Derived Waste
PPL – Priority Pollutant List
VOH – Volatile Organic Halocarbon
BTEX – Benzene, toluene, ethylbenzene, xylene
MTBE – Methyl tertiary-butyl ether
PAH – Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH – Total Recoverable Petroleum Hydrocarbon
EDB – Ethylene Dibromide
MS/MSD – Matrix Spike/Matrix Spike Duplicate
(1) United States Environmental Protection Agency (EPA) Method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

P:\CIS\SAUFLEY_OLF\APR\BASEMAP.APR PROPOSED DPT AND MW LAYOUT 7/13/05 CF



DRAWN BY	DATE
C. FOSTER	5/9/05
CHECKED BY	DATE
L. SMITH	7/13/05
REVISED BY	DATE
SCALE: AS NOTED	

NAVFAC

PROPOSED DPT AND MONITORING WELL LOCATIONS
SITE CHARACTERIZATION STUDY
SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA

CONTRACT NO. 00036	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2 - 1	REV. 0

Samples will be described lithologically in the field by a TtNUS geologist. Evidence of impacted soil, including odors and staining, if present, will also be noted.

If contaminated soil is suspected beyond the depth range of the DPT collection method, samples will be collected using split-spoon samplers attached to a truck-mounted drill rig during Phase II of the investigation. Soil samples collected from the subsurface tank sides or pit bottom having the highest hydrocarbon vapor readings will be retained for fixed-base laboratory analyses. Samples will be analyzed for either Kerosene Analytical Group (KAG) or Gasoline Analytical Group (GAG) constituents as required and defined by Chapter 62-761. These consituents are listed on Table 2-1.

Approximately 12 DPT soil borings will be advanced at each of the two aircraft wash racks (west of Hangar 807 and east of Hangar 810) during the Phase I investigation for a total of 24 borings. Soil samples collected from the 24 borings will be screened for organic vapors using an OVA-FID as described previously. All 24 borings will extend to the water table. Soil samples with the highest hydrocarbon vapor readings will be retained for laboratory analysis. Soil samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), Appendix IX TCL semi-volatile organic compounds (SVOCs), PCBs, TRPH, and Target Analyte List (TAL) metals. The laboratory analytical methods to be used are specified in Table 2-2. For source area samples where FID responses are high or the on-site geologist determines it is appropriate, Synthetic Precipitate Leaching Procedure (SPLP) analyses will be performed on select samples.

Site 5

TtNUS estimates approximately 465 soil borings and up to 35 permanent monitoring wells will be required for the characterization of Site 5. Phase I will consist of the advancement of 55 DPT borings located along the AVGAS pipelines within 3 feet of the associated refueling pits (see Figure 2-1 for locations). Approximately 410 additional borings will be advanced at 20 feet horizontal spacings to assess the buried pipeline between the refueling pits and along the feeder lines originating from the UST area as required by 62-761, F.A.C. Each soil boring will be excavated with posthole diggers from the surface to 4 feet bls to ensure underground utilities are not present.

Since VOCs are the most likely contaminants at Site 5, soil samples will be screened in the field using an OVA-FID in accordance with headspace analysis techniques described in Chapter 62-770.200(12) and 62-761, F.A.C. Samples will be described by a TtNUS geologist, and visual or olfactory evidence of impacted soil will also be noted.

TABLE 2-2

FIELD INVESTIGATION SITE 4
ANALYTICAL SUMMARY FOR SOIL SAMPLING AT AIRCRAFT WASH RACK AREAS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	SPLP Samples	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Soil									
TCL VOCs and Appendix IX	8260B	24	12	2	2	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**40**
TCL SVOCs and Appendix IX	8260B	24	12	2	2				**40**
PCBs	8082	24	12	2	2				**40**
TRPH	FL-PRO	24	12	2	2				**40**
TAL Metals	6010B	24	12	2	2				**40**

NOTES:

FL-PRO – Florida Petroleum Range Organics
IDW – Investigation Derived Waste
TCL – Target Compound List
VOC - Volatile Organic Compound
SVOC- Semivolatile Organic Compound
PCB – Polychlorinated biphenyl
TRPH - Total Recoverable Petroleum Hydrocarbon
TAL – Target analyte list
MS/MSD – Matrix Spike/Matrix Spike Duplicate
(1) EPA Method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.

- Soil Density or Cohesiveness
- Soil Color
- Unified Soil Classification System (USCS) Material Description
- Sample Depths
- Depth to lithologic boundaries (i.e., contacts)
- Approximate moisture content of sample
- Depth to groundwater (or perched water, if present)
- Corrected OVA reading
- Drilling Method
- Total depth of boring
- Other pertinent observations

An example of the boring log form is provided in Appendix B.

Background

To address CERCLA regulations for this and future investigations at OLF Saufley, approximately 10 surface soil samples will be collected from random locations along the pipeline immediately below the concrete ramp apron and engineered base. An additional 10 surface soil samples will be collected from areas between and away from the runways and anthropogenic activities/structures to establish the OLF Saufley background surface soil charateristics as required by CERCLA. As borings are advanced at Sites 4 and 5 and at the background monitoring well locations, 20 SPLP samples will be collected at random subsurface elevation intervals in undisturbed material between the surface and water table. Table 2-4 lists proposed analytes and proposed analytical methods for background soil samples.

2.3.2 Groundwater Assessment, Phase I

Site 4

During Phase I DPT activities, groundwater grab samples will be collected from the uppermost saturated zone at the selected boring locations. Samples will be collected using 4-foot long stainless steel retractable screen point samplers attached to the end of the DPT drill string. When the desired depth is reached and the screen point is exposed to the formation, groundwater samples will be collected by the low-flow method using either a peristaltic pump with appropriate tubing and foot valve attached or an appropriate sized and designed bailer.

TABLE 2-4

FIELD INVESTIGATION
ANALYTICAL SUMMARY FOR SOIL SAMPLING AT BACKGROUND LOCATIONS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	SPLP Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
SOIL										
TCL VOCs & Appendix IX	8260B	20	20		2	1	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**43**
TCL SVOCs & Appendix IX	8270C	20	20		2	1				**43**
TCL PEST/PCBs & Appendix IX	8081A/ 8082	20	20		2	1				**43**
TCL Herbicides & Appendix IX	8141A/ 8151A	20	20		2	1				**43**
TAL Metals	6010B	20	20		2	1				**43**

NOTES:

SPLP – Synthetic Precipitate Leaching Procedure
IDW – Investigation Derived Waste
TCL – Target Compound List
VOC – Volatile Organic Compound
SVOC – Semivolatile Organic Compound
PEST – Pesticide
PCB – Polychlorinated biphenyl
TAL – Target Analyte List
(1) Method referenced reflects: FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

At locations where petroleum hydrocarbons are expected (UST tanks), grab samples will only be collected from the uppermost zone of saturation since these contaminants are less dense than water and tend to stay near or above the surface of the water table. Table 2-5 lists proposed analytes and proposed analytical methods for groundwater samples at the waste oil/solvent, kerosene, and gasoline tanks.

At the 24 boring locations outside Hangars 807 and 810 where the aircraft wash racks were located, additional groundwater grab samples will be collected 10 feet below the water table surface to assess the potential presence of chlorinated solvents. These compounds are commonly used as cleaning agents for aircraft parts, and when released to the environment in pure form, have the tendency to migrate downward within the zone of saturation because they are denser than water. If chlorinated solvents are identified, additional grab samples will be collected at 10-foot vertical intervals until no detections are reported.

Any additional groundwater grab samples collected from the screen point samplers will be shipped to a fixed-base laboratory for analysis of only TCL VOCs and Appendix IX constituents. The laboratory analytical methods to be used for the aircraft wash rack samples are specified in Table 2-6.

Site 5

Groundwater grab samples will be collected from the uppermost occurrence of groundwater (estimated to be 45 to 50 feet bls) at the DPT boring locations assessed during Phase I. These samples will be analyzed for petroleum related compounds. The groundwater samples collected from the screen point samplers will be analyzed for PPL VOHs, 1,2-DCA, and BTEX, PAHs, TRPH, EDB, and arsenic, cadmium, chromium, and lead. The laboratory analytical methods to be used are specified in Table 2-7. Groundwater samples will be collected in accordance with FS 2220, Groundwater Sampling Techniques (FDEP, 2004).

2.3.3 Groundwater Assessment, Phase II

TtNUS estimates it will require 71 monitoring wells installed to depths of approximately 50 to 70 feet bls at Sites 4 and 5 to define dissolved plume geometry(ies), assuming contamination is detected during the Phase I assessment. If chlorinated solvents are identified, a larger number of wells, some significantly deeper than 70 feet bls, could be required. The proposed monitoring well locations will be determined based on groundwater quality data obtained during the Phase I investigation. Navy and FDEP approval will be obtained prior to installation of monitoring wells. Laboratory analyses of groundwater samples collected from the wells after installation will be used to determine the magnitude of contamination and to delineate the horizontal and vertical extent of dissolved COCs in groundwater, if and where present.

TABLE 2-5

FIELD INVESTIGATION SITE 4
ANALYTICAL SUMMARY FOR GROUNDWATER SAMPLING AT WASTE OIL/SOLVENT, KEROSENE, AND GASOLINE TANKS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
PPL VOHs, BTEX & MTBE	8260B	6	1	1	1	2	3	10	**24**
PAH	8310 or 8270C	6	1	1	1	1	3		**13**
PCBs	8082			1		1	3		**5**
TRPH	FL-PRO	6	1	1	1	1	3		**13**
EDB	504.1	6	1	1	1		1		**10**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	6	1	1	1	1	3		**13**

NOTES:

IDW – Investigation Derived Waste
PPL – Priority Pollutant List
VOH - Volatile Organic Halocarbon
BTEX – Benzene, toluene, ethylbenzene, and xylene
MTBE – Methy tertiary-butyl ether
PAH - Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH - Total Recoverable Petroleum Hydrocarbon
EDB - Ethylene Dibromide
(1) EPA Method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-6

FIELD INVESTIGATION SITE 4
ANALYTICAL SUMMARY FOR GROUNDWATER SAMPLING AT AIRCRAFT WASH RACK AREA
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
TCL VOCs and Appendix IX	8260B	40*	1	2	2	2	2	36	**45**
TCL SVOCs and Appendix IX	8310 or 8270C	28	1	2	2	2	2		**31**
PCBs	8082	28	1	2	2	2	2		**31**
TRPH	FL-PRO	28	1	2	2	2	2		**31**
EDB	504.1	28	1	2	2				**31**
TAL Metals	6010B	28	1	2	2	2	2		**31**

NOTES:

IDW – Investigation Derived Waste
VOC - Volatile Organic Compound
* - Includes 12 screening samples from the Phase I Wash Rack Investigation
SVOC- Semivolatile Organic Compound
PAH - Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH - Total Recoverable Petroleum Hydrocarbon
EDB - Ethylene Dibromide
TAL – Target analyte list
(1) EPA Method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-7

FIELD INVESTIGATION SITE 5
ANALYTICAL SUMMARY FOR GROUNDWATER SAMPLING AT AVGAS PIPELINE AND BOWSERS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
PPL VOHs, 1,2-DCA, & BTEX	8260B	65*	1	3	3	23	23	30	**121**
PAHs	8310 or 8270C	35	1	2	2	23	23		**86**
TRPH	FL-PRO	35	1	2	2	23	23		**86**
EDB	504.1	35	1	2	2	23	23		**86**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	35	1	2	2	23	23		**86**

NOTES:

IDW – Investigation Derived Waste
PPL – Priority Pollutant List
VOH - Volatile Organic Halocarbon
BTEX – Benzene, toluene, ethylbenzene, xylene
* - Includes 30 screening samples from the Phase I AVGAS Pipeline and Bowsers Investigation
PAH - Polynuclear Aromatic Hydrocarbon
TRPH - Total Recoverable Petroleum Hydrocarbon
EDB - Ethylene Dibromide
(1) EPA Method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

Water table elevation data generated from depth-to-water measurements obtained at the wells will be used to evaluate groundwater flow direction underlying Sites 4 and 5 so the direction of contaminant migration, if and where present, can be more easily predicted.

2.3.4 Monitoring Well Installation Methods

All permanent monitoring wells will be installed in accordance with the *Monitoring Well Design, Installation, Construction and Development Guidelines* (March 27, 1997) provided by NAVFAC EFD SOUTH. Permanent monitoring wells will be installed using either DPT, rotosonic, mud-rotary, or hollow stem auger drilling techniques.

Small diameter monitoring wells (microwells) with 3/4-inch to 1-inch inside diameters (ID), constructed with pre-packed well screens, will be installed by DPT methods where possible. If it is necessary to install conventional monitoring wells by rotosonic, mud rotary, or hollow stem auger methods due to subsurface conditions or the mandate for aquifer testing, such wells will be constructed of 2-inch ID Schedule 40, flush-joint polyvinyl chloride (PVC) riser and flush-joint factory slotted well screen. Each section of casing and screen shall be National Sanitation Foundation (NSF) approved. Screen slot size shall be 0.010 inch. Shallow monitoring wells will be constructed with 10 to 15 feet of screen with the top of the screen positioned approximately 4 feet above the water table. Boreholes for 2-inch diameter wells will have a minimum diameter of 6 inches.

Clean silica sand of U.S Standard Sieve Size No. 20/30 will be installed into the boring annulus around the well screen. The sand pack will be set from the bottom of the hole to approximately 2 feet above the top of the well screen. A minimum 2-foot thick 30/65 fine sand seal will be installed above the sand pack. The remainder of the boring will be backfilled with a Type I Portland cement/bentonite grout. The depths of all backfill materials will be constantly monitored during the well installation process by means of a weighted stainless steel or fiberglass tape. The position of the top of the screened interval, sand pack, and fine sand seal may be adjusted as site conditions warrant (elevated water table, etc.)

If any monitoring well boreholes will potentially pass through contaminated zones or confining layers, an outer protective casing will be installed to prevent cross contamination of the aquifer below. The outer casing will penetrate the confining layer 1 or 2 feet or be set below the zone of known contamination. Upon completion of the boring, the casing will be set to the desired depth and the annular space filled with Portland cement grout from bottom to top through a tremie pipe. After allowing the grout to cure for a minimum of 24 hours, the mud-rotary drilling method will be used to drill through the outer casing to advance the boring to the desired depth. Double-cased monitoring well construction details (i.e., screen

slot size, filter pack, seal, and grout) will be similar to other wells. Rotosonic drilling intrinsically incorporates an outer casing and would preclude an installed casing if used.

Flush mounted steel well covers and manholes will be installed around the monitoring wells. The manhole will consist of a flush-mounted, 22-gauge steel, water resistant, welded box with 3/8-inch thick steel lid. A 2-feet by 2-feet by 6-inch thick concrete apron will be constructed around the manhole. The manhole shall be completed 1 inch above existing grade in grassy areas and the apron tapered to be flush with the existing grade at the edges enabling the water to run off the apron. The manhole shall be completed at grade in paved areas. A detail of a typical flush-mounted monitoring well is provided in Appendix B. All locks supplied for the wells will be keyed alike. After installation, the ground surface and the top of the PVC riser pipe will be surveyed to within 0.01-foot vertical accuracy using datum points as discussed in Section 4.0. A monitoring well construction diagram will be completed for each well installed. A sample of the monitoring well construction form is provided in Appendix B.

The monitoring wells will be developed no sooner than 24 hours after installation to remove fine material from around the screened interval of the well. Wells will be developed by bailing and surging, or by pumping, as determined by the field geologist. Temperature, pH, specific conductance and turbidity will be recorded periodically during development. Wells will be developed a maximum of one hour or until these measurements become stable and the purge water is visibly clear. Water quality stabilization will be determined using the following criteria: temperature +/- 1.0°C (plus or minus one degree Celsius), pH +/- 0.1 unit, specific conductivity +/- 10 percent, and turbidity remains within a 10 Nephelometric Turbidity Unit (NTU) range for two consecutive readings.

2.3.5 Groundwater Sampling

Groundwater samples will be obtained from monitoring wells in accordance with TtNUS Comprehensive Quality Assurance Plan (FDEP Comp Quality Assurance Plan No. 980038 Revision 2).

Site 4

Pending results of groundwater screening during Phase I, groundwater samples may be collected from a total of 34 monitoring wells at Site 4. A total of eight monitoring wells will be installed in the aircraft wash rack areas and six around the USTs. It is estimated in order to delineate the areal and vertical extent of identified constituents, 20 additional wells will be required.

Based on Phase I results, intermediate and/or deep monitoring wells may be required in addition to water table monitoring wells to assess chlorinated solvent concentrations originating from the used oil/solvent tanks or aircraft wash rack areas. Sampling of deeper zones may also be warranted by a positive chlorinated solvent detection near the surface of the water table. Groundwater assessment deeper in the

saturated zone is advisable where impacts from chlorinated solvents are suspected due to the aforementioned tendency of these compounds to migrate downward.

Samples will be collected by the low-flow method using an inline pump with appropriate tubing and foot valve attached. During purging, field parameters pH, temperature, conductivity, dissolved oxygen, and turbidity will be measured periodically and recorded on FDEP-approved Groundwater Sampling Log Sheets. An example of a Groundwater Sampling Log Sheet is provided in Appendix B. Groundwater samples collected from the monitoring wells will by shipped to a fixed-base laboratory for analysis of TCL VOCs and Appendix IX, TCL SVOCs and Appendix IX, PCBs, TRPH, EDB, and TAL Metals. The list of the analyses for each groundwater sample is provided in Tables 2-5 and 2-6. Groundwater samples will be collected in accordance with FS 2220, Groundwater Sampling Techniques (FDEP, 2004).

Site 5

Groundwater samples will be collected from a total of 35 monitoring wells at Site 5. Pending results of groundwater screening during Phase I, shallow monitoring wells will be installed and screened across the uppermost zone of saturation since the potential contaminants are petroleum hydrocarbons and tend to stay near the surface of the water table.

The groundwater samples collected from the monitoring wells will be analyzed for PPL VOHs; 1,2-DCA; BTEX; PAHs; TRPH; EDB; arsenic; cadmium; chromium; and lead. The list of the analyses for each groundwater sample is provided in Table 2-7. Groundwater samples will be collected in accordance with FS 2220, Groundwater Sampling Techniques (FDEP, 2004).

Background

To address CERCLA regulations for this and future investigations at OLF Saufley, two monitoring wells will be installed hydrogeologically upgradient of Sites 4 and 5. Surface soil and SPLP samples will be collected concurrent with the installation of these two monitoring wells (Table 2-8).

2.4 ENVIRONMENTAL SAMPLING SUMMARY

The following tables provide a summary of environmental samples to be collected and drilling/sampling activities to be performed at Sites 4 and 5. Table 2-9 is a summary of monitoring well and drilling field work to be perfromed. Tables 2-10, 2-11, 2-12, and 2-13 provide a summary of environmental samples to be collected at the USTs, wash rack area, pipeline and bowsers, and background samples, respectively.

TABLE 2-8

FIELD INVESTIGATION
ANALYTICAL SUMMARY FOR GROUNDWATER SAMPLING AT BACKGROUND WELLS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
GROUNDWATER									
TCL VOCs & Appendix IX	8260B	2		1		1		2	**3**
TCL SVOCs & Appendix IX	8270C	2		1		1			**3**
TCL PEST/PCBs & Appendix IX	8081A/ 8082	2		1		1			**3**
TCL Herbicides & Appendix IX	8141A/ 8151A	2		1		1			**3**
TAL Metals	6010B	2		1		1			**3**

NOTES:
PLP – Synthetic Precipitate Leaching Procedure
IDW – Investigation Derived Waste
TCL – Target Compound List
VOC – Volatile Organic Compound
SVOC – Semivolatile Organic Compound
PEST – Pesticide
PCB – Polychlorinated biphenyl
TAL – Target Analyte List
(1) Method referenced reflects: FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-9

FIELD INVESTIGATION
DRILLING AND MONITORING WELL INSTALLATION SUMMARY
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	DPT or Rotosonic	Depth (feet)	Converted to Monitoring Well	PVC Riser/ Grout	PVC Screen	Sand Pack	Total Linear Ft Drilling
UST Borings	455	60	35	2880	350	420	**27,300**
Tank Borings	30	60	6	288	60	720	**1800**
Aircraft Wash Rack Borings	24	60	8	384	80	96	**1440**
CERCLA contingency Borings	20	60	20	960	200	240	**1200**
Background Borings	2	60	2	96	20	24	**120**
Total	**432**	**60**	**71**	**4608**	**710**	**1500**	**31,760**

TABLE 2-10

FIELD INVESTIGATION SITE 4
ENVIRONMENTAL SAMPLE SUMMARY: TWO WASTE OIL/SOLVENT, TWO KEROSENE, TWO GASOLINE TANKS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
PPL VOHs and BTEXM	8260B	6	1	1	1	2	3	10	**9**
PAH	8310 or 8270C	6	1	1	1	1	3		**9**
PCBs	8280			1		1	3		**0**
TRPH	FL-PRO	6	1	1	1	1	3		**9**
EDB	504.1	6	1	1	1		1		**9**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	6	1	1	1	1	3		**9**
Soil									
PPL VOHs, BTEX, and MTBE	8260B	10	1	1	1	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**13**
BTEXM	8260B	20	1	1	1				**23**
PAH	8310 or 8270C	30	1	2	1				**34**
PCBs	8280	30	1	2	1				**34**
TRPH	FL-PRO	30	1	2	1				**34**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	10	1	1	1				**13**

NOTES:

IDW – Investigation Derived Waste
PPL – Priority Pollutant List
VOH – Volatile Organic Halocarbon
BTEX – Benzene, toluene, ethylbenzene, xylene,
MTBE – Methyl tertiary-butyl ether

PAH – Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH – Total Recoverable Petroleum Hydrocarbon
EDB – Ethylene Dibromide
FL-PRO – Florida Petroleum Range Organics

(1) EPA method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-11

FIELD INVESTIGATION SITE 4
ENVIRONMENTAL SAMPLE SUMMARY: AIRCRAFT WASH RACK AREA AND CONTINGENCY WELLS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
TCL VOCs and Appendix IX	8260B	40	1	2	2	2	2	36	**45**
TCL SVOCs and Appendix IX	8310 or 8270C	28	1	2	2	2	2		**31**
PCBs	8082	28	1	2	2	2	2		**31**
TRPH	FL-PRO	28	1	2	2	2	2		**31**
EDB	504.1	28	1	2	2				**31**
TAL Metals	6010B	28	1	2	2	2	2		**31**
Soil									
TCL VOCs and Appendix IX	8260B	24		2	2	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**28**
TCL SVOCs and Appendix IX	8260B	24		2	2				**28**
PCBs	8082	24		2	2				**28**
TRPH	FL-PRO	24		2	2				**28**
TAL Metals	6010B	24		2	2				**28**

NOTES:

IDW – Investigation Derived Waste
VOC – Volatile Organic Compound
SVOC – Semivolatile Organic Compound
PAH – Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH – Total Recoverable Petroleum Hydrocarbon
EDB – Ethylene Dibromide
TAL – Target analyte list
(1) EPA method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-12

FIELD INVESTIGATION SITE 5
ENVIRONMENTAL SAMPLE SUMMARY: AVGAS PIPELINE AND BOWSERS
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
Groundwater									
PPL VOHs, 1,2-DCA, & BTEX	8260B	45	1	3	3	21	20	85	**52**
PAHs	8310 or 8270C	35	1	2	2	20	18		**40**
TRPH	FL-PRO	35	1	2	2	20	18		**40**
EDB	504.1	35	1	2	2	20	18		**40**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	35	1	2	2	20	18		**40**
Soil									
PPL VOHs, 1,2-DCA, BTEX, & MTBE	8260B	356	1	18	18	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**393**
PAH	8310 or 8270C	356	1	18	18				**393**
PCBs	8082	356	1	18	18				**393**
TRPH	FL-PRO	356	1	18	18				**393**
Total Arsenic, Cadmium, Chromium, and Lead	6010B	356		18	18				**393**

NOTES:

IDW – Investigation Derived Waste
PPL – Priority Pollutant List
VOH - Volatile Organic Halocarbon
BTEX – Benzene, toluene, ethylbenzene, xylene
MTBE – Methyl tertiary-butyl ether
PAH - Polynuclear Aromatic Hydrocarbon
PCB – Polychlorinated biphenyl
TRPH - Total Recoverable Petroleum Hydrocarbon
EDB - Ethylene Dibromide

(1) EPA method SW-846 series: reflects FDEP 62-770 or 62-761, F.A.C. requirements.
(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

TABLE 2-13

FIELD INVESTIGATION
ENVIRONMENTAL SAMPLE SUMMARY: BACKGROUND SOIL, GROUNDWATER AND SPLP SAMPLES
OLF SAUFLEY
PENSACOLA, FLORIDA

Analyte	Proposed Method (1)	Env. Samples	SPLP Samples	IDW Samples (2)	Duplicate Samples	MS/MSD	Rinsate Blanks	Field Blanks	Trip Blanks	Total Samples
GROUNDWATER										
TCL VOCs & Appendix IX	8260B	2					1	2	4	**2**
TCL SVOCs & Appendix IX	8270C	2					1	2		**2**
TCL PEST/PCBs & Appendix IX	8081A/ 8082	2					1	2		**2**
TCL Herbicides & Appendix IX	8141A/ 8151A	2					1	2		**2**
TAL Metals	6010B	2					1	2		**2**
SOIL										
TCL VOCs & Appendix IX	8260B	20	20		2	1	Rinsate and Field Blank requirements for soil samples are included in the requirements for groundwater samples.			**45**
TCL SVOCs & Appendix IX	8270C	20	20		2	1				**45**
TCL PEST/PCBs & Appendix IX	8081A/ 8082	20	20		2	1				**45**
TCL Herbicides & Appendix IX	8141A/ 8151A	20	20		2	1				**45**
TAL Metals	6010B	20	20		2	1				**45**

NOTES:

SPLP – Synthetic Precipitate Leaching Procedure
IDW – Investigation Derived Waste
TCL – Target Compound List
VOC – k Volatile Organic Compound
SVOC – Semivolatile Organic Compound
PEST – Pesticide
PCB – Polychlorinated biphenyl
TAL – Target Analyte List
(1) Method referenced reflects: FDEP 62-770 or 62-761, F.A.C. requirements.

(2) IDW samples are based on collecting one composite soil sample and one composite liquid sample per site.

3.0 FIELD OPERATIONS

This section describes the procedures for conducting the project-specific field investigation to be performed during soil and groundwater sampling at Sites 4 and 5. Field activities to be performed include health and safety, record-keeping, equipment calibration and maintenance, soil sampling, groundwater sampling, equipment decontamination, quality assurance/quality control sampling, sample nomenclature, handling and custody, waste handling, site management and base support, and surveying. The individual activities are described below.

3.1 HEALTH AND SAFETY

A Health and Safety plan is provided as Appendix A.

3.2 RECORD KEEPING

In addition to chain-of-custody records associated with sample collection, packaging, and shipping, certain standard forms will be completed for sample description and documentation. These shall include sample log sheets (for soil and groundwater samples), daily activity records, and logbooks. Examples of these forms are provided in Appendix B.

Each field operations leader (FOL) will maintain a bound/weatherproof field notebook. The FOL or designee shall record all information related to sampling or field activities. This information may include sampling time, weather conditions, unusual events (e.g., well tampering), field measurements, descriptions of photographs, etc.

The FOL shall maintain a site logbook. This book will contain a summary of the day's activities and will reference the field notebooks when applicable.

3.3 EQUIPMENT CALIBRATION AND MAINTENANCE

Field instruments will be calibrated in accordance with manufacturer's specifications. Calibration will be documented on an Equipment Calibration Log as shown in Appendix B. During calibration, an appropriate maintenance check will be performed on each piece of equipment. If damaged or defective parts are identified during the maintenance check and it is determined the damage could have an impact on the instrument's performance, the instrument will be removed from service until defective parts are repaired or replaced.

3.4 SOIL SAMPLING

Soil samples will be collected with a stainless steel hand auger assembly to a depth of 4 feet bls, and with a 4-foot long DPT core barrel lined with acrylic sleeves at depths greater than 4 feet bls. The sample aliquots will be collected at prescribed intervals. Each sample aliquot will be screened immediately with a FID, then homogenized in a stainless steel bowl and transferred to laboratory-supplied sample containers. The samples will be labeled, preserved on ice, and transported to the laboratory. All portions of the sampling equipment used in sample collection will be decontaminated before each use using standard decontamination procedures. Equipment rinsate blanks will be collected from the decontaminated sampler at the prescribed frequency. Soil will be collected using the procedures specified in FS 3100, Surface Soil Sampling and FS 3200, Subsurface Soil Sampling (FDEP, 2004).

3.5 GROUNDWATER SAMPLING

3.5.1 Screen Point Sampling

Groundwater samples collected by DPT will be retrieved from stainless steel screen point samplers using either a bailer or low-flow purging techniques (typically at a rate of less than 1 liter per minute) with an appropriate pump and tubing. If possible, prior to sample collection, water will be purged from the screen point until the water is sediment-free or until it is determined the turbidity level is at the lowest value attainable.

3.5.2 Monitoring Well Sampling

All groundwater samples collected from monitoring wells will be collected using the procedures specified in FS 2200, Groundwater Sampling (FDEP, 2004). If Light Non-Aqueous Phase Liquid (LNAPL) is detected in purge water initially being pumped from a monitoring well at any given location, its presence will be noted, but groundwater samples will not be collected for laboratory analysis.

3.6 EQUIPMENT DECONTAMINATION

The equipment used in field sampling activities will be decontaminated prior to and during drilling and sampling activities. This equipment includes drill rigs, downhole tools, augers, drill rods and bits, and soil and water sampling equipment.

3.6.1 Major Equipment

All downhole drilling equipment used in the construction and sampling of permanent monitoring wells will be steam cleaned prior to beginning work, between boreholes, any time the drill rig leaves the drill site prior to completing a boring, and at the conclusion of the drilling program.

These decontamination operations will consist of washing equipment with Alconox and a high-pressure steam wash from a potable water supply. All decontamination activities will take place at a predetermined location. Additional requirements for drilling equipment decontamination are provided in SOP SA-7.1 included in Appendix C.

3.6.2 Sampling Equipment

All equipment such as trowels, bailers, and split spoon samplers used for collecting samples will be decontaminated prior to beginning field sampling and between sample locations. Water level measurement probes and other sampling equipment will be decontaminated as necessary, utilizing the following methods:

- Potable water and Alconox or liquinox detergent wash
- Potable water rinse
- De-ionized, analyte-free water rinse
- Isopropanol rinse
- De-ionized, analyte-free water rinse
- Air dry
- Aluminum foil wrap until used

Instrument probes such as pH, conductivity, and temperature probes used for measuring field parameters will be rinsed first with tap water, then with de-ionized, analyte-free water, and finally with the sample liquid.

3.7 DATA QUALITY REQUIREMENTS

3.7.1 Laboratory Analyses and Quality Assurance/Quality Control Samples

The analytical methods to be used were included with each analysis in Tables 2-1 through 2-8. The analytical data packages will be NEESA Level E (EPA Level III). Each sample delivery group (SDG) of the analytical data will receive a full validation.

In addition to periodic calibration of field equipment and appropriate documentation, quality control samples will be collected or generated during environmental sampling activities. Quality control samples may include rinsate blanks, field duplicates, trip blanks, and MS/MSDs. Each type of field quality control sample is defined as follows:

Rinsate Blank - Rinsate blanks are obtained under representative field conditions by running analyte free water through sample collection equipment (bailer, split-spoon, core barrel etc.) after decontamination. Rinsate blanks will be used to assess the effectiveness of decontamination procedures. If necessary, rinsate blanks may be collected for each type of non-dedicated sampling equipment used.

Field Duplicate - Field duplicate(s) are samples collected independently at a sample location during a single act of sampling under representative field conditions. Field duplicate sample frequencies are provided in Table 3-1. When collected, the duplicates shall be analyzed for the same parameters in the laboratory as the original samples are with the exception of natural attenuation parameters.

Trip Blanks - Trip blank(s) will be prepared at the laboratory facility and will accompany the volatile organic aromatic vials to the sampling site and back to the laboratory. Trip blanks are not required by the FDEP unless 10 or more volatile samples are collected during a given sampling event .

MS/MSD – A matrix spike (MS) is an environmental sample with a known amount of target analyte added. A MS is intended to provide information about the performance of target analytes in the subject matrix. A matrix spike duplicate (MSD) is an exact replicate of the MS and is used to assess precision in the subject matrix relative to the MS. The additional sample aliquots required for analysis of MS/MSD will be determined by the laboratory and will be collected at a frequency of 1 per 20 samples per matrix. Table 3-1 provides the frequency of collection for field quality assurance/quality control samples.

TABLE 3-1

**FREQUENCY OF FIELD QUALITY CONTROL SAMPLES
SAMPLING AND ANALYSIS PLAN FOR
SITE CHARACTERIZATION AT SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA**

Type Of Samples	Frequency
Rinsate Blank	1 per media per sample event
Trip Blank (VOCs only)	1 per sample shipment
Field Blank	1 per 20 samples/matrix
Field Duplicate	1 per 20 samples/matrix
MS/MSD	1 per 20 samples/matrix

3.8 SAMPLE NOMENCLATURE

3.8.1 Phase I Grab Samples

Each grab sample collected during Phase I by DPT (or other) methods will be assigned a unique codified sample identification number. The unique nomenclature established for this sampling event is as follows:

1		2		3
OLFSN	-	SBNN	-	SNN or GNN-NN
Site Location and Site Number		Sample ID Number		Sample medium and depth ("S" = Soil, "G" = Groundwater) (discrete depth for soil samples, 4-foot range for GW samples)

1 OLFS – Outlying Landing Field Saufley
N – Either 4 or 5 for Site 4 or Site 5

2 SB – Soil Boring
NN – Boring Number. For Site 4, borings will be labeled sequentially from SB01 through SB54; for Site 5, boringings will be labeled sequentially from SB001 through SB356

3 S – Soil sample
G – Groundwater sample
NN – Soil sample; discrete depth (nearest whole number)
NN-NN – Groundwater sample; interval spanned by screen point sampler

Examples of the above are:

- A soil sample collected from soil boring DP11 at Site 4 collected 12 feet bls would be represented by OLFS4-DP11-S12.

- A groundwater sample collected from refueling bowser 26 at Site 5 with screen point sampler placed at a total depth of 41 feet bls might be represented by OLFS5-DP26-G37-41.

Duplicate samples collected for quality assurance/quality control during the sampling program will be identified as OLFSN-DUPnnS or G, where N is either 4 or 5, depending on site number, nn is an ascending sequential number beginning with 01, S is "soil sample" and G is "groundwater sample." An example of this is as follows: the second groundwater duplicate collected during the Site 5 characterization would be designated OLFS5-DUP02G.

Other QA/QC samples collected during the field activities will be labeled as follows:

- Trip Blanks – OLFS4- or 5-TBNN, where NN is an ascending sequential number starting with 01. An example of this is as follows: the second trip blank sent during the Site 4 characterization would be designated OLFS4-TB02.

- Rinsates – OLFS4- or 5-RNN, where NN is an ascending sequential number starting with 01. An example of this is as follows: first rinsate sample collected during Site 5 characterization would be designated OLFS5-R01.

- MS/MSD – OLFS4- or 5-MSNN, where NN is an ascending sequential number starting with 01. An example of this is as follows: the second MS/MSD collected during the Site 5 Characterization would be designated OLFS5-MS02.

3.8.2 Monitoring Well Identification and Sample Designation

Monitoring wells will be designated as follows:

1		2
OLFS<u>N</u>	-	MW<u>NNX(N)</u>
Site Location and Site Number		Monitoring Well ID Number

1 OLFS – Outlying Landing Field Saufley
<u>N</u> – Either 4 or 5 for Site 4 or Site 5

2 MW – Monitoring Well

<u>NN</u> – Monitoring well number; for Site 4, monitoring wells will be labeled sequentially from MW01 through MW34; for Site 5, monitoring wells will be labeled sequentially from MW01 through MW35.

<u>X(N)</u> – Well depth reference:
S = Shallow well with 15-foot screen bracketing water table
I = Intermediate depth well with submerged 5-foot screen, max total depth 75 feet bls
D = Deep well with submerged 5-foot screen, total depth 76 to 90 feet bls
D1 = Deep well with submerged 5-foot screen, total depth 91 to 110 feet bls
D2 = Deep well with submerged 5-foot screen, total depth 111 to 150 feet bls

Groundwater samples collected from the monitoring wells will be given the monitor well designation followed by a 3-digit number representing the total well depth and a four-digit number representing the month and year the well was sampled. For example, if the 23rd well at Site 4 was installed to a depth of 80 feet bls and sampled in March 2006, the sample identification would be: OLFS4-MW23D-080-0306.

3.8.3 Sample Containers, Preservation, Holding Times, and Analyses

Pre-preserved, certified-clean bottleware will be supplied by the subcontracted laboratory. A summary of analytical methods, bottleware requirements, preservation requirements, and sample holding times are provided in Tables 3-2 and 3-3.

3.8.4 Sample Packaging and Shipping

Samples will be packaged and shipped according to FS 1000, General Sampling Procedures (FDEP, 2004). The FOL will be responsible for completion of the following forms when samples are collected and prepared for shipping:

- Sample labels
- Chain-of-Custody seals
- Appropriate labels affixed to shipping coolers (e.g., "luggage" tags or "Saturday Delivery" stickers)
- Chain-of Custody Forms
- Federal Express Air Bills

3.9 SAMPLE CUSTODY

The chain-of-custody begins with the release of the sample bottles from the laboratory and must be documented and maintained at all times. To maintain custody of the sample bottles or samples, they must be in someone's physical possession, in a locked room or vehicle, or sealed with an intact custody seal.

When possession of bottles or samples is transferred from one person to another, it will be documented in the field logbook and on the chain-of-custody.

TABLE 3-2

**SUMMARY OF SOIL ANALYTICAL REQUIREMENTS, FIXED-BASE LABORATORY
SAMPLING AND ANALYSIS PLAN FOR
SITE CHARACTERIZATION AT SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA**

Analysis	Analytical Method	Sample Mass[1]	Bottleware	Preservation	Holding Time[2]
Lead	EPA SW-846 6010B	10 grams	Widemouth jar (approx. 100 grams)	Cool to 4°C	Within 180 days
Arsenic	EPA SW-846 6010B	10 grams	Widemouth jar (approx. 100 grams)	Cool to 4°C	Within 180 days
CLP TCL VOCs	EPA SW-846 8260B	5 grams	40 mL VOA vials	Cool to 4°C Preserved with water within 24 hours	14 days
CLP TCL PAHs	EPA SW-846 3310 or 8270C SIM	100 grams	Widemouth jar (approx. 200 grams)	Cool to 4°C	14 days until extraction, 40 days for analysis
CLP TCL SVOCs	EPA SW-846 8270C	100 grams	Widemouth jar (approx. 200 grams)	Cool to 4°C	14 days until extraction, 40 days for analysis
CLP TCL PCBs	EPA SW-846 8082	100 grams	Widemouth jar (approx. 200 grams)	Cool to 4°C	14 days until extraction, 40 days for analysis
CLP TCL Pesticides	EPA SW-846 8081A	100 grams	Widemouth jar (approx. 200 grams)	Cool to 4°C	14 days until extraction, 40 days for analysis
CLP TAL Inorganics	EPA SW-846 6010B	10 grams	widemouth jar (approx. 100 grams)	Cool to 4°C	Within 180 days

TABLE 3-2

SUMMARY OF SOIL ANALYTICAL REQUIREMENTS, FIXED-BASE LABORATORY
SAMPLING AND ANALYSIS PLAN FOR
SITE CHARACTERIZATION AT SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA

Analysis	Analytical Method	Sample Mass[1]	Bottleware	Preservation	Holding Time[2]
EDB	EPA SW-846 8260	5 grams	40 mL VOA Vials	Cool to 4°C Preserved with water within 24 hours	14 days
TRPHs	FDEP FL-PRO (Florida-specific method)	100 grams	widemouth jar (approx. 200 grams)	Cool to 4°C	28 days
SPLP – TAL Metals	EPA SW-846 1312/6010B	100 grams	widemouth jar (approx. 100 grams)	Cool to 4°C	Within 180 days
SPLP – TCL VOCs	EPA SW-846 1312/8260B	5 grams	40 mL VOA Vials	Cool to 4°C Preserved with water within 24 hours	14 days

NOTES:
1 Sample mass may vary based on laboratory requirements.
2 Holding times are measured from the date/time of sample collection.
°C = Degrees Celsius
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
TAL = Target Analyte List
TRPH = Total Recoverable Petroleum Hydrocarbons
CLP = Contract Laboratory Program
oz = ounce
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TCL = Target Compound List
EDB = Ethylene dibromide
SPLP = Synthetic Precipitate Leaching Procedure

TABLE 3-3

**SUMMARY OF GROUNDWATER ANALYTICAL REQUIREMENTS
SAMPLING AND ANALYSIS PLAN FOR
SITE CHARACTERIZATION AT SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA**

Analysis	Analytical Method	Sample Volume(1)	Bottleware	Preservation	Holding Time(2)
CLP TCL VOCs	SW-846 8260B	3 x 40 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C, HCl to pH<2	14 days from sampling to analysis
CLP TCL PAHs	EPA SW-846 3310 or 8270C SIM	3 x 1000 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C	7 days until extraction, 40 days for analysis
CLP TCL SVOCs	EPA SW-846 8270C	3x1000 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C	7 days until extraction, 40 days for analysis
CLP TCL PCBs	EPA SW-846 8082	1000 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C	7 days until extraction, 40 days for analysis
CLP TCL Pesticides	EPA SW-846 8081A	1000 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C	14 days until extraction, 40 days for analysis
CLP TAL Inorganics	EPA SW-846 6010B	200 mL	Plastic, plastic screw cap, Teflon™-lined	Cool to 4°C , HNO_3 to pH<2	Within 180 days

TABLE 3-3

**SUMMARY OF GROUNDWATER ANALYTICAL REQUIREMENTS
SAMPLING AND ANALYSIS PLAN FOR
SITE CHARACTERIZATION AT SITES 4 AND 5
OLF SAUFLEY
PENSACOLA, FLORIDA**

Analysis	Analytical Method	Sample Volume(1)	Bottleware	Preservation	Holding Time(2)
EDB	504.1	3x40 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C, sodium thiosulfate needed to react with residual chlorine	14 days
TRPHs	FDEP FL-PRO	3x1000 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C, HCL to pH<2	28 days

NOTES:
1 Sample volume may vary based on laboratory requirements.
2 Holding times are measured from the date/time of sample collection.

mL = milliliter
°C = Degrees Celsius
CLP = Contract Laboratory Program
VOC = Volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon Compound
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyl Compound
TCL = Target Compound List
TAL = Target Analyte List
EDB = Ethylene dibromide
TRPH = Total Recoverable Petroleum Hydrocarbons
HCl = Hydrochloric Acid
HNO_3 = Nitric Acid

3.10 WASTE HANDLING

Purge water, decontamination water and soil cuttings will be collected and containerized in Department of Transportation-approved (Specification 17C) 55-gallon drums. Each drum will be sealed, labeled, and left at a drum staging area pending groundwater analytical results or composite waste sample results, and will be subsequently managed in accordance with the procedures described in the NAS Pensacola IDW Plan. This Plan emphasizes management of all IDW in an environmentally responsible manner consistent with the CERCLA program, Resource Conservation and Recovery Act (RCRA) requirements, and the base's standard procedures. A NAS Pensacola representative will sign all manifests pertaining to the disposal of IDW, if required.

Health and safety equipment (e.g., gloves and ear plugs.) and miscellaneous waste material generated during the field activities will be collected in trash bags and disposed in dumpsters as approved by local base personnel.

The objectives of the IDW management plan are to:

- Manage IDW to prevent contamination of uncontaminated areas and protect human health and the environment.
- Minimize volume of IDW, thereby reducing costs and the potential for human or ecological exposure to contaminated materials.
- Comply with federal and state Applicable or Relevant and Appropriate Requirements (ARARs).

3.11 SURVEYING

The locations of sample points, soil borings, and monitoring wells may initially be determined during the field investigation using a portable global positioning system (GPS) instrument with sub-meter accuracy. This information may be helpful in plotting results and analyzing the data coverage in real-time to make data acquisition decisions during the RI. The GPS instrument will be used in accordance with the manufacturers instructions, and results will be recorded in the field logbook. Monitoring wells and other selected points, however, will be permanently located using a National Geodetic Vertical Datum (NGVD) survey at the conclusion of field activities.

The locations of monitoring wells installed during the investigation will be measured by a certified land surveyor. Each point will be measured from a reference location tied to the Florida State Plane

Coordinate System. An X-Y-coordinate system shall be used to identify locations. The X coordinate will be east-west axis and the Y-coordinate will be the north-south axis.

All survey locations will be reported using the Florida State Plane Coordinate system. Existing installation benchmarks will serve as horizontal and vertical datums for the survey. Elevations and horizontal locations will be recorded to the nearest hundreds of a foot. The elevations of all monitoring wells will be surveyed at the water level measuring reference point on top of the well riser and on the undisturbed ground surface adjacent to the well pad.

3.12 SITE MANAGEMENT AND BASE SUPPORT

TtNUS will perform this project with support from the Navy. Throughout the duration of the investigation activities, work at Saufley Field will be coordinated through NAVFAC EFD SOUTH, NAS Pensacola personnel, and the Saufley Field Facilities Manager. The primary contacts are as follows:

1. NAVFAC EFD SOUTH Engineer in Charge
   Ms. Linda Martin
   (843) 820-5628

2. NAS Pensacola Facilities
   Greg Campbell
   (904) 542-2717 ext. 120

3. OLF Saufley Facilities
   Chief Stone or Phil Littrell/Regina Boone
   (850) 458-7250

NAS Pensacola personnel, in coordination with Saufley Field Facilities Management, will aid in arranging for the following, if required:

- Personnel identification badges, vehicle passes, and/or entry permits.
- A secure staging area (approximately 1,000 square feet) for storing equipment and supplies.
- A supply (e.g., outside faucet, etc.) of potable water for equipment cleaning, etc.
- Escorts for contract personnel working in secured areas.
- A decontamination area and waste staging area located adjacent to or near the study area.

The project will be staffed with personnel from the TtNUS Florida Region (Tallahassee, Jacksonville, Tampa, and/or Deerfield Beach). During field activities, TtNUS will provide a staff geologist and equipment technician(s).

Mr. Terry Hansen, P.G., of the TtNUS Tallahasse office is the Task Order Manager (TOM) for CTO 0370 and will be the primary point of contact. He is responsible for cost and schedule control as well as technical performance. Mr. Hansen will provide senior level review and oversight during field activities. Mr. Hansen can be contacted at (850) 385-9899 or e-mail hansent@ttnus.com.

4.0 DATA VALIDATION AND SITE CHARACTERIZATION REPORT

Formal data validation will be performed. The data will be evaluated for, but not limited to precision, accuracy, representativeness, completeness, and comparability parameters using the EPA CLP National Validation Functional Guidelines for Organic Data Review (EPA, 1999), the EPA CLP National Validation Functional Guidelines of Inorganic Data Review (EPA, 1994), and the TtNUS SOPs.

The validated data package(s) will be included in the IR. This report will also include sections concerning site background, investigative methods, a description of lithologic and hydrologic features encountered during the investigation, nature and extent of contamination, if present, and conclusions and recommendations for future assessment, if necessary

The Investigation Report will be issued in draft to NAVFAC EFD SOUTH for initial review. The final report will be issued upon incorporation of review comments. If the recommendations of the Investigation Report indicate the site should be elevated to Operable Unit status, all data previously collected will be incorporated into the human health and ecological risk assessments and the results will be published in a draft-final and final RI report.

5.0 PROJECT SCHEDULE

The proposed schedule for site characterization activities and reporting is as follows:

- Final Sampling and Analysis Plan Approval: 25 July 2005
- Investigation Fieldwork: 29 October 2005 to 20 December 2005
- Final Site Characterization Report: 30 April 2006

The above scheduled durations are approximate, based on assumed site conditions, and will be updated monthly to reflect actual progress during the project.

REFERENCES

FDEP (Florida Department of Environmental Protection), 2005. Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 Florida Administrative Code, April 17, 2005.

FDEP (Florida Department of Environmental Protection), 2004. Petroleum Storage Systems (USTs), Chapter 62-761 Florida Administrative Code, June 21, 2004.

FDEP, 2004. Standard Operating Procedures for Field Activities DEP-SOP-001/01, February 1, 2004.

NEESA (Naval Energy and Environmental Support Activity), 1983. Initial Assessment Study of Naval Air Station, Pensacola, Pensacola, Florida, NEESA 13-015, June 1983.

TtNUS (Tetra Tech NUS, Inc.), 2001. Corporate Quality Assurance Program Manual, January 1, 2001.

TtNUS, 2002. Florida Regional Quality Assurance Manual, October 9, 2002.

TtNUS, 2004. Corporate Standard Operating Procedures, April 2004.

USEPA (U.S. Environmental Protection Agency), 1994. USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review, Office of Solid Waste and Remedial Response, Washington, District of Columbia.

USEPA, 1999. USEPA Contract Laboratory Program National Functional Guidelines For Organic Data Review, Office of Emergency and Remedial Response, Washington, District of Columbia.

University of Florida, 2004. Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C. Center for Environmental & Human Toxicology, Gainesville, Florida, February 26, 2004

APPENDIX A

HEALTH AND SAFETY PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
05/22/05

Health and Safety Plan
for the
Site Characterization Study
Installation Restoration Sites 4 & 5

Naval Air Station Pensacola
Pensacola, Florida

Contract Task Order 0370

June 2005

NAVFAC
Naval Facilities Engineering Command

Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

Revision 0
June 2005

HEALTH AND SAFETY PLAN
SITE CHARACTERIZATION STUDY
INSTALLATION RESTORATION SITES 4 & 5

OUTLYING LANDING FIELD SAUFLEY
NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0370

JUNE 2005

PREPARED UNDER THE SUPERVISION OF:

Chalk M FOR

TERRY HANSEN
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

Matthew M. Soltis

MATTHEW M. SOLTIS, CIH, CSP
CLEAN HEALTH AND SAFETY MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1-1
1.1 KEY PROJECT PERSONNEL AND ORGANIZATION 1-1
1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS 1-3

2.0 EMERGENCY ACTION PLAN 2-1
2.1 INTRODUCTION 2-1
2.2 EMERGENCY PLANNING 2-1
2.3 EMERGENCY RECOGNITION AND PREVENTION 2-2
2.3.1 Recognition 2-2
2.3.2 Prevention 2-2
2.4 SAFE DISTANCES AND PLACES OF REFUGE 2-3
2.5 EVACUATION ROUTES AND PROCEDURES 2-3
2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES 2-3
2.7 EMERGENCY CONTACTS 2-4
2.8 ROUTE TO HOSPITAL 2-5
2.9 DIRECTIONS 2-6
2.10 DECOMTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT 2-7
2.11 INJURY/ILLNESS REPORTING 2-7

3.0 SITE BACKGROUND 3-1
3.1 SITE DESCRIPTION 3-1
3.2 OLF SAUFLEY 3-1

4.0 SCOPE OF WORK 4-1

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES 5-1
5.1 GENERAL SAFE WORK PRACTICES 5-1
5.2 SOIL BORING (DPT) SAFE WORK PRACTICES 5-2
5.2.1 Before Soil Boring/Drilling 5-2
5.2.2 During Soil Boring/Drilling 5-3
5.2.3 After Soil Boring/Drilling 5-4

6.0 HAZARD ASSESSMENT 6-1
6.1 CHEMICAL HAZARDS 6-1
6.2 PHYSICAL HAZARDS 6-7
6.2.1 Slips, Trips, and Falls 6-7
6.2.2 Cuts or Other Injuries Associated with Hand Tool Use 6-7
6.2.3 Energized Systems (Contact with Underground or Overhead Utilities) 6-8
6.2.4 Ambient Temperature Extremes (Heat Stress) 6-9
6.2.5 Flying Projectiles 6-9
6.3 NATURAL HAZARDS 6-9
6.3.1 Insect Bites and Stings 6-9
6.3.2 Snakes of Florida 6-12
6.3.3 Inclement Weather 6-14

7.0 AIR MONITORING 7-1
7.1 INSTRUMENTS AND USE 7-1
7.1.1 Flame Ionization Detector 7-1
7.1.2 Hazard Monitoring Frequency 7-2
7.2 INSTRUMENT MAINTENANCE AND CALIBRATION 7-2

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS 8-1

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING 8-1
8.1.1 Training Requirements For TtNUS and Subcontractor Personnel 8-1
8.2 SITE-SPECIFIC TRAINING 8-1
8.3 MEDICAL SURVEILLANCE 8-2
8.3.1 Medical Surveillance Requirements for TtNUS and Subcontractor Personnel 8-2
8.3.2 Medical Data Sheet 8-2
8.4 SUBCONTRACTOR EXCEPTION 8-2

9.0 SPILL PREVENTION AND CONTAINMENT PROGRAM 9-1
9.1 SCOPE AND APPLICATION 9-1
9.2 POTENTIAL SPILL AREAS 9-1
9.3 CONTAINMENT AREAS 9-1
9.3.1 IDW 9-2
9.3.2 Flammable/POL Storage 9-2
9.4 MATERIALS HANDLING 9-2
9.5 LEAK AND SPILL DETECTION 9-3
9.6 PERSONNEL TRAINING AND SPILL PREVENTION 9-3
9.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT 9-3
9.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN 9-4

10.0 SITE OPERATIONS AND CONTROL 10-1
10.1 WORK ZONES 10-1
10.1.1 Exclusion Zone 10-1
10.1.2 Contamination Reduction Zone 10-2
10.1.3 Support Zone 10-3
10.2 SAFE WORK PERMITS 10-3
10.3 SITE MAP 10-4
10.4 BUDDY SYSTEM 10-4
10.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS 10-6
10.6 COMMUNICATION 10-6
10.7 SITE VISITORS 10-6
10.8 SITE SECURITY 10-7

11.0 CONFINED SPACE ENTRY 11-1

12.0 MATERIALS AND DOCUMENTATION 12-1
12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE 12-1

13.0 GLOSSARY 13-1

ATTACHMENTS

I INJURY/ILLNESS PROCEDURE AND REPORT FORM
II STANDARD OPERATING PROCEDURE FOR UTILITY LOCATING AND EXCAVATION CLEARANCE
III EQUIPMENT INSPECTION CHECK LIST
IV SAFE WORK PERMITS
V MEDICAL DATA SHEETS

TABLES

NUMBER		PAGE
2-1	Emergency Reference	2-7
5-1	Tasks/Hazards/Control Measures	5-15
6-1	Chemical, Physical and Toxicological Data	6-3

FIGURES

NUMBER		PAGE
2-2	Route to Hospital	2-9
2-2	Emergency Response Protocol	2-11
7-1	Documentation of Field Calibration	7-3
8-1	Site-Specific Training Documentation	8-4
10-1	Safe Work Permit	10-5

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide practices and procedures for Tetra Tech NUS, Inc. (TtNUS) and subcontractor personnel engaged in site characterization activities at Sites 4 and 5 at Outlying Landing Field (OLF) Saufley (Saufley Field), Naval Air Station (NAS) Pensacola, in Pensacola, Florida as part of Contract Task Order (CTO) 0370. The CTO directing this investigation is part of an overall effort conducted under the Comprehensive Long-Term Environmental Action Navy (CLEAN III) administered through the U.S. Navy Southern Division Naval Facilities Engineering Command (NAVFAC) as defined under Contract Number N62467-94-D-0888. Site activities include soil boring and the collection of soil and groundwater samples to characterize Sites 4 and 5. This HASP must be used in conjunction with the TtNUS Health and Safety Guidance Manual. Both of these documents must be present at the site during the performance of site activities. The Guidance Manual provides detailed information pertaining to the HASP as well as applicable TtNUS Standard Operating Procedures (SOPs). This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 CFR 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response Standard).

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site. The HASP will be modified if new information becomes available. Changes to the HASP will be made with the approval of the TtNUS Task Order Manager (TOM). The TOM will notify affected personnel of changes. A Site Safety Follow-up Report must be completed to document changes to the HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS employees and subcontractor personnel engaged in onsite activities. These persons will be the primary point of contact for questions regarding safety and health procedures and the selected control measures addressed in this HASP.

- The TtNUS TOM is responsible for the overall direction and implementation of this HASP.

- The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
  - Providing information regarding site contaminants and physical hazards.
  - Establishing air monitoring and decontamination procedures.
  - Assigning personal protective equipment based on task and potential hazards.
  - Determining emergency response procedures and emergency contacts.
  - Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
  - Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste site work.
  - Modify this HASP when necessary.

- The Site Safety Officer (SSO) supports site activities by advising the TOM on the aspects of health and safety on site. These duties may include the following:
  - Coordinate health and safety activities with the FOL.
  - Select, inspect, implement, and maintain personal protective equipment.
  - Establish work zones and control points.
  - Implements air-monitoring program for onsite activities.
  - Verify training and medical status of onsite personnel status in relation to site activities.
  - Implements hazard communication, respiratory protection, and other associated safety and health programs as necessary
  - Coordinates emergency services.
  - Provides site specific training for onsite personnel.
  - Investigates accidents and injuries (see Attachment I Illness/Injury Procedure and Report Form)
  - Provides input to the PHSO regarding the need to modify, this HASP, or other applicable health and safety associated documents as per site-specific requirements.

- Compliance with the requirements of this HASP are monitored by the SSO and coordinated through the TtNUS CLEAN Health and Safety Manager (HSM).

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NAS Pensacola the FOL may also be responsible for the SSO duties. This action will be performed only as credentials, experience, and availability permits.

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: OLF Saufley, Naval Air Station Pensacola Address: Pensacola, Florida

Navy Remedial Project Manager: Byas Glover Phone Number: (843) 820-5651

Navy Engineer-In-Charge (EIC): William Hill Phone Number: (843) 820-7324

NAS Pensacola Environmental Coordinator: Greg Campbell Phone Number: (850) 452-4611 ext. 103

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 4.0), including concrete coring, soil boring using hand auger and Direct Push Technology (DPT), multi media sampling, Global Positioning System (GPS) surveying, and IDW management for the purpose of characterizing contamination at Sites 4 and 5.

Proposed Dates of Work: April 2005 to October 2005

Project Team:

TtNUS Management Personnel:	Discipline/Tasks Assigned:	Telephone
Terry Hansen	Task Order Manager (TOM)	(850) 385-9899
Charles Metz	Deputy Task Order Manager (TOM)	(850) 385-9899
TBD	Field Operations Leader (FOL)	
TBD	Site Safety Officer (SSO)	
Donald J. Westerhoff, CSP	Project Health and Safety Officer (PHSO)	(412) 921-7281
Matthew M. Soltis, CIH, CSP	CLEAN Health and Safety Manager	(412) 921-8912
Thomas Patton	Equipment Manager	(412) 859-4670

Non-TtNUS Personnel	Affiliation/Discipline/Tasks Assigned	Telephone
	Direct Push Drilling Subcontractor	
Steve Paul	US Department of Justice, Federal Bureau of Prisons	850-458-7272 850-554-3370
Chief Terry Myatt	OLF Saufley Facilities	850-452-1001 X 1811 or 1805

Hazard Assessment (for purposes of 29 CFR 1910.132) for HASP preparation has been conducted by:

Prepared by: Donald J. Westerhoff, CSP

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. In the event of an emergency that cannot be handled by onsite personnel, site personnel will be evacuated 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. Therefore, TtNUS will not provide emergency response support for significant emergency events 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 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 operations, a factor which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

TtNUS personnel will, through necessary services, include initial response measures for incidents such as:

- Incipient fire-fighting support and prevention
- Incipient spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

2.2 EMERGENCY PLANNING

From the initial site hazard/risk assessment, injury/illness resulting from exposure to chemical or physical hazards and fire are the most probable emergencies that could occur during site activities. To minimize or eliminate these potential emergency situations, emergency planning activities will include the following (which are the responsibility of the SSO and/or the FOL):

- Coordinating response actions with NAS Pensacola Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.

- 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 (for substances used onsite), with Material Safety Data Sheets.
  - Onsite personnel medical records (Medical Data Sheets).
  - A logbook identifying personnel onsite each day.
  - Emergency notification phone numbers in site vehicles
- Identifying a chain or 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.

It is the responsibility of the TtNUS FOL to ensure that this information is available and present at the site.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by worker observation or through air monitoring equipment readings. Through site-specific training, site personnel will have knowledge regarding the signs and symptoms of overexposure to contaminants of concern. This knowledge will assist site personnel in identifying potential emergency situations and to alert personnel of potential hazards. Many of the potential hazards and recommended control measures are discussed in Sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate conditions that may predispose site personnel or property to an emergency. Site surveys will be conducted at least once a week during the initiation of this effort.

The above actions will provide early recognition for potential emergency situations. Should an incident take place, TtNUS will take defensive and offensive measures to control the situation. However, if the FOL and/or the SSO determine that an incident has progressed to a serious situation, TtNUS will withdraw, and notify appropriate response agencies.

2.3.2 Prevention

TtNUS will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. In the event that an activity or operation is covered by more than one of these documents, the most stringent requirement shall apply.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, personnel will immediately stop activities and report to the TtNUS FOL at the safe refuge area. Safe places of refuge will be determined prior to commencement of site activities and will be conveyed to personnel as part of the daily safety meeting conducted each morning. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the FOL or the on-site Incident Commander of the Emergency Response Team. The FOL or the SSO will take a head count at this location to confirm the location of site personnel. The site logbook will be used to take and record the head count. Ideally, the places of refuge should offer a point for communication.

2.5 EVACUATION ROUTES AND PROCEDURES

An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety, or welfare of site workers or when acceptable entry conditions within the fiber optic vault are compromised. Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services.

Evacuation procedures will be discussed prior to the initiation of work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site 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) will influence the designation of evacuation routes. As a result, multiple assembly points will be selected at NAS Pensacola, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since personnel will be working in close proximity of each other, hand signals, voice commands, air horns, and line of site communication will comprise the mechanisms to alert site personnel of an emergency.

If an emergency incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) via hand signals, voice commands, or vehicle horns.

- Describe to the FOL (who will serve as the Incident Commander) what has occurred and as many details as possible. Once personnel are evacuated, incipient response procedures will be enacted to control the situation.

In the event that site personnel cannot control the incident through offensive and/or defensive measures, the FOL and the SSO will enact emergency notification procedure to secure additional outside assistance in the following manner:

- Call 911 and report the emergency
- Give the emergency operator the location of the emergency and a brief description of the incident
- Stay on the phone and follow the instructions given by the operator
- The appropriate agency will be notified and dispatched

If an incident occurs at NAS Pensacola outside of our designated operating areas impacting field personnel, the following procedures are to be initiated:

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns, or two-way radio.
- Proceed to the assembly points as directed by NAS Pensacola personnel.

2.7 EMERGENCY CONTACTS

Prior to performing work at the site, personnel will be thoroughly briefed on the procedures to be followed in the event of an emergency incident. Table 2-1 provides a list of emergency contacts and their corresponding 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 CONTACTS
NAS PENSACOLA

AGENCY	TELEPHONE
EMERGENCY (Police, Fire, and Ambulance)	**911**
NAS Pensacola – Emergency Dispatch	(850) 452-3333
Navy Engineer-in-Charge, Byas Glover	(843) 820-5651
Facility Point of Contact , Greg Campbell	(850) 452-4611 ext 103
Sacred Heart Hospital	(850) 416-7000
Navy Hospital	(850) 505-6600
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Florida Poison Control Center	(800) 222-1222
FL Game and Fresh Water Fish Commission NW Region Office	(850) 265-3676
WorkCare	(800) 229-3674
TtNUS Tallahassee Office	(850) 385-9899
TOM, Terry Hansen	(850) 385-9866 ext 27
Deputy TOM, Charles Metz	(904) 730-4669 ext 220
FOL,	
Project Health and Safety Officer, Donald J. Westerhoff, CSP	(412) 921-7281
CLEAN HSM, Matthew M. Soltis, CIH, CSP	(412) 921-8912

2.8 ROUTE TO HOSPITAL

Sacred Heart Health Center

5151 N 9th Ave

Pensacola, Florida 32504

850-416-7000

Sacred Heart Hospital provides 24-hour Emergency Department that includes a comprehensive Trauma Center that is staffed and equipped to handle life-threatening injuries. The Hospital is designated by the State of Florida as a Level II Trauma Center. The facility provides 35 treatment rooms, a 10-bed Chest Pain Center, with a centrally located station so that all patient rooms are visible to staff at all times.

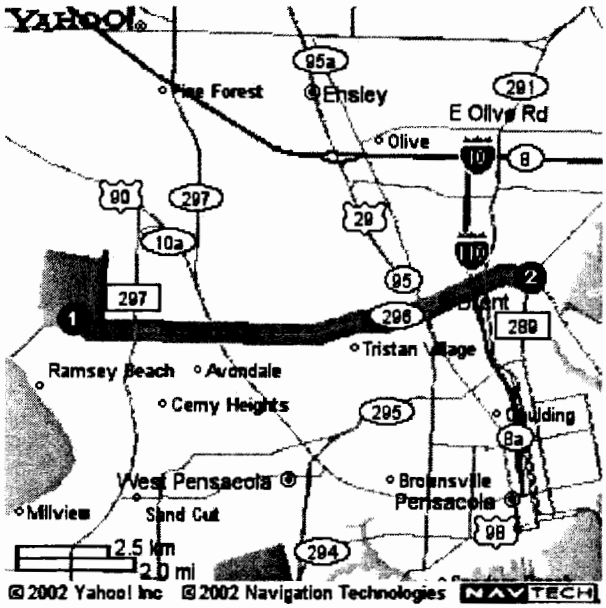
2.9 DIRECTIONS

❶ From Saufley Field Rd continue east on FL Route 296 which will become W Michigan Ave then Beverly Parkway then Brent Lane and finally Bayou Boulevard. Turn Left on N 9th Ave and proceed to Health Center Entrance❷

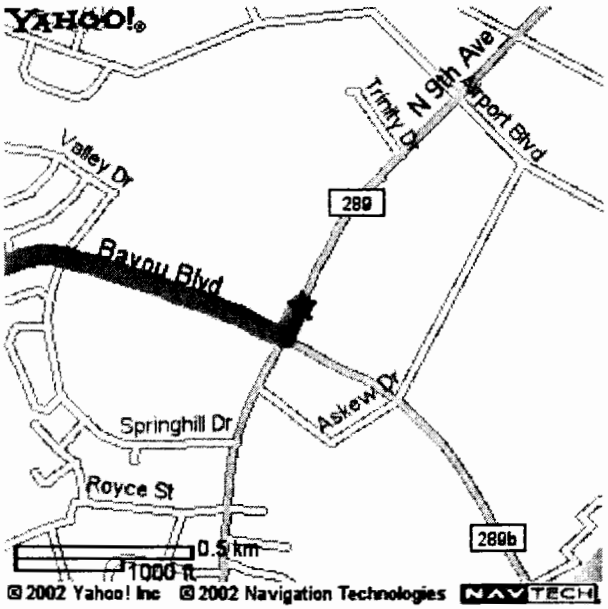
FIGURE 2-1

Route to Hospital

FULL ROUTE



DESTINATION



2.10 DECOMTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During a site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Given the anticipated concentrations of site contaminants, it is unlikely that extensive decontaminations efforts would be required prior to receiving emergency medical treatment. Personal decontamination will not be performed if the action that initiates an evacuation would further endanger the lives of workers. If the emergency involves suspected exposure, follow the steps provided in Figure 2-2.

2.11 INJURY/ILLNESS REPORTING

If TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting the information obtained at the time of the incident. Also, as soon as possible the Navy Contact must be informed of incidents or accidents that require medical attention.

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 TtNUS 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:
  - 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 TtNUS 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 Manager 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 the 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 SITE DESCRIPTION

NAS Pensacola is located in Escambia County in the panhandle of Northwest Florida. The installation occupies 8,423 acres of land - 5,800 acres at the main installation (NAS), and 2,623 acres at other area locations including Corry Station, Saufley Field and Outlying Landing Field Bronson.

3.2 OLF SAUFLEY

OLF Saufley is located in northwest Florida, and more specifically, Escambia County. The base is located between Highway 10 and Perdido Bay, approximately five miles northwest of Pensacola. OLF Saufley was opened in 1940 as Naval Auxiliary Air Station Saufley, and was used to train U.S. and allied pilots during World War II and the Korean Conflict. It consists of four airstrips, two of which are active. The base also has a small number of support buildings and a Federal Prison, which are located south of the airfield. OLF Saufley covers 866 acres of land, the majority of which is covered by the airstrips and wooded areas.

Sites 4 and 5 are hangar areas and former fuel distribution lines, respectively. Site 4 is comprised of two pair of hangars and concrete areas surrounding the individual hangars. The hangar pairs are arrayed roughly symmetrically about Building 803, a centrally-located structure where the control tower was formally located. The two hangars located southwest of Building 803 are designated Buildings 807 and 808 and those located southeast of Building 803 are designated Buildings 809 and 810. The distance between Building 803 and the hangars is approximately 350 feet (ft).

Site 5 consists of former fuel distribution lines which terminated in refueling pits (bowsers) along the flight line. Fuel used on the flight line originated from an Underground Storage Tank (UST) farm located approximately 500 ft south of the westernmost hangar (Building 807). The UST farm, which was formerly comprised of six 25,000-gallon tanks containing aviation gas (avgas) and one 15,000-gallon tank containing JP-3 jet fuel is part of UST Site 2406, currently under investigation by TtNUS.

Underground piping connecting the fuel farm to the flight line consisted of 4-inch, 8-inch, and 10-inch diameter steel lines. Airplanes refueled from 56 pits arrayed in two parallel lines along the flight line. The pits were numbered sequentially from 1 through 56 and, with some exceptions, were spaced 100 ft apart. One line of refueling pits was situated along the inner edge of the warm-up platform on the south side of the innermost taxiway nearest to the site buildings. This line of pits, which passed within 10 ft of the hangars, was broken into two segments approximately 90 degrees to one another: one trending

southwest-to-northeast passing in front of Hangars 807 and 808 and extending further to the southwest; the other trending northwest-to-southeast passing in front of Hangars 809 and 810 and extending further to the southeast. The control tower (Building 803) occupied the discontinuity in this inner line of pits. A parallel line of refueling pits mirroring these two segments was present on the opposite (north) side of the inner taxiway approximately 230 ft out from (north of) the inner line of pits. Refueling pits were connected by service trenches.

No environmental investigations involving sampling and analysis of environmental media have been performed at Sites 4 or 5. In May 1992, Naval Energy and Environmental Support Activity (NEESA) based in Port Hueneme, California submitted a "Preliminary Assessment Report, Naval Educational and Training Program Management Support Activity (NETPMSA), Saufley Field, Escambia County, Florida." In this document, NEESA made the following general statements or observations:

- Between 1942 and 1976, numerous types of solvents, oils, and fuels were used at Saufley Field to support air operations.
- By volume, more high octane avgas was used than any other hazardous material.
- Used solvent and waste oils were the majority of hazardous wastes generated.
- Toluene, carbon tetrachloride, and trichloroethane were a few of the solvents used.
- Usage rates of fuels, oils, and solvents at Saufley are unknown.
- During aerial operations between 1942 and 1977, 14 USTs and two aboveground storage tanks (ASTs) were in service.
- Most of the tanks were removed in late 1980.

Specific references to Site 4 were as follows:

- Waste oils were placed in two 2000-gallon capacity USTs designated tanks 807B and 810B located at Hangars 807 and 810, respectively.
- Waste solvents may also have been stored in these tanks.
- When the tanks were full, waste oils were transported off base or burned by the base fire department at the fire fighting training pit north of the runways.
- Additional tanks associated with Hangars 807 and 810 were 1000-gallon kerosene tanks (tanks 807C and 810C) and 1000-gallon gasoline tanks (tanks 807D and 810D).

Specific references to Site 5 were:

- The seven aerial refueling tanks (subject of UST Site 2406 study) were connected by over two miles of 10-inch and 8-inch diameter steel fuel lines to 52 refueling pits located on the aircraft parking platform.

- In late 1950, lightning ignited a row of refueling pits in front of Hangars 807 and 808 causing minor damage to the pits involved. It is not known whether any damage was done to the fuel lines.
- The refueling pits were removed in early 1980. It is not known whether the underground piping associated with the fuel pits was removed.

4.0 SCOPE OF WORK

This section discusses the specific tasks that are to be conducted as part of this scope of work as identified by CTO 0370. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit the requested modifications to this document to the HSM.

Specific tasks to be conducted include the following:

- Mobilization/demobilization activities
- Soil borings via Direct Push Technology (DPT) and hand augers
- Concrete coring (at Site 4)
- Multimedia sampling including
  - Groundwater
  - Surface soil
  - Subsurface soil
- Decontamination
- Surveying (handheld GPS)
- IDW Management

For more detailed description of the associated tasks, refer to the Sampling and Analysis Plan (SAP) and/or Work Plan (WP).

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section is intended to assist project personnel in the recognition of hazards and recommended control measures necessary for each planned task 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 are to be used as well as appropriate air monitoring techniques and action levels. This table must be updated if the scope of work, contaminants of concern, or pertinent conditions change.

Safe Work Permits will be issued for site activities (See Section 10.2). The FOL and/or the SSO will use the elements defined in Table 5-1 as the primary reference for completing the Safe Work Permit adding additional information as warranted.

5.1 GENERAL SAFE WORK PRACTICES

These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Refrain from eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.

- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. This is especially critical between breaks and prior to lunch and associated hand to mouth activities.

- 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.

- Be familiar with and adhere to instructions provided within this site-specific HASP.

- Be aware of the location of the nearest telephone and emergency telephone numbers. See Section 2.0, Table 2-1.

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

- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.

- Rehearse unfamiliar operations prior to implementation.
- Use the "buddy system".
- 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 (DPT) SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working near operating DPT or other drilling equipment.

5.2.1 Before Soil Boring/Drilling

- Identify underground utilities, buried structures, and aboveground utility lines before drilling. This service is provided by the NAS Pensacola and Sunshine State One Call of Florida. In addition, TtNUS personnel will use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.
- All heavy equipment (DPT/drill rigs) will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. Needed repairs or identified

deficiencies will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment III. Additional inspections will be performed at least once every 10-day shift or following repairs.

- Check operation of the Emergency Stop Switch (initially, then periodically thereafter).
- Ensure that machine guarding is in place and properly adjusted.
- Use out riggers/levelers to prevent movement of the DPT/drill rig.
- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding operating equipment.
- The driller's helper will establish an equipment staging and lay down plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as rods or drill flights will be provided to avoid the collapse of stacked equipment.
- Potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located equipment decontamination unit.
- Prior to each instance of engaging the equipment, the Driller will look to ensure that the soil boring/drilling area is clear of personnel and obstructions, and verbally alert everyone in the area that the rig is about to be engaged.
- Prior to the start of boring operations, one individual will be designated at the person responsible for immediate activation of the emergency stop device (if applicable) in the event of an emergency. This individual will be made known to the field crew and will be responsible for visually checking the work area and verbally alerting everyone of boring operations prior to engaging the equipment.

5.2.2 <u>During Soil Boring/Drilling</u>

- The Driller will ensure that an individual is constantly stationed at a location were the emergency stop switch can be immediately engaged.
- 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 equal to or greater than the height of the mast plus five feet or 25-feet for DPT operations whichever is greater to remove these activities from within physical hazard boundaries.

- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the rig.

- During maintenance, use only manufacturer provided/approved equipment.

- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should move heavy tooling.

- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone.

5.2.3 After Soil Boring/Drilling

- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determine 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 day's activities. During fueling operations equipment will be shutdown and bonded to the fuel source.

- When not in use rigs will be shutdown, and emergency brakes set and wheels will be chocked to prevent movement.

- Areas subjected to subsurface investigative methods will be restored to equal or better than original condition. Any contamination that was brought to the surface by drilling or DPT operations will be removed and containerized. Physical hazards (debris, uneven surfaces, ruts, etc.) will be removed, repaired or otherwise corrected. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment (Note: if Tyvek are deemed required as precaution or the FOL or SSO required)	Decontamination Procedures
Mobilization/ Demobilization This activity includes, but not limited to: - Equipment Preparation and Inspection - Resource acquisition and unpacking of supplies - Site clearance and preparation – Utility clearances, etc. - Construct decontamination and IDW operation and storage facilities, as applicable.	***Chemical hazards:*** 1) Exposure to potential site contaminants is not anticipated during these activities. Site contaminants are not anticipated to be encountered during mobilization/demobilization activities. However, contact with chemicals brought on-site (fuels, preservatives, etc.) will be considered. ***Physical hazards:*** 2) Lifting (strain/muscle pulls) 3) Pinches and compressions 4) Slips, trips, and falls 5) Vehicular and foot traffic ***Natural hazards:*** 6) Ambient temperature extremes (heat/cold stress) 7) Insect and animal bites 8) Inclement weather	1) The on-site Hazard Communication Program (Section 5.0 TtNUS Health and Safety Guidance Manual) will be followed. All chemicals brought onto the site by TtNUS and subcontractor personnel will be inventoried with each applicable chemical having an MSDS on site, on file. This effort shall include: - A Chemical Inventory list is generated for chemicals brought on site (Complete Section 5.0 of the TtNUS Health & Safety Guidance Manual) - MSDS' 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, where possible. - 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 obtainable. - 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. - Area available to maneuver the lift. - Area of the lift – Work place clutter, slippery surfaces 3) Only modify tools according to manufacturer's instruction. - Keep any machine guarding in place, avoid moving parts. - Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points. - Adjust machine guarding as necessary to minimize access into the machine. - When staging equipment, insure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. 4) Preview work locations for unstable/uneven terrain. - Cover, guard and barricade all open pits, ditches, and floor opening as necessary. - Ruts, roots, tools, and other tripping hazards should be eliminated to minimize trips and falls. - Maintain a clutter free work area. - As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas. 5) Establish safe zones of approach (i.e. Boom or mast + 5 feet). See Table 5-1 for Soil boring/Monitoring Well Installation for recommended distances. - The mast will be lowered when moving the rig. - Foot and vehicular traffic routes shall be well defined. - Heavy equipment patterns shall be isolated using fences or other suitable barricades from pedestrian pathways. - Bumpers or other suitable traffic stops shall be placed in areas where it is desired that traffic approaching an drop offs or unprotected banks. - All self-propelled equipment with restricted vision moving backwards shall be equipped with back up warning systems. - The FOL and/or the SSO as a precautionary measure to remove or demarcate physical hazards shall preview traffic routes (foot and vehicular) before the commitment of personnel and resources. 6) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat and cold stress is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual. 7) This is not considered a predominant hazard as these activities are to be conducted in a well maintained area. To combat the potential impact of natural hazards, the following actions are recommended: - Wear light color clothes and, if necessary, tape pant legs to work boots to block direct access. - Use repellents – Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Follow manufacturer's recommendations for use. 8) Suspend or terminate operations until directed otherwise by SSO. See Section 4.0 of the TtNUS Health and Safety Guidance Manual for additional information concerning natural hazards.	Visual observation of work practices by the FOL and/or the SSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.). Monitoring for chemical hazards is not required during this activity.	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - *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 (At the direction of the FOL and/or the SSO).* As site conditions may change, the following equipment will be maintained during all on-site activities as prescribed in Section 2.0 of this HASP - Fire Extinguishers - First-aid kit **Note:** The FOL and/or the SSO will determine the number of fire extinguishers and first-aid kits to be made available based on the number of operations to be conducted at any given time.	Not required. Good personal hygiene practices should be employed prior to breaks lunch or other period when hand to mouth contact occurs. This will minimize potential ingestion exposures. Personnel should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to assist in stopping the transfer of these insects into vehicles, homes, and offices. In a review of a number of tick bites reported over the past few years, the ticks that went undetected were located on the back and in the shoulder areas. Have your buddy examine this area carefully.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment (Items in italics are deemed optional as conditions or the FOL or SSO require.)	Decontamination Procedures
Soil Borings and groundwater sampling – using DPT Soil samples will be collected using 4 ft. long, 2-inch diameter macrocore samplers lined with acrylic/acetate sleeves. Groundwater samples will be collected using 4-ft long stainless steel retractable screen point samplers attached to the end of the DPT drill string.	***Chemical hazards:*** 1) No environmental investigations have been performed at Sites 4 and 5. Historical activities that were conducted at these sites involved the use of fuels, oils, and solvents. Potential contaminants of concern may include petroleum-related hydrocarbons; solvents (specifically toluene, carbon tetrachloride, and trichloroethane); and metals (including lead and arsenic). Other potential contaminants that may be present, but are less likely to present an occupational exposure concern, include SVOCs, PAHs, PCBs, and pesticides. Further information on the primary contaminants of concern are presented in Section 6.1, and Table 6-1. 2) Transfer of contamination into clean areas or onto persons ***Physical hazards:*** 3) Heavy equipment hazards (pinch/compressions points, rotating equipment, hydraulic lines, etc.) 4) Noise in excess of 85 dBA 5) Energized systems (contact with underground or overhead utilities) 6) Lifting (strain/muscle pulls) 7) Slips, trips, and falls 8) Cuts and lacerations 9) Vehicular and foot traffic ***Natural hazards:*** 10) Inclement weather 11) Insect bites	1) Avoid contact with contaminated media (air, water, soils, etc.) through safe work practices, PPE, and decontamination. Since limited information is available and contaminant concentrations within soils and groundwater are unknown, continuous air monitoring will be performed and conservative action levels will be established to protect site personnel from potential exposures through inhalation. Some contaminants are solids and are most likely to be bound to particulates. Site activities however, are not anticipated to generate significant airborne dusts. If airborne dusts are observed, area wetting methods (dust suppression) will be used. Good work and personal hygiene measures will be used to control potential exposures through incidental ingestion. Avoid hand to mouth contact, wash hands and face or use hygienic wipes to remove potential contaminants prior to breaks or lunch or other hand to mouth activities. 2) Restrict the cross use of equipment and supplies between locations and activities without first going through a suitable decontamination. Work practices including establishing a rigid decontamination procedure will be employed for all equipment between locations and between clean and potentially dirty work. This provision along with dedicated sampling equipment will insure materials are not carried and deposited in unaffected areas. 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 DPT Rigs) found in (See Attachment III) of this HASP. - Operated and supported by knowledgeable operators and ground crew. - Personnel not directly supporting this operation will remain at least 25 feet from the point of operation (for DPT rigs) 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 it operational status. - One person will be assigned responsibility for activating the Emergency Shut Off Device in the event of an emergency. Prior to engaging the equipment, the DPT operator will announce, loud enough for all to hear that he is engaging the DPT rig. He will visually confirm that all personnel are clear from all moving equipment prior to engaging the equipment. - 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 soil boring 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 (i.e., you must raise your voice to speak to someone within two feet of where you are standing) will require hearing protection until sound level measurements and/or noise dosimetry may be conducted to quantify the associated noise levels. 5) All soil boring activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II of this HASP. All utility clearances will be obtained in writing, and locations identified and marked, prior to activities. 6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Table 5-1 for mobilization/demobilization. 7) Preview work locations and site lines for uneven/unstable terrain. Clear necessary vegetation and establish temporary means for traversing hazardous terrain (e.g. rope ladders). 8) Use the knife and acrylic/acetate tube retention tub recommended by Geoprobe (Geoprobe Sampling Kit) to prevent potential cuts and lacerations when accessing samples within MacroCore acrylic/acetate liners. - Always cut away from yourself and others. - Do not place items to be cut in your hand or on your knee. - Maintain a sharp cutting edge. - Wear cut-resistant gloves (leather or heavy cotton) - Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when work infringes traffic thoroughfares. Use physical barricades, when working within or altering normal traffic flow patterns/traffic lanes. 10) Wear appropriate clothing for weather conditions. Follow the provisions as specified in Section 4.0 of the TtNUS Health and Safety Guidance Manual regarding the identification and evaluation of heat/cold stress related conditions. 11) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation. When feasible and necessary, use commercially available insect repellants. Report potential hazards to the SSO. Inspect clothing and persons for ticks and other vectors during and after work activities in wooded areas.	Potential site contaminants have not been fully characterized. A direct reading instrument such as Flame Ionization Detector will be used to detect volatile organic compounds (VOCs). Any elevated VOC readings in worker breathings zones will require site activities to be suspended until the source of the elevated readings is determined. This action level has been established due to the unknown nature of site contaminants. The FID will be used to screen potential source (sample locations, boreholes, etc.) areas to detect the presence of any VOCs. Positive readings at a source area will require that worker's breathing zone be monitored to determine exposure potentials. Any sustained readings above background (> 1 minute in duration) in a worker's breathing zone, or observations of symptoms of exposure, will require that site activities be suspended until the readings subside to background levels or the source is determined. Noise monitoring may be conducted at the discretion of the PHSO and/or the SSO. Action Level - >85 dBA Participation in the Project Hearing Conservation Program. Hearing protection is required for all DPT operations. Site activities are unlikely to generate airborne dusts. If visible dusts are observed, use area wetting methods. If airborne dusts cannot be controlled, site activities will be suspended until dust monitoring is available and upgraded levels of protection provided, if necessary.	Soil boring and groundwater sampling using DPT operations will be initiated using Level D protection. Level D protection constitutes the following minimum protection: - Standard field dress (Long pants and sleeved shirts) - Surgical style nitrile gloves - Steel toe shoes or work boots - Safety glasses - Hardhat - Hearing protection for high noise areas, as directed by the SSO. - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists of soiling work attire.* - *Reflective vest for high traffic areas* Additional PPE may be required based on site conditions or observations made during the site visit (e.g., rain gear, rubber boots, Note: The Safe Work Permit for this task (see Attachment IV) will be issued at the beginning of the task to address planned activities. Additional PPE may be assigned to reflect site-specific conditions or special considerations.	**Personnel Decontamination** -This function will take place at an area adjacent to the work operations. This decontamination procedure for Level D protection will consist of - Equipment drop - Soap/water wash and rinse of outer coveralls, gloves and boots, if applicable -Outer coverall and outer glove removal - Disposal of non-reusable PPE in doubly-lined bags/ and then into an industrial dumpster - Wash hands and face, leave contamination reduction zone **Equipment Decontamination** – See Decontamination of heavy equipment. Heavy equipment decontamination will take place at a centrelized decontamination pad utilizing steam or pressure washers. Heavy equipment such as DPT rigs will have the wheels or tracks cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and also 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 on-site activity. All 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 and that which is to leave the site. No equipment will be authorized access or exit without this authorization. Soil cuttings shall be containerized in 55-gallon drums, labeled, and staged pending disposal characterization.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operations Conducted	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment (Based on tasks and expected contact or conditions in the APP or SOO hazard)	Decontamination Procedures
Concrete Coring at Site 4.	***Chemical hazards:*** 1) It is unlikely that concrete coring activities will bring site personnel into contact with potential contaminated media that may be present below the paved surface. However, concrete coring is likely to generate significant dusts that contain silica and other nuisance particulates that may present an inhalation hazard or may be hazardous or irritating to the eyes, skin, mucous membranes, and respiratory system. Although unlikely to be present, the potential for encountering site contaminants must be considered possible without data to support the contrary. Historical activities that were conducted at these sites involved the use of fuels, oils, and solvents. Potential contaminants of concern may include petroleum-related hydrocarbons; solvents (specifically toluene, carbon tetrachloride, and trichloroethane); and metals (including lead and arsenic). Other potential contaminants that may be present, but are less likely to present an occupational exposure concern, include SVOCs, PAHs, PCBs, and pesticides. Further information on the primary contaminants of concern are presented in Section 6.1, and Table 6-1. ***Physical hazards:*** 2) Heavy equipment hazards (pinch/compressions points, rotating equipment, etc.) 3) Noise in excess of 85 dBA 4) Energized systems (contact with underground or overhead utilities) 5) Lifting (strain/muscle pulls) 6) Slips, trips, and falls 7) Cuts and lacerations ***Natural hazards:*** 8) Inclement weather	1) Approach the work area from an upwind direction and try to maintain an upwind location while operating the concrete corer to avoid potential exposure to dusts generated during the coring process. Use area wetting methods to suppress airborne dusts. Minimize contact with concrete dusts and debris as these substances contain caustic material that may irritate the skin, eyes, mucous membranes and respiratory tract. Avoid contact with contaminated media (soils under concrete) through safe work practices, PPE, and decontamination. Since limited information is available and contaminant concentrations within soils and groundwater are unknown, air monitoring will be performed and conservative action levels will be established to protect site personnel from potential exposures through inhalation if suspected contaminated media is encountered during this task. Some contaminants are solids and are most likely to be bound to particulates. Good work and personal hygiene measures will be used to control potential exposures through incidental ingestion. Avoid hand to mouth contact, wash hands and face or use hygienic wipes to remove potential contaminants prior to breaks or lunch or other hand to mouth activities. 2) All equipment will be: - Inspected to ensure all guards and other protective devices are present prior to use. - Operated and supported by knowledgeable operators in accordance with the manufacturer's specifications. - Personnel not directly supporting this operation will remain at least 25 feet from the point of operation 3) 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 (i.e., you must raise your voice to speak to someone within two feet of where you are standing) will require hearing protection until sound level measurements and/or noise dosimetry may be conducted to quantify the associated noise levels. 4) All coring activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II of this HASP. All utility clearances will be obtained in writing, and locations identified and marked, prior to activities. 5) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Table 5-1 for mobilization/demobilization. 6) Protect or otherwise mark with traffic cones, open pilot holes created by the coring process to prevent trips and falls. 7) Ensure cutting tools are sharp and replace worn bits/blades in accordance with the manufacturer's specifications. Keep all guards in place and do not modify for any reason. 8) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation. When feasible and necessary, use commercially available insect repellants. Report potential hazards to the SSO. Inspect clothing and persons for ticks and other vectors during and after work activities in wooded areas.	Of primary concern is the potential for exposure to silica and nuisance particulates generated during coring operations. Air monitoring for dusts is not anticipated to be necessary given the limited number of corings and the likelihood that airborne dusts generated during the coring process can be avoided or otherwise controlled through administrative and engineering controls. If airborne dusts, cannot be avoided or controlled, or if extensive concrete coring is necessary, air monitoring for airborne dusts and silica may be implemented to evaluate potential exposure to dust and silica. Potential site contaminants have not been fully characterized and concrete coring activities are unlikely to present a significant exposure threat to site personnel since potential site contaminants are likely to be present under the concrete and are unlikely to be contacted during coring activities. If suspected contamination is encountered, a direct reading instrument such as Flame Ionization Detector will be used to detect volatile organic compounds (VOCs). Any elevated VOC readings in worker breathings zones will require site activities to be suspended until the source of the elevated readings is determined. This action level has been established due to the unknown nature of site contaminants. Any sustained readings above background (> 1 minute in duration) in a worker's breathing zone, or observations of symptoms of exposure, will require that site activities be suspended until the readings subside to background levels or the source is determined. Noise monitoring may be conducted at the discretion of the PHSO and/or the SSO. Action Level - >85 dBA Participation in the Project Hearing Conservation Program. Hearing protection is required for all DPT operations.	Concrete coring operations will be initiated using Level D protection. Level D protection constitutes the following minimum protection: - Standard field dress (Long pants and sleeved shirts) - Leather of cotton work gloves - Steel toe shoes or work boots - Safety glasses or goggles - Hearing protection for high noise areas, as directed by the SSO. - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists of soiling work attire.* - *Reflective vest for high traffic areas* - *Hardhat* Note: The Safe Work Permit for this task (see Attachment IV) will be issued at the beginning of the task to address planned activities. Additional PPE may be assigned to reflect site-specific conditions or special considerations.	Decontamination of coring equipment is not anticipated to be necessary since contaminated media is unlikely to be encountered during this activity. Decontamination measures are provided as a contingency. **Personnel Decontamination** -This function will take place at an area adjacent to the work operations. This decontamination procedure for Level D protection will consist of - Equipment drop - Soap/water wash and rinse of outer coveralls, gloves and boots, if applicable -Outer coverall and outer glove removal - Disposal of non-reusable PPE in doubly-lined bags/ and then into an industrial dumpster - Wash hands and face, leave contamination reduction zone **Equipment Decontamination** – See Decontamination of heavy equipment. Heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. All 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 and that which is to leave the site. No equipment will be authorized access or exit without this authorization. Concrete cuttings shall be containerized in 55-gallon drums, labeled, and staged pending disposal characterization.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment (Refer to Table 5-2 for general Control of Exposure to the PPE in Table 5-2 below)	Decontamination Procedures
Hand augering and associated soil sampling.	***Chemical hazards:*** 1) No environmental investigations have been performed at Sites 4 and 5. Historical activities that were conducted at these sites involved the use of fuels, oils, and solvents. Potential contaminants of concern may include petroleum-related hydrocarbons; solvents (specifically toluene, carbon tetrachloride, and trichloroethane); and metals (including lead and arsenic). Other potential contaminants that may be present, but are less likely to present an occupational exposure concern, include SVOCs, PAHs, PCBs, and pesticides. Further information on the primary contaminants of concern are presented in Section 6.1, and Table 6-1. 2) Transfer of contamination into clean areas. ***Physical hazards:*** 3) Slip, trip, and fall hazards 4) Strain/muscle pulls from manual lifting 5) Ambient temperature extremes (heat/cold stress) ***Natural hazards:*** 6) Animal and insect bites and encounters 7) Inclement weather	1) Avoid contact with contaminated media (air, water, soils, etc.) through safe work practices, PPE, and decontamination. Since limited information is available and contaminant concentrations within soils and groundwater are unknown, continuous air monitoring will be performed and conservative action levels will be established to protect site personnel from potential exposures through inhalation. Some contaminants are solids and are most likely to be bound to particulates. Site activities however, are not anticipated to generate significant airborne dusts. Good work and personal hygiene measures will be used to control potential exposures through incidental ingestion. Avoid hand to mouth contact, wash hands and face or use hygienic wipes to remove potential contaminants prior to breaks or lunch or other hand to mouth activities. 2) Transfer of Contamination into Clean Areas - Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. See decontamination of heavy and sampling equipment for direction regarding this task. In addition, the bulk of sampling equipment such as tubing, trowels are disposable therefore dedicated. This will aid in preventing cross contamination. 3) Preview work locations and site lines for uneven/unstable terrain. Clear necessary vegetation and establish temporary means for traversing hazardous terrain (e.g. rope ladders). 4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques (See Lifting Mobilization/Demobilization of this table). 5) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat/cold stress is provided in Section 4.0 of the Health and Safety Guidance Manual. Care should be exercised when working outdoors due to harmful effects of the sun. 6) Wear light color clothes. - When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations. - Use repellents – Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. Products containing DEET can be applied directly to the skin. As always, follow manufacturer's recommendations for use. See Section 4.0 of the Health and Safety Guidance Manual Section 4.0 for more information concerning these natural hazards. 7) Suspend or terminate operations during electrical storms. Return to work when directed by the FOL and/or the SSO.	Potential site contaminants have not been fully characterized. A direct reading instrument such as Flame Ionization Detector will be used to detect volatile organic compounds (VOCs). Any elevated VOC readings in worker breathings zones will require site activities to be suspended until the source of the elevated readings is determined. This action level has been established due to the unknown nature of site contaminants. The FID will be used to screen potential source (sample locations, boreholes, etc.) areas to detect the presence of any VOCs. Positive readings at a source area will require that worker's breathing zone be monitored to determine exposure potentials. Any sustained readings above background (> 1 minute in duration) in a worker's breathing zone, or observations of symptoms of exposure, will require that site activities be suspended until the readings subside to background levels or the source is determined.	Level D protection constitutes the following for sampling activities Standard field dress (long pants, Sleeved shirts) Steel toe safety shoes or work boots Nitrile surgeon style inner gloves for sampling *Hard Hats* *Safety glasses* *Hearing protection* *Impermeable boot covers* *Reflective vest for traffic areas* Protective Measures as specified for DPT operations and soil boring will be employed for all subsurface soil sampling at the DPT rig. **Note:** The Safe Work Permit(s) for this task (See Attachment IV) 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** Upon completion of the sampling - Dedicated trowels, tubing, PPE will be rinsed and bagged for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location. **Equipment Decontamination** Decontamination of equipment (sampling and hand tools) will proceed as indicated in Table 5-1 of this HASP and/or the Work Plan.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment (Where in tasks are cleaned against as conditions or the FOL or SSO requires)	Decontamination Procedures
Decontamination of Heavy Equipment using pressure washers or steam cleaners. Decontamination of sampling equipment using 5-gallon buckets/scrub brushes, etc.. It is anticipated that this activity will take place at a temporary centralized location.	***Chemical hazards:*** 1) No environmental investigations have been performed at Sites 4 and 5. Historical activities that were conducted at these sites involved the use of fuels, oils, and solvents. Potential contaminants of concern may include petroleum-related hydrocarbons; solvents (specifically toluene, carbon tetrachloride, and trichloroethane); and metals (including lead and arsenic). Other potential contaminants that may be present, but are less likely to present an occupational exposure concern, include SVOCs, PAHs, PCBs, and pesticides. Further information on the primary contaminants of concern are presented in Section 6.1, and Table 6-1. 2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent) ***Physical hazards:*** 3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Falling hazards 7) Slips, trips, and falls ***Natural hazards:*** 8) Inclement weather	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain and familiarize yourself with manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TtNUS Health and Safety Guidance Manual. 3) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes. - Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization. 4) Wear hearing protection when operating the pressure washer and/or steam cleaner. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA. 5) Use eye and face protective equipment when operating the pressure washer and/or steam cleaner, due to flying projectiles. All other personnel must be restricted from the area. In addition to minimize hazards (flying projectiles, water lacerations and burns) associated with this operation, the following controls will be implemented - A Fan Tip 25° or greater will be used on pressurized systems over 3,000 psi. This will reduce the possibility of water lacerations or punctures. - Do not point the wand at persons or place against any part of your body. - Thermostat control will be in place and operational to control the temperature levels of the water where applicable. - Visual evaluations of hoses and fittings for structural defects - Construct deflection screens as necessary to control overspray and to guard against dispersion of contaminants driven off by the spray. 6) Ensure wash and drying racks are of suitable construction to prevent heavier items such as rods from falling and striking someone during the decontamination process. 7) The decontamination pad should be constructed to contain wash waters generated during decontamination procedures. Temporary decontamination pads are usually 10-30 mil polyethylene or polyvinyl chloride tarp construction. Although these items when used as a liner offer containment, they also present a slipping hazard. When these temporary liners are employed, it is recommended that a light coating of sand be spread over the walking surface to provide traction. - In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks. - Hoses should be gathered when not in use to eliminate potential tripping hazards. 8) Suspend or terminate operations until directed otherwise by SSO.	Use visual observation and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried.	**For Heavy Equipment** This applies to pressure washing and/or steam cleaning operations and soap/water wash and rinse procedures. Level D Minimum requirements: - Hard hat with splash shield - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Chemical resistant boot covers - Nitrile outer gloves over nitrile inner gloves - Safety glasses underneath a splash shield - Hearing protection (plugs or muffs) - *Hooded PVC Rainsuits or PE or PVC coated Tyvek.* Impermeable aprons may be used instead of coveralls if they offer adequate protection against overspray and back splash. **For sampling equipment** (trowels, split spoons,, etc.), the following PPE is required **Note:** Consult MSDS for additional PPE guidance. Otherwise, observe the following. Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves over nitrile inner gloves - Safety glasses - *Impermeable apron* **Note:** The Safe Work Permit(s) for this task (See Attachment IV) 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). The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; personnel will wash hand tools and pass hand equipment through as necessary. Stege 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit or apron as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands **Equipment Decontamination** - Gross contamination will be removed to the extent possible at the site. Contaminated tooling then will be wrapped in polyethylene sheeting for transport to the centralized location for a full decontamination and evaluation. - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer. - Remove gross (visible) materials using scrapers, shovels as necessary (soils, etc.) - Use the pressure washer/steam cleaner remove remaining visible debris. - As necessary, follow up with scrub brushes with Alconox or Liquinox detergent wash. - Potable water rinse using pressure washer/steam cleaner as necessary - DI water rinse - Air dry Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. **Sampling Equipment Decontamination** - Remove heavy materials (soils, etc.) - Alconox or Liquinox detergent wash - Potable water rinse - Solvent rinse (Isopropanol) - DI water rinse - Air dry All 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.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Tasks/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring Type And Action Levels	Personal Protective Equipment (Level A, Level B, Level C, Level D, Modified Level D, As Considered By The POC Or The SSO)	Decontamination Procedures
IDW Management including storage of IDW in drums and roll-offs.	***Chemical hazards:*** 1) No environmental investigations have been performed at Sites 4 and 5. Historical activities that were conducted at these sites involved the use of fuels, oils, and solvents. Potential contaminants of concern may include petroleum-related hydrocarbons; solvents (specifically toluene, carbon tetrachloride, and trichloroethane); and metals (including lead and arsenic). Other potential contaminants that may be present, but are less likely to present an occupational exposure concern, include SVOCs, PAHs, PCBs, and pesticides. Further information on the primary contaminants of concern are presented in Section 6.1, and Table 6-1. 2) Transfer of contamination into clean areas or onto persons ***Physical hazards:*** 3) Lifting (strain/muscle pulls) 4) Heavy equipment hazards (pinch/compression points). 5) Noise in excess of 85 dBA 6) Slip, trip, and fall hazards (uneven or unstable terrain) 7) Vehicular and foot traffic 8) Ambient temperature extremes ***Natural hazards:*** 9) Inclement weather	1) All staged IDW containers should be clearly labeled. Contact with the container's contents should be avoided whenever possible. Identify PPE to control exposures to potentially contaminated media, prior to drum movement. 2) Decontaminate all equipment and supplies, if they have become contaminated. 3) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. See Table 5-1for details. 4) Keep hands and fingers free of drum pinch/compression points. Use tools or equipment to avoid contacting pinch points. Whenever possible, use drum dollies to transport drums. Drums shall be staged as follows: - sealed with rings, bolts, and gaskets - four drums to a pallet; labels must face outward - stationed with a minimum of 4 feet between rows - inventory must be available 5) 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 (i.e., you must raise your voice to speak to someone within 2 feet of where you are standing) will require hearing protection until sound level measurements and/or noise dosimetry may be conducted to quantify the associated noise levels. 6) Preview work locations for uneven/unstable terrain. 7) Traffic and equipment considerations include the following: Establishing safe zones of approach. Checking that equipment is equipped with movement warning systems. Ensuring all personnel working in high equipment traffic areas are wearing reflective vests for high visibility. Following traffic rules and requirements established by NAS Pensacola. Traffic patterns will be dictated in support of on-site activities. However, regulated patterns in and about the work zones will be established to safely control the flow patterns of mechanized vehicles and pedestrians. 8) Wear appropriate clothing for the anticipated weather conditions while maintaining the required level of protection. Provide acceptable shelter and fluids for field crews. Refer to the TINUS Health and Safety Guidance Manual for additional information regarding heat and cold stress. 9) In the event of inclement weather suspend or terminate operations until directed by the SSO.	None Required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the activity associated with the task when the materials were generated such as Soil boring or well installation.	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Leather or canvas work gloves - *Safety glasses (When utilizing cables or slings to move the containers)* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* PPE changes may be made with the implementation of the Spill Containment Program. This represents the only anticipated modification to this level of protection.	**Personnel Decontamination** -This function will take place at an area adjacent to the site activities. This decontamination procedure for Level D protection will consist of - Equipment drop - Soap/water wash and rinse of outer gloves and outer boots, as applicable - Soap/water wash and rinse of the outer splash suit, as applicable - Bag disposable PPE - Wash hands and face, leave contamination reduction zone

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
SITES 4 & 5 – OLF SAUFLEY - NAS PENSACOLA, PENSACOLA, FLORIDA

Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type And Action Levels	Personal Protective Equipment (PPE) Based On Anticipated Operational Conditions (In The Eye Of The SSO Director)	Decontamination Procedures
Surveying activities (GPS)	***Chemical hazards:*** 1) Exposure to potential site contaminants during surveying activities is unlikely given the nature of surveying work and the limited contact with potentially contaminated media (i.e. soils, etc.) Refer to Section 6.0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment III for specific contaminants of concern associated with particular sites and site activities. ***Physical hazards:*** 2) Slip, trip, and fall hazards (uneven or unstable terrain) 3) Vehicular and foot traffic 4) Ambient temperature extremes ***Natural hazards:*** 5) Insect/animal bites or stings, poisonous plants, etc.) 6) Inclement weather	1) To further reduce the potential for exposure, personnel performing surveying activities will minimize contact with potentially contaminated media and will avoid areas where chemical hazards may exist. 2) Preview work locations and site lines for uneven/unstable terrain. Clear necessary vegetation and establish temporary means for traversing hazardous terrain (e.g. rope ladders). 3) Traffic considerations include the following: Establishing safe zones of approach. Ensuring all personnel working in high equipment traffic areas are wearing reflective vests for high visibility. Following traffic rules and requirements established by NAS Pensacola. Traffic patterns will be dictated in support of on-site activities. However, regulated patterns in and about the work zones will be established to safely control the flow patterns of mechanized vehicles and pedestrians. 4) Wear appropriate clothing for the anticipated weather conditions while maintaining the required level of protection. Provide acceptable shelter and fluids for field crews. Refer to the TtNUS Health and Safety Guidance Manual for additional information regarding heat and cold stress. 5) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison oak & ivy, etc.). When feasible and necessary, use commercially available insect repellants. Report potential hazards to the SSO. Inspect clothing and persons for ticks and other vectors during and after work activities in wooded areas. 6) All operations will be temporarily suspended during electrical storms.	Air monitoring is not required given the unlikelihood that airborne contaminants will be present. The potential for exposure to site contaminants during this activity is considered minimal.	Surveying activities shall be performed in Level D protection Level D Protection consists of the following: - Standard field dress including sleeved shirt and long pants - Shoes rugged lug sole for traction - Work gloves shall be worn when clearing brush. - *Safety glasses, hard hats (if working near machinery, overhead hazards, or clearing brush)* - *Snake chaps for heavily wooded area where encounters are likely.* - *Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks.* - *Reflective or blaze orange vests should be worn when working along traffic thoroughfares.* **Note:** The Safe Work Permit(s) for this task (See Attachment IV) 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** - A structured decontamination is not required as the likelihood of encountering contamineted media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to stop the transfer of these insects into vehicles, homes, and offices. In addition, early detection shall provide for early removal.

6.0 HAZARD ASSESSMENT

This section provides information regarding the chemical, physical, and natural hazards associated with the sites to be investigated and the activities that are to be conducted as part of the scope of work. Table 6-1 provides information on potential chemical contaminants of concern, including exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data.

6.1 CHEMICAL HAZARDS

No environmental investigations have been performed at Sites 4 and 5. However, based on known activities that were conducted at these sites, it is anticipated that potential contaminants of concern may include petroleum related hydrocarbons associated with high octane avgas, JP-3, kerosene, and oils; and solvents (including toluene, carbon tetrachloride, and trichloroethane). Analytical parameters for this investigation also include analysis for metals (including lead and arsenic), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. However, from an occupational exposure standpoint, exposure to volatile organic compounds (VOCs) associated with fuels and solvents through inhalation or contact with the skin will be considered the primary chemical exposure hazard associated with site activities. Protective measures including safe work practices, use of personal protective equipment (PPE), and appropriate decontamination measures implemented to protect personnel from exposure to VOCs will be effective at preventing potential exposures to other potential contaminants that may be present in site media (soils, groundwater, etc.).

Exposure to chemicals hazards, specifically fuel and solvent related contaminants, is most likely to occur if free product or free product saturated media are encountered during intrusive operations. Soils or groundwater containing high concentrations fuels or solvents may present an inhalation hazard to site workers. Since no analytical data is available, conservative action levels have been established to protect site personnel in the event that airborne concentrations of VOCs are detected. Contact with potentially contaminated media also present an exposure concern through skin contact and adsorption. All media should be considered to be potentially contaminated and PPE will be used to prevent direct contact with the skin. Potential exposures as a result of incidental ingestion will be prevented through the use of safe work practices, decontamination and hand/face washing prior to performing hand to mouth activities, eating, drinking, smoking, taking medications, etc. Additionally, hand to mouth activities will be restricted to support zones that are located away from areas containing potential contamination (exclusion zones).

Concrete coring activities to create pilot holes at Site 4 may generate airborne dusts that may present an exposure threat to site personnel. Although site contaminants are not likely to be present in concrete,

exposure to silica and nuisance particulates may exist. Constituents of concrete may become alkaline when exposed to moisture. Contact with concrete/dusts may dry the skin, cause alkali burns and effect mucous membranes. Dust can irritate the eyes and upper respiratory tract and cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis. Respirable crystalline silica (quartz) can cause a condition known as silicosis, a fibrosis (scaring) of the lungs and possibly cancer. Potential exposures will be avoided by situating personnel and sensitive receptors in an upwind direction, away from visible dust plumes. Area wetting methods will be used to minimize the generation of airborne dusts. If significant dusts are generated and cannot be avoided or controlled through area wetting methods, this HASP will be amended to include particulate air monitoring to evaluate potential inhalation hazards and to address the need for additional PPE (respiratory protection).

Information on the toxicological, chemical, and physical properties of the 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.).

TABL -1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA

SITES 4 & 5, OLF SAUFLEY - NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
AVGas (Aviation Gasoline) Composition Naphtha (petroleum), light alkylation; 64741-66-8 (>90%) Toluene; 108-88-3(up to 10%) Benzene; 71-43-2 (up to 0.1%) Hexane; 110-54-3 (0-3%) 1,2,4-Trimethylbenzene; 95-63-6 (0-2%) Organic lead additives (up to 0.14%)	See component list	PID (10.6 eV Lamp Strength Correction factor = 0.6 FID = LEL Meter = 0.85	Air sample using charcoal tube. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501. See also OSHA CSI Method application	Manufacturer's Recommendation – 100 ppm (300 mg/m^3) for 8-Hour work day. No regulatory or advisory limits have been set.	Petroleum odor threshold ~ 800 ppm Rating - Poor to Adequate **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** NitrilSolve 727 (>480 minutes) or Neporene 6780 (287 minutes)	Characteristics vary by fuel blending, grade, and manufacturer (e.g., impurities and additives) Boiling Pt: 158°F, ~70°C Melting Pt: -72° F; -58°C Molecular Weight: ~86-170 Flash Pt: -50°F, -45°C LEL: 1.4% UEL: 7.6% Autoignition Temp.:824°F; 439°C Vapor Density: ~4 Vapor Pressure: 5.5 to 7.0 psi SG: 0.71@ 60° F; 15.6°C PH: ~7.0 Solubility in water: Negligible (<0.1%) @ 77°F; 25°C Viscosity: 0.6 cST@ 77°F; 25°C Appearance and Odor: Clear green liquid with gasoline hydrocarbon odor Avoid contact with heat, sparks and flame	AVGas is irritating to the eyes, skin, respiratory tract, and CNS (This through direct contact or reaching concentrations >1000 ppm). **Direct contact** may result in mild irritation with a possible drying and defatting of the skin. **Ingestion** may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. **Inhalation** of vapors or mists of AVGas may result in headache, nausea, confusion, narcotic effect, and drowsiness. Acute exposures to extreme airborne concentration can result in death. Chronic inhalation of aviation gas vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers. Repeated exposures to the skin may cause skin cancer. This product does contain components which have demonstrated carcinogenic capabilities.
Jet Petroleum (e.g., JP-3. JP-5, JP- 8) Components Petroleum distillates, hydrotreated light (64742-47-8) (100%) and antioxidant and metal deactivator <100 ppm	64742-47-8 (JP-5)	PID (10.6 eV Lamp Strength Correction factor = 0.6 FID = LEL Meter = 0.85	Air sample using charcoal tube. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501. See also OSHA CSI Method application.	Manufacturer's Recommendation – 100 ppm (750 mg/m^3) for 8-Hour work day. No regulatory or advisory limits have been set USAF 8-hr = 200 ppm.	Petroleum odor threshold ~ 800 ppm Rating - Poor to Adequate **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** NitrilSolve 727 (>480 minutes) or Neporene 6780 (287 minutes)	Characteristics vary by fuel blending, grade, and manufacturer and may include impurities and additives. Boiling Pt: 338-554°F, 170-290°C Melting Pt: -51° F; -46°C Molecular Weight: ~185 Flash Pt: 140°F, 60°C LEL: 0.9% UEL: 7% Auto ignition Temp.:475°F; 246°C Vapor Density: >1 - 5 Vapor Density: <5 @ 20°C SG: 0.788 to 0.845 Solubility in water: Negligible (<0.1%) @ 77°F; 25°C Viscosity: 8.5 cST@ -4°F -20°C Appearance and Odor: Clear water-white liquid with faint petroleum odor Avoid contact with heat, sparks and flame Avoid contact with strong oxidizing agents.	JP fuels are irritating to the eyes, skin, and respiratory tract (This through direct contact or reaching concentrations >700 ppm). **Direct contact** may result in mild irritation with a possible drying and defatting of the skin. **Ingestion** may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. **Inhalation** of vapors or mists of JP-5 may result in headache, nausea, confusion, narcotic effect, and drowsiness. Acute exposures to extreme airborne concentration can result in death. Chronic inhalation of jet fuel vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers. Repeated exposures to the skin may cause skin cancer.

TABLE 6-1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA

SITES 4 & 5, OLF SAUFLEY - NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Kerosene Diesel Fuel No.1	8008-20-6	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID.	Air sampling use charcoal tube as a collection media; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with NIOSH Method #1550.	NIOSH 100 mg/m^3	Kerosene odor **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** Nitrile	Boiling Pt: 347-617°F Melting Pt: Not available Solubility: Insoluble Flash Pt: 100-162°F LEL/LFL: 0.7 UEL/UFL: 5 Vapor Density: >5 Vapor Pressure: 5 mHg @ 70°F; 21°C Specific Gravity: 0.81 Incompatibilities: strong oxidizers. Appearance and odor: Colorless to yellowish, oily liquid with a strong characteristic odor.	Prolonged or repeated exposures to this product may cause skin and eye irritation. Due to the defatting capabilities this exposure may lead to a dermatitis condition. High vapor concentrations are irritating to the eyes and respiratory tract. Exposure to high airborne concentrations may result in narcotic effects including dizziness, headaches, and anesthetic to unconsciousness. High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation.
1,1,2-Trichloroethane	79-00-5	PID: I.P. 11.0 eV, relative response ratio unknown. FID: 85% response with FID.	Air sample using charcoal sorbent tube and carbon disulfide desorption with gas chromatography-flame ionization detector; Sampling and analytical protocol in accordance with OSHA Method #07, or NIOSH Method #1003 Halogenated Hydrocarbons.	OSHA; NIOSH; ACGIH: 10 ppm (skin) IDLH: 100 ppm	No information was found concerning odor threshold limits. The use of air-purifying respirator with organic vapor cartridge for <100 ppm for escape purposes is permitted. Exceedances above 100 ppm will require the use of airline or SCBA combination units. **Recommended glove:** Butyl rubber, solvent dipped, unsupported - >5.78 hrs; PV alcohol - >8.00 hrs; Teflon - >24.00 hrs; Viton - <24.00 hrs	Boiling Pt: 237°F; 114°C Melting Pt: -31°F-35°C Solubility: 0.6% Flash Pt: Not available LEL/LFL: 6% UEL/UFL: 15.5% Vapor Density: Not available Vapor Pressure: 19 mmHg @ 68 °F; 20°C Specific Gravity: 1.44 Incompatibilities: Acids, acid fumes, oxidizers, caustics, and chemically active metals such as aluminum, magnesium, sodium, potassium, etc. Appearance and Odor: Colorless liquid with a sweet chloroform-like odor.	Overexposure to this substance may cause irritation to the eyes, skin, and mucous membranes of the respiratory and gastrointestinal tract. CNS effects may include sleepiness, incoordination, and depression similar to a narcotic. Chronic exposure may cause liver, kidney and lung damage. This substance has demonstrated carcinogenic potential in laboratory animals. Repeated or prolonged exposure may cause dermatitis.

TABL -1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA

SITES 4 & 5, OLF SAUFLEY - NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Carbon Tetrachloride	56-23-5	PID: I.P. 11.47 eV, relative response ratio unknown. FID: Relative response ratio for FID detection is 10%.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID Detection. Sampling and analytical protocol in accordance with NIOSH Method #1003.	ACGIH: 5 ppm, 10 ppm STEL OSHA: 10 ppm, 25 ppm Ceiling NIOSH: STEL 2 ppm IDLH: 200 ppm	Inadequate - Odor threshold 140-584 ppm. An air purifying respirator equipped with a organic vapors filter is acceptable for escape purposes only. PAPRs for concentrations up to 250 ppm and supplied air units should be employed for concentrations exceeding 250 ppm. **Recommended glove:** CPE 3.50 hrs.; Nitrile > 1.00 hr.; PV Alcohol >6.00 hrs; Silver Shield >6.00 hrs.; Teflon >3.00 hrs.; viton >13.00 hrs.	Boiling Pt: 170°F; 77°C Melting Pt: -8°F; -22°C Solubility: 0.05% Flash Pt: Nonflammable LEL/LFL: Nonflammable UEL/UFL: Nonflammable Note: Used as a fire extinguisher media, however, may form phosgene if used to put out electrical fires. Vapor Density: 5.5 Vapor Pressure: 91 mmHg Specific Gravity: 1.59 Incompatibilities: Chemically active metals such as sodium, potassium, magnesium; fluorine; aluminum Appearance and Odor: Colorless liquid with an ether like odor	Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. Poisoning through inhalation, ingestion, and skin absorption may result in nausea, vomiting, diarrhea, headache, stupor, and visual disturbances. Alcohol may have synergistic effects intensifying exposure symptoms. Long duration exposures may result in kidney (anuria and azotemia) and liver damage. This material has demonstrated cancer causing potential in laboratory animals.
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.

TABLE 6-1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA

SITES 4 & 5, OLF SAUFLEY - NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Arsenic	7440-38-2	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using a particulate filter; acid desorption; AAS detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7900.	OSHA: Organic compounds 0.5 mg/m3 Inorganic compounds 0.01 mg/m3 NIOSH: (Ceiling) 0.002 mg/m3 ACGIH: 0.01 mg/m3 IDLH: 5 mg/m3 as arsenic	No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for dust and fume. Organic vapor acid gases with HEPA filter. This substance may be presented a pesticide, therefore a cartridge suita for pesticides (MSA-GMP). Recommended Gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: sublimation @ 1134°F; 612°C Melting Pt: 1497°F; 814°C @ 36 atm Solubility: Insoluble in water; soluble in nitric acid Flash Pt: Nonflammable, however, airborne in the form of a dust this substance will support combustion LEL/LFL: Nonflammable UEL/UFL: Nonflammable Vapor Density: Not available Vapor Pressure: 1 mmHg @ 372°C (sublimes) Specific Gravity: 5.73 Incompatibilities: Oxidizers, halogens, zinc, lithium, azides, and acetylides Appearance and odor: Gray to black, brittle, crystalline, amorphous, odorless.	Overexposure to this substance through inhalation or ingestion may result in ulceration of the nasal septum, GI disturbances resulting in violent purging and vomiting, hoarse voice, sore throat, excessive salivation, peripheral neuropathy (numbness and burning sensations beginning at the extremities followed by motor weakness), respiratory irritation leading to possible pulmonary edema. Skin or eye contact may result in irritation, conjunctiva, dermatitis, and hyperpigmentation (darkening of the areas exposed) of the skin. This substance has been judged to be a Human carcinogen by NTP, and IARC.
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO3 or H2O2 desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m3 ACGIH: 0.05 mg/m3 NIOSH: 0.05 mg/m3 IDLH: 100 mg/m3 as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m3. Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 3164°F; 1740°C Melting Pt: 621°F; 327°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 11.34 Incompatibilities: Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids Appearance and Odor: Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

6.2 PHYSICAL HAZARDS

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

- Slips, trips, and falls
- Cuts (or other injuries associated with hand tool use)
- Lifting (strain/muscle pulls)
- Ambient temperature extremes (heat stress)
- Pinches and compressions
- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.)
- Energized systems (contact with underground or overhead utilities)
- Vehicular and foot traffic
- Noise in excess of 85 dBA
- Flying projectiles

Each of these physical hazards is discussed in greater detail in Section 4.0 of the TtNUS health and Safety Guidance Manual. Additionally, information on the associated control measures for these hazards are discussed in Table 5-1 of this HASP.

6.2.1 Slips, Trips, and Falls

Site conditions may create an increased potential for slip, trip, and fall hazards.

- The safest approach to sample points will be identified and cleared to permit field crew access to sample locations/sign installation.
- Establish anchor points and rope handrails for traversing/ascending/descending angles and slopes greater than 45% grade.
- Footwear with an adequate traction.
- Prepare work areas by removing tripping hazards (ruts, roots, debris). This is especially critical around rotating equipment, where a fall into the rotating apparatus could be life threatening.

6.2.2 Cuts or Other Injuries Associated with Hand Tool Use

The improper use of hand tools has been the cause of several past accidents. In particular the use of box cutters when cutting acetate liners has resulted in lacerations to workers hands, legs, and fingers. Use manufacturer approved cutting tools (geoprobe acetate liner holder and cutter). Never rest an object on your knee or other part of your body when cutting. Keep cutting tools sharp. Additionally, the clearing of

brush and vegetation may be necessary using hand tools that may include machetes and brush axes. The control measures presented below will help minimize the potential for physical and cutting hazards.

- Wear leather or heavy cotton work gloves when using tools to protect against blisters, cuts, or other hand injuries.
- Wear eye protection (safety glasses with side shields) to protect the eyes from twigs, sticks, or flying debris.
- Clear the immediate cutting area of personnel (radius of the tool swing area).
- Wear long pants and long-sleeved shirts to protect against abrasions.
- Wear hard hats if work will involve areas with overhead hazards (e.g., overhanging branches).
- Wear sturdy work boots.
- Inspect hand tools [i.e., shovel handles (cracks, splinters, etc.), brush hook handles and blade attachment points, etc.)
- Ensure that hand tools are sharp to facilitate cutting action. This will avoid persons forcing the tool to cut and increasing potential hazards.
- Use the proper tool for the intended purpose. The proper tool is the acetate tube retention tub and recessed double bladed hand knife recommended by Geoprobe. This will avoid potential injury possibly created through improper cutting procedures.

Additionally equipment used to perform concrete coring and DPT operations may present the potential for cuts and other injuries. All manufacturer installed guards and protective systems must be present and functional. Site personnel will not be permitted to remove or otherwise alter guards and protective systems during operations of the equipment used on site.

6.2.3 Energized Systems (Contact with Underground or Overhead Utilities)

Underground utilities such as pressurized lines, water lines, telephone lines, buried utility lines, and high voltage power lines may be present throughout the facility. Therefore, subsurface activities must be conducted following the requirements of the TtNUS SOP for "Utility Locating and Excavation Clearance (HS-1.0)". A copy of this SOP is provided as Attachment II. Clearance of underground and overhead utilities for each sample location will be coordinated with NAS Pensacola personnel. Greg Campbell is the point-of-contact for NAS Pensacola and can be reached at (850) 452-4611 ext 103. Additionally, drilling operations will be conducted at a safe distance from overhead power lines. In certain cases, NAS Pensacola personnel

may need to de-energize electrical cables using facility lockout/tagout procedures to insure electrical hazards are eliminated.

6.2.4 Ambient Temperature Extremes (Heat Stress)

Overexposure to high ambient temperatures (heat stress) may exist during performance of this work depending on the project schedule. Work performed when ambient temperatures exceed 70°F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additionally, workload and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. The SSO will recommend additional heat stress control measures as they are deemed necessary as per ACGIH guidelines.

6.2.5 Flying Projectiles

Site activities, particularly, concrete coring at Site 4 and decontamination activities using pressure washers may expose site workers to flying projectiles. Flying projectiles may damage the eyes or puncture the skin if not properly protected. Site activities that pose an eye hazard will require the use of ANSI approved eye protection (safety glasses with side shields). Site activities that create flying projectiles will require the face shields be used in addition to safety glasses.

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. As previously discussed, this area is well maintained and hazards of this nature are not considered a primary concern.

For more information concerning these hazards see Section 4.0 of the HSGM. The following information is specific to the region and therefore not in the HSGM.

6.3.1 Insect Bites and Stings

Various insects and animals may be present and should be considered during field work. For example, fire ants present a unique situation when working outdoors in the southern portion of the United States. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom (formic acid) that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling,

shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician. Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

Insect/animal bites and stings are difficult to control given the climate and environmental setting of NAS Pensacola. 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 – Products such as Permanone should not be applied directly to the skin due to potential irritation. This product, when permitted for use, should be applied over clothing articles. Products such as DEET can be applied directly to the skin. Follow the manufacturer's instructions.

- 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. However, in many of the reported cases attachment has occurred on the back near the shoulders.

- 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 and Mosquito Transmitted Illnesses and Diseases

Ticks and mosquitoes have been identified in the transmission of diseases including Lyme's disease and malaria. Warm months (Spring through early Fall) are the most predominant time for this hazard. Information concerning Lyme's Disease including recognition, evaluation, tick removal, and control is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual.

Malaria may occur when a mosquito or other infected insect sucks blood from an infected person, and the insect becomes the carrier to infect other hosts. The parasite reproduces within the mosquito, and is then passed on to another person through the biting action. Acute symptoms include chills accompanied by fever and general flu like symptoms. This generally terminates in a sweating stage. These symptoms may recur every 48 to 72 hours.

West Nile Virus (WNV)

The WNV is a type of virus that causes encephalitis or inflammation of the brain. The virus is transmitted by mosquitoes that acquire it from infected birds. Symptoms generally occur five to 15 days following the bite of an infected mosquito, and range from a slight fever or headache to rapid onset of severe headache, high fever, stiff neck, muscle weakness, disorientation and death.

WNV encephalitis has no specific treatment. In northern areas of the world, WNV encephalitis cases occur primarily in the late summer or early fall. In southern climates, where temperatures are milder, WN encephalitis can occur year round. There is no vaccine.

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 manufacturer's instruction to exposed skin. An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide). Avoid products containing more than 30% DEET.
- Spray clothing with repellents containing permethrin or DEET, mosquitoes may bite through thin clothing.

6.3.2 Snakes of Florida

The poisonous snakes found in Florida are the coral snake, cottonmouth or water moccasin, copperhead, and the pygmy, timber, and diamondback rattlesnakes. Initial efforts will be directed to avoid, where possible, nesting and territorial areas. Again, it is not anticipated that these reptiles will be encountered - the following is provided only for informational purposes.

Coral Snake

Coral Snakes are extremely poisonous snakes with small, blunt heads and brightly colored bodies. They do not strike as effectively as other venomous snakes, but they bite. They are dangerous if stepped on or handled. The *eastern* coral snake generally ranges from 20 to 40 inches in length. Its body is encircled by broad black and red bands separated by narrow yellow ones. Just behind the snake's black snout is a wide yellow band followed by a black band. Some are covered with black pigment that hides much of the red color. Some nonpoisonous snakes look like coral snakes because they have similar coloring. But coral snakes have red bands next to yellow ones. The harmless snakes have red bands next to black ones.

Cotton Mouth or Water Moccasin

The water moccasin is a pit viper. It has a hollow, or pit, in the side of its head, between and slightly below the eye and nostril. Several harmless water snakes have a broad head like the moccasin, but they lack the pit. Adult water moccasins are about 3 ½ feet long, though some grow to more than 5 feet long. They usually have broad dark bands across their bodies. Water moccasins feed on a wide variety of animals, including frogs, fish, small mammals, and birds. Water moccasins are most often seen in watery places, in the swampy backwaters of rivers and streams, and on marshy lakeshores. The bite of the water moccasin is highly dangerous and may be fatal. This snake is also called a cottonmouth because when threatened it throws back its head and flashes its white-lined mouth as a warning signal.

Copperhead

Copperhead is also a poisonous pit vipers. Its body has broad chestnut-red bands. Most copperheads are about 2 ½ feet long while the largest grow to about 4 feet. The copperhead bites people more often than most rattlesnakes, partly because it is silent and smaller, and is not so quickly noticed. The bite is seldom fatal to adults. This reptile usually eats rodents and other small mammals by killing them with their poison and swallowing them whole. Sometimes the snake eats insects and frogs. The copperhead can be identified by the presence of a pit in front of and below each eye. The snake's nostril is in front of the pit.

Rattlesnake

The rattlesnake is a pit viper with a rattle on the end of its tail. The rattle is used to warn enemies to stay away. However, sometimes they give no warning before they bite. The rattlesnake always lifts its tail when it sounds where as harmless snakes that mimic the rattlesnake move their tail back and forth on top of dry leaves or grass.

The diamondback rattler is the heaviest of the poisonous snakes, though not the longest. It gets its name because diamond-shaped blotches edged with yellow cover its body. Diamondbacks rarely grow over feet long.

Pigmy rattlesnakes are short, relatively thick-bodied snakes. They have a dark line through the eye on each side of the face and a series of dark, roughly circular spots running down the center of the back. These dorsal spots interrupt a thin reddish-orange stripe that runs along the mid-body line. Pigmy rattlesnake's first line of defense is to remain motionless. Their color pattern makes them hard to see in grass or leaf litter, especially when they are coiled. They almost never warn approaching people by sounding their rattle. They are likely to remain motionless until stepped on or over.

The Timber Rattlesnake has a large body and ranges in length of five to six feet. It has a broad triangular head, vertical pupils and heat sensitive pits. The body color may be yellow, gray, dark brown or black, with dark, V-shaped crossbands across the back. The head is usually unpatterned and is covered with many small scales. A distinct rattle on the end of a darkly colored tail produces a buzzing sound when vibrated.

Rattlesnakes send out poison through two long hollow fangs, in its upper jaw. The poison forms in a pair of glands behind each eye on the upper jaw. The rattlesnake's fangs are folded back in the mouth when not in use. When an angry rattlesnake strikes, the fangs are erected and the mouth opened wide. Most rattlesnakes eat birds, small mammals, amphibians and reptiles. The larger rattlers rank among the most dangerous of snakes and should be avoided

Snake Bite

However, should field personnel come in contact with these animals and receive a bite, the following actions are necessary:

- Obtain a detailed description of the snake. This and the bite mark will enable medical personnel administering medical aid to provide prompt and correct antidotes, as necessary.

- Immobilize the bite victim to the extent possible. Physical exertion will mobilize the toxins (if poisonous varieties) from the bite point systemically through the body.

- Apply a pressure wrap (for extremities), just above and over the bite area. With a couple wraps of the pressure wrap in place over the bite area, apply a splint, and continue the application of the pressure wrap. The purpose for the splint is to restrict the movement of the extremity, this along with the pressure wrap will aid in restricting the toxins from leaving the site of the bite.

- Seek medical attention immediately.

6.3.3 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, tornados/heavy winds, extreme heat, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist. Site personnel will seek shelter in appropriate areas until weather conditions improve.

7.0 AIR MONITORING

Direct read instruments (DRIs) will be used to screen source areas (sample locations, boreholes, etc.) and worker breathing zones for volatile and detectable site contaminants. Most of the VOCs associated with the anticipated primary contaminants of concern are readily detected by both photo ionization (PID) and flame ionization detectors (FID). Some possible contaminants of concern (metals including lead and arsenic; SVOCs; PAHs; PCBs; and pesticides) are not volatile and are unable to be detected with these traditional field instruments. The presence of elevated airborne concentrations of volatile organic compounds in worker breathing zones will suggest a potential exposure threat to site personnel which will require site activities to be suspended until readings return to background levels. Exposure to silica (a constituent of concrete) and to secondary contaminants of concern including metals such as lead and arsenic is most likely to occur as a result of inhalation of airborne dusts containing these contaminants or incidental ingestion as a result of hand to mouth activities. The use of personal protective equipment and the observance of the other control requirements presented in this HASP have been selected to minimize potential for personnel exposures to hazardous concentrations (known or unknown) of site contaminants. Additionally, the Health and Safety Guidance Manual, Section 1.0, 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 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 Flame Ionization Detector

A Flame Ionization Detector (FID) will be used to screen source areas (sampling locations, monitoring wells, etc.) to detect the presence of any VOCs. This instrument will also be used to monitor the breathing zones of employees during site activities in the event that elevated readings are present at a source area. The FID has been selected because it is capable of detecting a large array of volatile organic compounds and it is more suitable of potentially humid environments typically associated with Florida.

Prior to the commencement of 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 (i.e., weather, temperature, humidity) 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 Frequency

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

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager. Operational checks and field calibration will be performed on each instrument every day prior to use. Field calibration will be performed on instruments according to manufacturer's recommendations (field calibrated daily). In the event that repeated elevated instrument readings are noted, the FID will require periodic checks using the calibration gas to any significant instrument drift. If necessary, the FID will be re-calibrated if instrument drift is noted. 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 standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site 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

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 specifies health and safety training and medical surveillance requirements for both TtNUS and subcontractor personnel participating in on site activities.

8.1.1 Training Requirements For TtNUS and Subcontractor Personnel

TtNUS and subcontractor personnel who will engage in field associated activities as described in this HASP must have:

- Completed 40 hours of introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e).
- Completed 8-Hour Refresher Training, if the identified persons had introductory training more than 12 months prior to site work.
- Completed 8-hour Supervisory training in accordance with 29 CFR 1910.120(e)(4), if their assigned function will involve the supervision of subordinate personnel.

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

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to TtNUS employees and subcontractor personnel who will perform work on this project.

Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities.

TtNUS will conduct a pre-activities training session prior to initiating site work. Additionally, a brief meeting will be held daily to discuss operations planned for that day. At the end of the workday, a short meeting may be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 10.2).

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS and Subcontractor Personnel

TtNUS and subcontractor personnel participating in project field activities will have had a physical examination. Physical examinations shall meet the minimum requirements of paragraph (f) of OSHA 29 CFR 1910.120. The physical examinations will be performed to ensure that personnel are medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained at the job site and made available, as necessary. Subcontractor personnel may use an alternative documentation for this purpose. The "Subcontractor Medical Approval Form" can be used to satisfy this requirement, or a letter from an officer of the company. The letter should state that the persons listed in the letter 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." The letter should further state the following:

- The persons listed have had physical examinations under this program within the frequency as determined sufficient by their occupational health care provider
- Date of the exam
- The persons identified have been cleared, by a licensed physician, to perform hazardous waste site work and to wear positive- and negative- pressure respiratory protection.

A sample Subcontractor Medical Approval Form and form letter have been provided to eligible subcontractors in the Bid Specification package.

8.3.2 Medical Data Sheet

Each field team member, including subcontractors and visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet that is available in Attachment V of this HASP. 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 EXCEPTION

If through the execution of their contract elements the subcontractor will not enter the exclusion zone and there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from the training and medical surveillance requirements with the exception of Section 8.2. Examples of

subcontractors who may qualify as exempt from training and medical surveillance requirements may include surveyors who perform surveying activities in site perimeter areas or areas were there is no potential for exposure to site contaminants and support or restoration services. Use of this Subcontractor Exception is strictly limited to the authority of the CLEAN Health and Safety Manager.

FIGURE 8-1

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing field investigation activities at OLF Saufley, NAS Pensacola, Pensacola, Florida and that I have received site-specific training that 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

My signature below indicates that I have been given the opportunity to ask questions, that 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

9.0 SPILL PREVENTION AND CONTAINMENT PROGRAM

9.1 SCOPE AND APPLICATION

This program applies to the single or aggregate accumulation of bulk storage materials (over 55-gallons). As the classification of certain materials such as IDW is unknown, these materials will be treated as hazardous, pending laboratory certification to the contrary. The types of materials for which this program will apply are as follows:

- Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters
- Resource Storage – Limited fuel and lubricant storage

The spill containment and control will be engaged any time there is a release of the above-identified materials from a containment system or vessel. This spill containment program will be engaged in order to minimize associated hazards.

9.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, limited areas are vulnerable to this hazard including:

- Resource deployment
- Waste transfer
- Central staging

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.

9.3 CONTAINMENT AREAS

In order to facilitate leak and spill inspection and response, and to minimize potential hazards which may impact the integrity of the storage containers, the staging area for these substances will be structured as follows:

9.3.1 IDW

- 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 4-feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management. It is currently planned only to drum soils and purge/development/decontamination generated wash waters.

The staging area will be identified as a Satellite Storage Area with proper signage, points of contact in the event of an emergency, alternate contacts, and identification of stored material (i.e., Purge or decontamination waters, soil cuttings, etc.).

An Inventory Log will be maintained by the FOL regarding types of IDW and volumes generated. An updated Inventory List will be provided by the FOL to the designated Emergency Response Agency or Facility Contact during days off and between shifts or phases of operations.

9.3.2 Flammable/POL Storage

Flammable Storage [i.e., fuels, decontamination solvents (Isopropanol)] and Petroleum/oil/lubricants (POL) will require proper dispensing containers and necessary storage for cumulative volumes in excess of 25 gallons. Storage and dispensing will comply with the following requirements:

- Fuels dispensed from portable containers, will utilize safety cans.
- Portable hand held storage containers will be labeled per Hazard Communication requirements.
- Larger volumes stored for fueling equipment will be stored in approved mobile Above Ground Storage Tanks with secondary containment capable of holding the tank volume plus 10%.
- Portable flammable liquid storage tanks will be properly grounded and will have bonding capabilities for the transfer of loading and off-loading of its contents.
- Dispensing locations will be supported by a Fire Extinguisher positioned no closer than 50 feet from the storage tank, properly mounted and identified.
- The storage location will be well marked with proper signage, protective bumper poles and will have straight through access/egress for vehicles.

9.4 MATERIALS HANDLING

To minimize the hazards associated with moving drums and containers (i.e., lifting, pinch and compression points) material handling will be supported in the following manner:

- A drum cart with pneumatic tires will be required, if drums are to be moved at the IDW storage area. This cart will be used to relocate drums within the staging and satellite storage location.

- In addition, a mechanized means such as a suitably equipped skid loader or back-hoe will be provided to move IDW containers from the field location to the staging and satellite storage location. This piece of equipment will also be used in site clearance and restoration as deemed appropriate and necessary.

Other means of material handling will be evaluated by the SSO based on their ability to minimize or eliminate material handling hazards.

9.5 LEAK AND SPILL DETECTION

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 FOL will be notified and the Spill Containment/Control Response Plan as specified in Section 9.8 will be engaged. Inspections will be documented in the project logbook.

9.6 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/or the SSO will serve as the Spill Response Coordinators for this operation, should the need arise. The FOL shall identify two members (at least two) of the project team as the Incidental Spill Response Team. Should an incidental spill occur these individuals will engage incident response measures. It shall be the responsibility of these individuals to insure they have the supplies and equipment specified in Section 9.7 to support this function. Insufficient supplies or resources should be reported to the FOL.

9.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that will always be maintained at the staging areas the purpose of supporting this Spill Containment/Control Plan.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Extra Drums (55-gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Pumps (Gas or Electric necessary for transferring liquids from leaking containers)/tubing
- Shovels, rakes, and brooms

- Container labels
- Personal Protective Equipment
  - Nitrile outer gloves
  - Splash Shield
  - Impermeable over-boots
  - Rain suit

9.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

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

- Notify the SSO or FOL immediately upon detection of a leak or spill.

- Employ the personal protective equipment stored at the staging area. Initiate incidental spill response measures. 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 2-inch of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options.

- If the spill cannot be controlled or contained, initiate emergency alerting procedures for that area to remove non-essential personnel.

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 specified in Section 2.0 of this HASP.

10.0 SITE OPERATIONS AND CONTROL

Site operations and control will be facilitated through the use of established work zones and security and control of those zones. These activities will minimize the impact and spread of contaminants brought to the surface through subsurface investigative methods as well as protect personnel and visitors within these zones during ongoing operations.

10.1 WORK ZONES

TtNUS will delineate and use work zones in conjunction with decontamination procedures to prevent the spread of contaminants to other areas of the site. A three-zone approach will be used for work at this site; an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. These will be used to control access to the work areas, restricting the general public, avoiding potentials to spread any contaminants, and to protect individuals who are not cleared to enter by way of training and/or medical surveillance qualifications.

10.1.1 Exclusion Zone

An Exclusion Zone will be established at each sampling point/location. The purpose of the exclusion zone is to define a area where a more rigorous protocol for workers within what is determined to be an impact area. The impact area is that area which could be adversely impacted by either chemical or physical hazards. Exclusion zone size and dimensions will vary based on activities. Impact areas dimensions will be influenced by the following considerations:

- Physical and topographical features of the site
- Weather conditions
- Field and analytical measurements of air and environmental contaminants
- Air dispersion calculations
- Potential for explosion and dispersion
- Physical, chemical and toxicological properties of the contaminants being investigated
- Tasks to be conducted
- Decontamination procedures
- Potential for exposure

As conditions change the dimensions of the exclusion zone will change. However, the following dimensions represent a starting point from which the exclusion zones will be expanded:

- DPT - Soil Boring. The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, with a minimum of 25-feet. This distance will also apply when surface and subsurface soil sampling from behind these type rigs.

- Groundwater sampling, monitoring well development and purging. The exclusion zone for this activity will be set at 10-feet surrounding the well head and discharge collection container or if conducted as part of the DPT operation, 25 feet surrounding the rig.

- Decontamination operation. The exclusion zone for this activity will be set at 25 feet surrounding the gross contamination wash and rinse as well as 25-feet surrounding the heavy equipment decontamination area.

- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

Exclusion zones shall remain marked until the SSO has evaluated the restoration effort and has authorized changing the zone status.

Exclusion zones will be marked using barrier tape, traffic cones and/or drive poles. Signs will be posted to inform and direct site personnel and site visitors.

10.1.2 Contamination Reduction Zone

The contamination reduction zone will be split to represent two separate functions. The first function will be a control/supply point for supporting exclusion zone activities. The second function, which may take place a sufficient distance from the exclusion zone is the decontamination of personnel and heavy equipment.

In order to move from the exclusion zone to a separate location the following activities will be used:

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be washed of gross contamination, removed, separated, and bagged. Personnel will use hygienic wipes, such as Handy Wipes, as necessary for personnel decontamination until they can

access the centralized decontamination unit. At the first available opportunity personnel will wash their face and hands. This is critical prior to breaks and lunch when contamination can be transferred to the mouth through hand to mouth contact.

- Muddy over-boots and gloves may be required to go through a gross contamination wash at the exclusion zone. These items will then be cleaned thoroughly at the centralized decontamination unit.

- Potentially contaminated tooling along with PPE will be wrapped, when necessary, for transport to the decontamination area. These items will be disposed of as general refuse.

- Upon completion of the assigned tasks the personnel will move through the central decontamination area to clean reusable PPE and field equipment. Based on ambient conditions medical evaluations may take place at the termination point of the decontamination line. These evaluations will include pulse rate, oral temperature, and breathing rate to evaluate physiological demands on site personnel. As stated earlier, these evaluations will be based on ambient conditions and acclimation periods.

10.1.3 Support Zone

The Support Zone will consist of a field trailer, storage, lay-down areas, or some other uncontaminated, controlled point. The Support Zone for this project will include a staging area where site vehicles can be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established in clean areas of the site.

10.2 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 is included in Figure 10-1. The daily meetings conducted by the FOL/SSO will further support these work permits. The use of these permits will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Safe Work Permits will require the signatures of either the FOL or the SSO. Personnel engaged in on-site activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

The use of these permits will establish and provide 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 Safe Work Permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

Upon completion of the work for which the Safe Work Permit was assigned, the Safe Work Permit will be turned into the FOL or the SSO. Concerns, complaints, and suggestions may be made on the reverse of the Safe Work Permit for consideration by the FOL and/or the SSO. Permits turned in with suggestions, difficulties, or complaints will be forwarded to the PHSO for review.

The Safe Work Permit and the HASP will serve as the primary reference for work place evaluations and audits conducted to determine if the task is being conducted under the direction conveyed by the HASP and the Safe Work Permit.

10.3 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. This map will be posted to illustrate up-to-date information of contaminants and adjustment of zones and access points. This map will be posted at the field support trailer.

10.4 BUDDY SYSTEM

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

FIGURE 10-1
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: _____

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

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SSO: 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 – Work)	☐ 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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

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

Permit Issued by: _____ Permit Accepted by: _____

10.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS personnel will provide MSDSs for 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 or the substances on-site. The MSDSs will be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SSO will be responsible for implementing a site-specific Hazard Communication Program (See Section 5.0 of the TtNUS Health and Safety Guidance Manual). This includes collection of MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, addressing container labeling and personnel training issues, and other aspects of Hazard Communication.

10.6 COMMUNICATION

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized. Two-way radio communication devices, if needed, will be used only with NAS Pensacola approval.

External communications will be accomplished utilizing telephones at predetermined and approved locations or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the FOL will determine and arrange for telephone communications, if it is determined a cellular means will not be used. Cellular communications will be tested to ensure adequate coverage from the areas of operation. If not provisions for external communication will be made prior to the commencement of site activities.

10.7 SITE VISITORS

Potential site visitors that may be encountered during the performance of the field work could include the following:

- Personnel invited to observe or participate in operations by TtNUS.
- Regulatory personnel (i.e., DOD, FDEP, EPA, OSHA, etc.)
- Southern Division Navy personnel
- Other authorized visitors

Non-DOD personnel working on this project are required to gain initial access to the base by coordinating with the TtNUS TOM or designee and following established base access procedures.

Once access to the base is obtained, personnel who require access to TtNUS work sites (areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon gaining access to the work site, site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated below.

- Site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individuals name (proper identification required), who they represent, and the purpose for the visit. The FOL is responsible for ensuring that site visitors are always escorted while on site.

- Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Southern Division Navy Personnel), and medical surveillance as stipulated in Section 8.3, of this document. In addition, to enter the sites 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 HASP.

Once the site visitors have completed the above items they 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 work areas visited. Any 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 on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support form the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

10.8 SITE SECURITY

As this activity will take place at a Navy facility, the first line of security will be provided by the base gate restricting the general public. The second line of security will take place at the work site referring interested parties to the FOL and Base Contact.

Security at the work areas will be accomplished using field personnel. This is a multiple person operation, involving multiple operational zones. TtNUS personnel will retain complete control over active operational zones.

The Base Contact will serve as the focal point for base personnel and interested parties and will serve as the primary enforcement contact.

11.0 CONFINED SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, 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 which has 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, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is one that:

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

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed, and the HSM will have to be notified.

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
- Material Safety Data Sheets for chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailers)
- Training/Medical Surveillance Documentation Form (Blank)
- 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 these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

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

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 used 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.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The lists 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) (posted) - This list of numbers and directions will be maintained at the phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site 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.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring (maintained) - The results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using Department of Transportation (DOT) placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose of maintaining or posting this information, as stated above, is to allow site personnel quick access. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
ASTs	Aboveground Storage Tanks
Avgas	Aviation gas
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
CTO	Contract Task Order
DPT	Direct-Push Technology
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDW	Investigation-derived Waste
IR	Installation Restoration
MSDS	Material Safety Data Sheet
N/A	Not Available
NAAS	Naval Auxiliary Air Station
NAS	Naval Air Station
NETPMSA	Naval Education and Training Program Management Support Activity
NIOSH	National Institute Occupational Safety and Health
OLF	Outlying Landing Field
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAH	Poly Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SVOCs	Semivolatile Organic Compounds
TOM	Task Order Manager
TtNUS	Tetra Tech NUS, Inc.
TWA	Time Weighted Average

UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

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: _____

Home address: _____

_____

Home telephone number: _____

Occupation (regular job title): _____

Department: _____

Office: _____

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

Marital status: _____

Date of birth: _____

Social security number: _____

Date of Accident: _____

Time Employee Began Work: _____

Time of Accident: _____ a.m. ☐ p.m. ☐

☐ 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

STANDARD OPERATING PROCEDURE FOR UTILITY LOCATING AND EXCAVATION CLEARANCE

TABLE OF CONTENTS

SECTION **PAGE**

1.0 PURPOSE 2

2.0 SCOPE 2

3.0 GLOSSARY 2

4.0 RESPONSIBILITIES 3

5.0 PROCEDURES 3

5.1 BURIED UTILITIES 3
5.2 OVERHEAD POWER LINES 5

6.0 UNDERGROUND LOCATING TECHNIQUES 5

6.1 GEOPHYSICAL METHODS 5
6.2 PASSIVE DETECTION SURVEYS 6
6.3 INTRUSIVE DETECTION SURVEYS 6

7.0 INTRUSIVE ACTIVITIES SUMMARY 7

8.0 REFERENCES 8

ATTACHMENTS

1 Listing of Underground Utility Clearance Resources 9
2 Frost Line Penetration Depths by Geographic Location 11
3 Utility Clearance Form 12
4 OSHA Letter of Interpretation 13

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

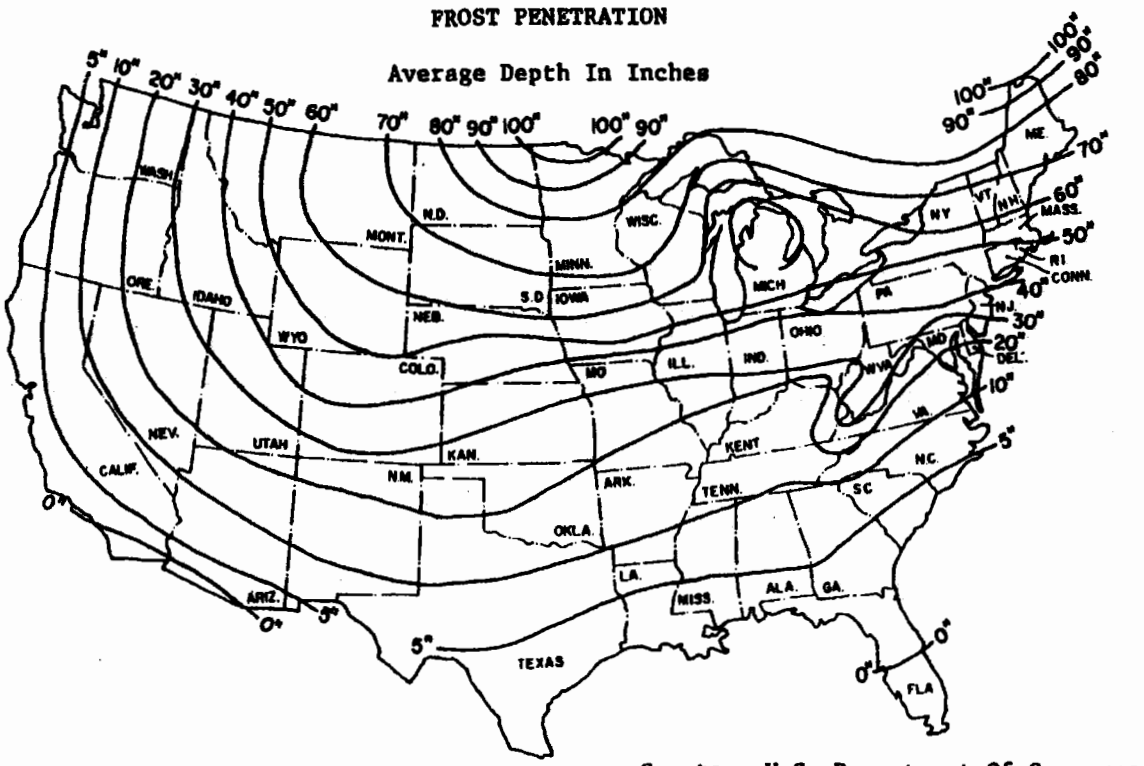
British Columbia
BC One Call
1-800-474-6886

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: _____

1. Underground Utilities — Circle One

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

2. Overhead Utilities — Present Absent

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 band-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 III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

COMPANY:_____ **UNIT NO.**_____

FREQUENCY: Inspect daily, document prior to use and as repairs are needed.

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

	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	❒	❒	❒
Accessways: 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?_____	❒	❒
– Emergency shut offs switches have been identified and communicated to the field crew?_____	❒	❒
– Have emergency shutoff switches 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 manufacturer's recommendation? ❒ ❒

Cleanliness:

- Overall condition (is 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 heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)?_____
- Does the operator, understand the equipments 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:_____

Approved for Use: ❒ Yes ❒ No_____

Site Safety Officer Signature

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT
MOBILIZATION AND DEMOBILIZATION
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA,
PENSACOLA, FLORIDA

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

I. **Work limited to the following (description, area, equipment used):** Mobilization / Demobilization activities.

II. **Primary Hazards:** Potential hazards associated with this task: lifting; pinches and compressions; slip, trip and falls; vehicular and foot traffic; ambient temperature extremes; insect and animal bites, and inclement weather

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**
None expected during this task

Primary Route(s) of Exposure/Hazard: NA

(Note to FOL and/or SSO: 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 – Work)	☐ 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: Various tasks performed as part of mobilization/demobilization require additional PPE. Tasks and site conditions will determine the need for additional PPE (hard hats, safety glasses, protective gloves, hearing protection, reflective vests, etc.).

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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting/carrying techniques. Use additional PPE based on the hazards that are associated with each task. Use work gloves when cutting boxes or handling sharp tools/cutting devices. Safety glasses will be required whenever eye hazards are present. Reflective vests will be used when working near roadways or areas of operating vehicles/equipment. Identify/remove potential physical hazards and mark areas or hazards that cannot be removed. Keep work area free of ground clutter.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
DPT SOIL BORING AND GROUNDWATER SAMPLING USING DPT
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA,
PENSACOLA, FLORIDA

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

I. **Work limited to the following (description, area, equipment used):** Soil boring and groundwater sampling using DPT.

II. **Primary Hazards:** Potential hazards associated with this task: contact with site contaminants; transfer of contamination; heavy equipment hazards; elevated noise; energized systems/utilities; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather

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
Metals (Lead & Arsenic)	Visual observation of airborne dusts in work areas.	If visible dusts are present use area wetting methods / dust suppression	Evacuate area until no visible dusts exist
VOCs	FID	Any elevated reading above background	Evacuate area - contact the PHSO

Primary Route(s) of Exposure/Hazard: Inhalation of airborne VOCs is most likely route or exposure. Incidental ingestion and contact with contaminants will be prevented through the use of PPE and safe work practices. Airborne dusts are unlikely to be generated during this activity, if present control through area wetting methods

(Note to FOL and/or SSO: 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/work)	☒ 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: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.)

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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Conservative action levels have been established due to the absence of any analytical data regarding site contaminants at Sites 4 & 5. Based on historical information, primary contaminants of concern are anticipated to be petroleum related hydrocarbons and solvents including toluene, carbon tetrachloride, and trichloroethane. Any sustained readings in workers breathing zones will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
HAND AUGERING AND ASSOCIATED SOIL SAMPLING
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA,
PENSACOLA, FLORIDA

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

I. **Work limited to the following (description, area, equipment used):** Hand augering and associated soil sampling including IDW management, moving and storage.

II. **Primary Hazards:** Potential hazards associated with this task: contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

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
Metals (Lead & Arsenic)	Visual observation of airborne dusts in work areas.	If visible dusts are present use area wetting methods / dust suppression	Evacuate area until no visible dusts exist
VOCs	FID	Any elevated reading above background	Evacuate area - contact the PHSO

Primary Route(s) of Exposure/Hazard: Contact and incidental ingestions as a result of hand to mouth activities.

(Note to FOL and/or SSO: 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)	☒ 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/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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Conservative action levels have been established due to the absence of any analytical data regarding site contaminants at Sites 4 & 5. Based on historical information, primary contaminants of concern are anticipated to be petroleum related hydrocarbons and solvents including toluene, carbon tetrachloride, and trichloroethane. Any sustained readings in workers breathing zones will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. Inspect drums used to store IDW prior to use. Cover IDW containers to prevent unauthorized entry and infiltration of precipitation.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
DECONTAMINATION
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA,
PENSACOLA, FLORIDA

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: contact with site contaminants; transfer of contamination; heavy equipment hazards; elevated noise; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather

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
Metals (Lead & Arsenic)	Visual observation of airborne dusts in work areas.	If visible dusts are present use area wetting methods / dust suppression	Evacuate area until no visible dusts exist
VOCs	FID	Any elevated reading above background	Evacuate area - contact the PHSO

Primary Route(s) of Exposure/Hazard: absorption

(Note to FOL and/or SSO: 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)	☒ 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/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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Review and follow the instructions on the MSDS for the decontamination fluids. Follow guidance in Table 5-1 for PPE for different decontamination tasks.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
GEOGRAPHIC LAND SURVEYING
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

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

I. **Work limited to the following (description, area, equipment used):** Surveying activities including the use of GPS units.

II. **Primary Hazards:** Potential hazards associated with this task: slip, trip and fall; vehicular and foot traffic; temperature extremes; inclement weather; insect /animal bites or stings, poisonous plants, etc.

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 expected during this task

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SSO: 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 – Work)	☐ 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: Snake chaps in high brush areas

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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

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

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
CONCRETE CORING AT SITE 4
SITES 4 & 5, OLF SAUFLEY - NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

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

I. **Work limited to the following (description, area, equipment used):** Concrete coring at Site 4

II. **Primary Hazards:** Potential hazards associated with this task: heavy lifting; heavy dusts, pinch and compressions; cut hazards, flying projectiles, noise; slip, trip and fall, temperature extremes, and inclement weather

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
Nuisance dusts/silica	Avoid contact and visible dusts	Use area wetting methods	Revise HASP to include particulate monitoring

Primary Route(s) of Exposure/Hazard: inhalation of dusts, incidental ingestion, and contact.

(Note to FOL and/or SSO: 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 – Work/nitrile)	☒ 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, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Inspect equipment before using. Ensure all manufacturer guards are in place and that equipment is used in accordance with manufacturer specifications. Work from an upwind location to prevent exposure to airborne dusts. Use area wetting methods to reduce airborne dusts – if unable to control contact the HSM/PHSO for guidance. Use proper lifting practices and obtain assistance when handling heavy drums. Use equipment whenever possible to move heavy items.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V

MEDICAL DATA SHEET

MEDICAL DATA SHEET

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

Project **NAS – Pensacola – Sites 4 & 5 OLF - Saufley** _____

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

APPENDIX B

FIELD FORMS

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: _____ BORING No.: _____
PROJECT NUMBER: _____ DATE: _____
DRILLING COMPANY: _____ GEOLOGIST: _____
DRILLING RIG: _____ DRILLER: _____

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**

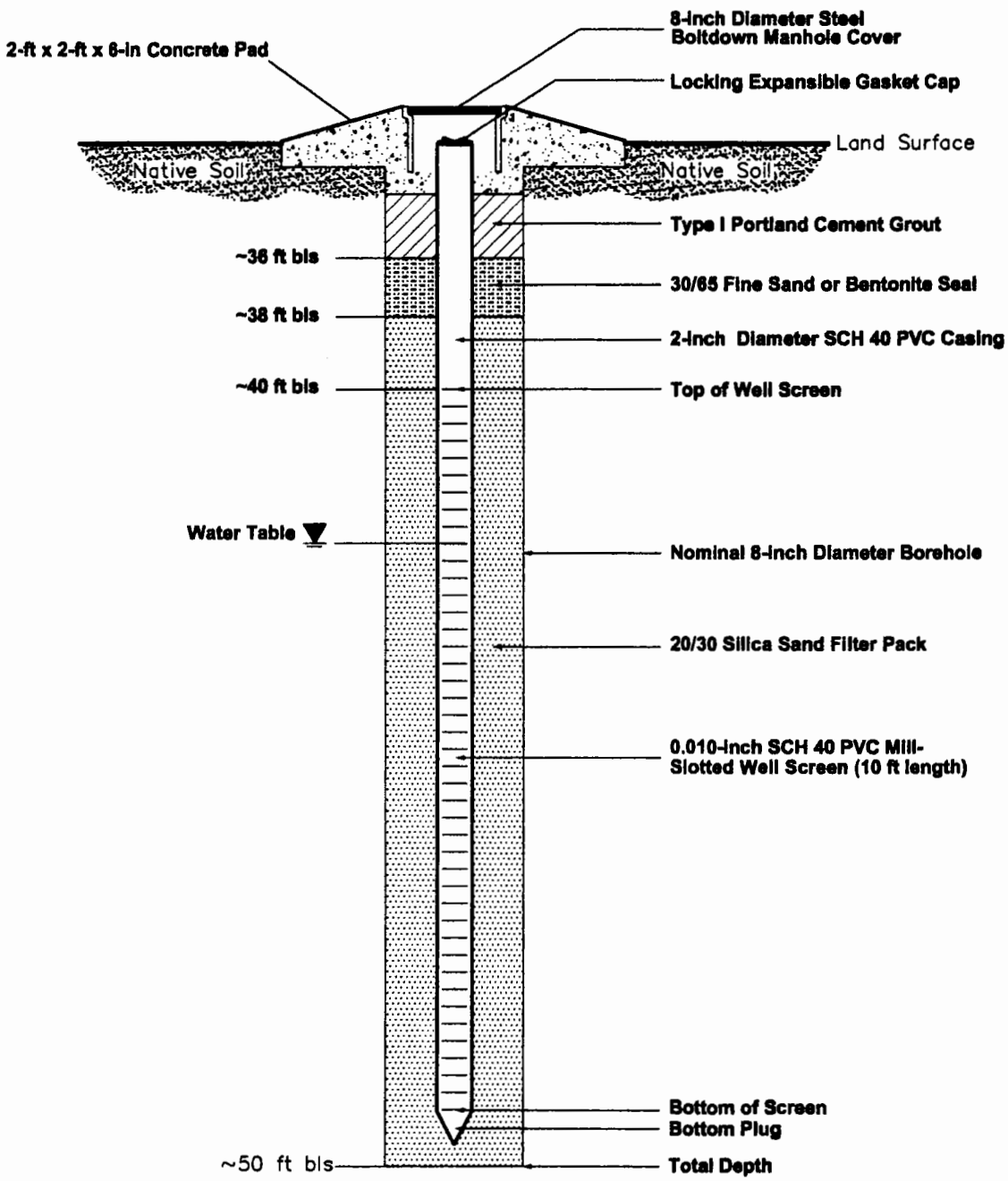
* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: _____

Converted to Well: Yes _____ No _____ Well I.D. #: _____



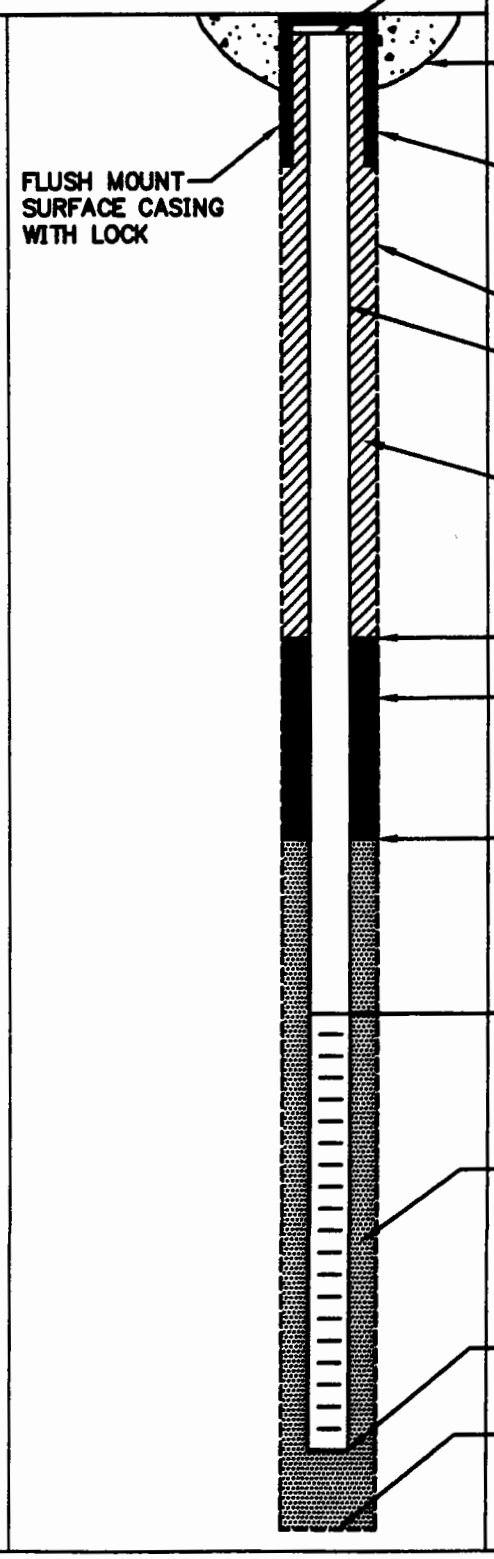
DRAWN BY LLK DATE 7/13/05	NAVFAC	TYPICAL MONITORING WELL DESIGN OLF SAUFLEY FIELD PENSACOLA, FLORIDA	CONTRACT NO. 00036
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE NOT TO SCALE			DRAWING NO. REV. 0

WELL NO.: _____

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT _____	LOCATION _____	DRILLER _____
PROJECT NO. _____	BORING _____	DRILLING METHOD _____
DATE BEGUN _____	DATE COMPLETED _____	
FIELD GEOLOGIST _____		DEVELOPMENT METHOD _____
GROUND ELEVATION _____	DATUM _____	



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: _____

TYPE OF PROTECTIVE CASING: _____

I.D. OF PROTECTIVE CASING: _____

DIAMETER OF HOLE: _____

TYPE OF RISER PIPE: _____

RISER PIPE I.D.: _____

TYPE OF BACKFILL/SEAL: _____

ELEVATION/DEPTH TOP OF SEAL: ____/____

TYPE OF SEAL: _____

ELEVATION/DEPTH TOP OF SAND: ____/____

ELEVATION/DEPTH TOP OF SCREEN: ____/____

TYPE OF SCREEN: _____

SLOT SIZE x LENGTH: _____

TYPE OF SAND PACK: _____

DIAMETER OF HOLE IN BEDROCK: _____

ELEVATION / DEPTH BOTTOM OF SCREEN: ____/____

ELEVATION / DEPTH BOTTOM OF SAND: ____/____

ELEVATION/DEPTH BOTTOM OF HOLE: ____/____

BACKFILL MATERIAL BELOW SAND: _____

ACAD:FORM_MWFM.dwg 07/28/99 INL

Tetra Tech NUS / FDEP Groundwater Sampling Sheet

SITE NAME:	SITE LOCATION:

WELL NO:	SAMPLE ID:	DATE:

PURGING DATA

WELL DIAMETER (inches):	TUBING DIAMETER (inches):	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
only fill out if applicable)
_____Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
_____Liters

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (Liters):

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (lpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm or µS/cm)	DISSOLVED OXYGEN (circle mg/L or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE: Teflon	
FIELD DECONTAMINATION: Y N	FIELD-FILTERED: Y N FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y N	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		
PP	3	CG	40 ml	HCL	NONE	<2	8260B	SM

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME: _____ **PROJECT NUMBER:** _____

CLIENT: _____ **LOCATION:** _____

DATE: _____ **ARRIVAL TIME:** _____

Tt NUS PERSONNEL: _____ **DEPARTURE TIME:** _____

CONTRACTOR: _____ **DRILLER:** _____

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE

COMMENTS: _____

_____

_____

_____

APPROVED BY:

_____ _____

Tt NUS REPRESENTATIVE DRILLER

DATE: _____

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : _____ INSTRUMENT NAME/MODEL: _____

SITE NAME: _____ MANUFACTURER: _____

PROJECT No.: _____ SERIAL NUMBER: _____

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

APPENDIX C

STANDARD OPERATING PROCEDURE
SOP SA-7.1
DECONTAMINATION OF FIELD EQUIPMENT

TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number SA-7.1	Page 1 of 8
		Effective Date 09/03	Revision 3
		Applicability Tetra Tech NUS, Inc.	
		Prepared Earth Sciences Department	
Subject DECONTAMINATION OF FIELD EQUIPMENT		Approved D. Senovich	

TABLE OF CONTENTS

SECTION		PAGE
1.0	PURPOSE	2
2.0	SCOPE	2
3.0	GLOSSARY	2
4.0	RESPONSIBILITIES	3
5.0	PROCEDURES	3
5.1	DECONTAMINATION DESIGN/CONSTRUCTIONS CONSIDERATIONS	3
5.1.1	Temporary Decontamination Pads	3
5.1.2	Decontamination Activities at Drill Rigs/DPT Units	4
5.1.3	Decontamination Activities at Remote Sample Locations	5
5.2	EQUIPMENT DECONTAMINATION PROCEDURES	5
5.2.1	Monitoring Well Sampling Equipment	5
5.2.2	Down-Hole Drilling Equipment	6
5.2.3	Soil/Sediment Sampling Equipment	6
5.3	CONTACT WASTE/MATERIALS	7
5.3.1	Decontamination Solutions	7
5.4	DECONTAMINATION EVALUATION	7

1.0 PURPOSE

Decontamination is the process of removing and/or neutralizing site contaminants that have contacted and/or accumulated on equipment. The objective/purpose of this SOP is intended to protect site personnel, general public, and the sample integrity through the prevention of cross contamination onto unaffected persons or areas. It is further intended through this procedure to provide guidelines regarding the appropriate procedures to be followed when decontaminating drilling equipment, monitoring well materials, chemical sampling equipment and field analytical equipment.

2.0 SCOPE

This procedure applies to all equipment including drilling equipment, heavy equipment, monitoring well materials, as well as chemical sampling and field analytical equipment decontamination that may be used to provide access/acquire environmental samples. Where technologically and economically feasible, single use sealed disposable equipment will be employed to minimize the potential for cross contamination. This procedure also provides general reference information on the control of contaminated materials.

3.0 GLOSSARY

Acid - For decontamination of equipment when sampling for trace levels of inorganics, a 10% solution of nitric acid in deionized water should be used. Due to the leaching ability of nitric acid, it should not be used on stainless steel.

Alconox/Liquinox - A brand of phosphate-free laboratory-grade detergent.

Decontamination Solution - Is a solution selected/identified within the Health and Safety Plan or Project-Specific Quality Assurance Plan. The solution is selected and employed as directed by the project chemist/health and safety professional.

Deionized Water (DI) - Deionized water is tap water that has been treated by passing through a standard deionizing resin column. This water may also pass through additional filtering media to attain various levels of analyte-free status. The DI water should meet CAP and NCCLS specifications for reagent grade, Type I water.

Potable Water - Tap water used from any municipal water treatment system. Use of an untreated potable water supply is not an acceptable substitute for tap water.

Pressure Washing - Employs high pressure pumps and nozzle configuration to create a high pressure spray of potable water. High pressure spray is employed to remove solids.

Solvent - The solvent of choice is pesticide-grade Isopropanol. Use of other solvents (methanol, acetone, pesticide-grade hexane, or petroleum ether) may be required for particular projects or for a particular purpose (e.g. for the removal of concentrated waste) and must be justified in the project planning documents. As an example, it may be necessary to use hexane when analyzing for trace levels of pesticides, PCBs, or fuels. In addition, because many of these solvents are not miscible in water, the equipment should be air dried prior to use. Solvents should not be used on PVC equipment or well construction materials.

Steam Pressure Washing - This method employs a high pressure spray of heated potable water. This method through the application of heat provides for the removal of various organic/inorganic compounds.

4.0 RESPONSIBILITIES

Project Manager - Responsible for ensuring that all field activities are conducted in accordance with approved project plan(s) requirements.

Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved Standards Operating Procedures or as otherwise dictated by the approved project plan(s).

Site Health and Safety Officer (SHSO) - The SHSO exercises shared responsibility with the FOL concerning decontamination effectiveness. All equipment arriving on-site (as part of the equipment inspection), leaving the site, moving between locations are required to go through a decontamination evaluation. This is accomplished through visual examination and/or instrument screening to determine the effectiveness of the decontamination process. Failure to meet these objectives are sufficient to restrict equipment from entering the site/exiting the site/ or moving to a new location on the site until the objectives are successfully completed.

5.0 PROCEDURES

The process of decontamination is accomplished through the removal of contaminants, neutralization of contaminants, or the isolation of contaminants. In order to accomplish this activity a level of preparation is required. This includes site preparation, equipment selection, and evaluation of the process. Site contaminant types, concentrations, media types, are primary drivers in the selection of the types of decontamination as well as where it will be conducted. For purposes of this SOP discussion will be provided concerning general environmental investigation procedures.

The decontamination processes are typically employed at:

- Temporary Decontamination Pads/Facilities
- Sample Locations
- Centralized Decontamination Pad/Facilities
- Combination of some or all of the above

The following discussion represents recommended site preparation in support of the decontamination process.

5.1 Decontamination Design/Constructions Considerations

5.1.1 Temporary Decontamination Pads

Temporary decontamination pads are constructed at satellite locations in support of temporary work sites. These structures are generally constructed to support the decontamination of heavy equipment such as drill rigs and earth moving equipment but can be employed for smaller articles.

The purpose of the decontamination pad is to contain wash waters and potentially contaminated soils generated during decontamination procedures. Therefore, construction of these pads should take into account the following considerations

- Site Location – The site selected should be within a reasonable distance from the work site but should avoid:

  - Pedestrian/Vehicle thoroughfares
  - Areas where control/custody cannot be maintained
  - Areas where a potential releases may be compounded through access to storm water transport systems, streams or other potentially sensitive areas.
  - Areas potentially contaminated.

- Pad – The pad should be constructed to provide the following characteristics

  - Size – The size of the pad should be sufficient to accept the equipment to be decontaminated as well as permitting free movement around the equipment by the personnel conducting the decontamination.

  - Slope – An adequate slope will be constructed to permit the collection of the water and potentially contaminated soils within a trough or sump constructed at one end. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks.

  - Sidewalls – The sidewalls should be a minimum of 6-inches in height to provide adequate containment for wash waters and soils. If splash represents a potential problem, splash guards should be constructed to control overspray. Sidewalls maybe constructed of wood, inflatables, sand bags, etc. to permit containment.

  - Liner – Depending on the types of equipment and the decontamination method the liner should be of sufficient thickness to provide a puncture resistant barrier between the decontamination operation and the unprotected environment. Care should be taken to examine the surface area prior to placing the liner to remove sharp articles (sticks, stones, debris) that could puncture the liner. Liners are intended to form an impermeable barrier. The thickness may vary from a minimum recommended thickness of 10 mil to 30 mil. Achieving the desired thickness maybe achieved through layering lighter constructed materials. It should be noted that various materials (rubber, polyethylene sheeting) become slippery when wet. To minimize this potential hazard associated with a sloped liner a light coating of sand maybe applied to provide traction as necessary.

  - Wash/drying Racks – Auger flights, drill/drive rods require racks positioned off of the ground to permit these articles to be washed, drained, and dried while secured from falling during this process. A minimum ground clearance of 2-feet is recommended.

  - Maintenance – The work area should be periodically cleared of standing water, soils, and debris. This action will aid in eliminating slip, trip, and fall hazards. In addition, these articles will reduce potential backsplash and cross contamination. Hoses should be gathered when not in use to eliminate potential tripping hazards.

5.1.2 Decontamination Activities at Drill Rigs/DPT Units

During subsurface sampling activities including drilling and direct push activities decontamination of drive rods, Macro Core Samplers, split spoons, etc. are typically conducted at an area adjacent to the operation. Decontamination is generally accomplished using a soap/water wash and rinse utilizing buckets and brushes. This area requires sufficient preparation to accomplish the decontamination objectives.

Buckets shall be placed within mortar tubs or similar secondary containment tubs to prevent splash and spills from reaching unprotected media. Drying racks will be employed as directed for temporary pads to permit parts to dry and be evaluated prior to use/re-use.

5.1.3 Decontamination Activities at Remote Sample Locations

When sampling at remote locations sampling devices such as trowels, pumps/tubing should be evacuated of potentially contaminated media to the extent possible. This equipment should be wrapped in plastic for transport to the temporary/centralized decontamination location for final cleaning and disposition.

5.2 Equipment Decontamination Procedures

The following represents procedures to be employed for the decontamination of equipment that may have contacted and/or accumulated contamination through site investigation activities.

5.2.1 Monitoring Well Sampling Equipment

5.2.1.1 Groundwater sampling pumps – This includes pumps inserted into the monitoring well such as Bladder pumps, Whale pumps, Redi-Flo, reusable bailers, etc.

1) Evacuate to the extent possible, any purge water within the pump.

2) Scrub using soap and water and/or steam clean the outside of the pump and tubing, where applicable.

3) Insert the pump and tubing into a clean container of soapy water. Pump a sufficient amount of soapy water through the pump to flush any residual purge water. Once flushed, circulate soapy water through the pump to ensure the internal components are thoroughly flushed.

4) Remove the pump and tubing from the container, rinse external components using tap water. Insert the pump and tubing into a clean container of tap water. Pump a sufficient amount of tap water through the pump to evacuate all of the soapy water (until clear).

5) Rinse equipment with pesticide grade isopropanol

6) Repeat item #4 using deionized water through the hose to flush out the tap water and solvent residue as applicable*.

7) Drain residual deionized water to the extent possible, allow components to air dry.

8) Wrap pump in aluminum foil or a clear clean plastic bag for storage.

5.2.1.2 Electronic Water Level Indicators/Sounders/Tapes

During water level measurements, rinsing with the extracted tape and probe with deionized water and wiping the surface of the extracted tape is acceptable. However, periodic full decontamination should be conducted as indicated below.

---

* - The solvent should be employed when samples contain oil, grease, PAHs, PCBs, and other hard to remove materials. If these are not of primary concern, the solvent step may be omitted. In addition, do not rinse PE, PVC, and associated tubing with solvents.

1) Wash with soap and water
2) Rinse with tap water
3) Rinse with deionized water

Note: In situations where oil, grease, free product, other hard to remove materials are encountered probes and exposed tapes should be washed in hot soapy water.

5.2.1.3 Miscellaneous Equipment

Miscellaneous equipment including analytical equipment (water quality testing equipment) should be cleaned per manufacturer's instructions. This generally includes wiping down the sensor housing and rinsing with tap and deionized water.

Coolers/Shipping Containers employed to ship samples are received from the lab in a variety of conditions from marginal to extremely poor. Coolers should be evaluated prior to use for

- Structural integrity – Coolers missing handles or having breaks within the outer housing should be removed and not used. Notify the laboratory that the risk of shipping samples will not be attempted and request a replacement unit.

- Cleanliness – As per protocol only volatile organic samples are accompanied by a trip blank. If a cooler's cleanliness is in question (visibly dirty/stained) or associated with noticeable odors it should be decontaminated prior to use.

  1) Wash with soap and water
  2) Rinse with tap water
  3) Dry

If these measures fail to clean the cooler to an acceptable level, remove the unit from use as a shipping container and notify the laboratory to provide a replacement unit.

5.2.2 Down-Hole Drilling Equipment

This includes any portion of the drill rig that is over the borehole including auger flights, drill stems, rods, and associated tooling that would extend over the borehole. This procedure is to be employed prior to initiating the drilling/sampling activity, then between locations.

1) Remove all soils to the extent possible using shovels, scrapers, etc. to remove loose soils.
2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.
3) Rinse with tap water.
4) Rinse equipment with pesticide grade isopropanol
5) To the extent possible allow components to air dry.
6) Wrap or cover equipment in clear plastic until it is time to be used.

5.2.3 Soil/Sediment Sampling Equipment

This consists of soil sampling equipment including but not limited to hand augers, stainless steel trowels/spoons, bowls, dredges, scoops, split spoons, Macro Core samplers, etc.

1) Remove all soils to the extent possible.

2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.

3) Rinse with tap water.

4) Rinse equipment with pesticide grade isopropanol

5) Rinse with deionized water

6) To the extent possible allow components to air dry.

7) If the device is to be used immediately, screen with a PID/FID to insure all solvents (if they were used) and trace contaminants have been adequately removed.

8) Once these devices have been dried wrap in aluminum foil for storage until it is time to be used.

5.3 Contact Waste/Materials

During the course of field investigations disposable/single use equipment becomes contaminated. These items include tubing, trowels, PPE (gloves, overboots, splash suits, etc.) broken sample containers.

With the exception of the broken glass, single use articles should be cleaned (washed and rinsed) of visible materials and disposed of as normal refuse. The exception to this rule is that extremely soiled materials that cannot be cleaned should be containerized for disposal in accordance with applicable federal state and local regulations.

5.3.1 Decontamination Solutions

All waste decontamination solutions and rinses must be assumed to contain the hazardous chemicals associated with the site unless there are analytical or other data to the contrary. The waste solution volumes could vary from a few gallons to several hundred gallons in cases where large equipment required cleaning.

Containerized waste rinse solutions are best stored in 55-gallon drums (or equivalent containers) that can be sealed until ultimate disposal at an approved facility. These containers must be appropriately labeled.

5.4 Decontamination Evaluation

Determining the effectiveness of the decontamination process will be accomplished in the following manner

- Visual Evaluation – A visual evaluation will be conducted to insure the removal of particulate matter. This will be done to insure that the washing/rinsing process is working as intended.

- Instrument Screening – A PID and/or an FID should be used to evaluate the presence of the contaminants or solvents used in the cleaning process. The air intake of the instrument should be passed over the article to be evaluated. A positive detection requires a repeat the decontamination process. It should be noted that the instrument scan is only viable if the contaminants are detectable within the instruments capabilities.

- Rinsate Blanks – It is recommended that Rinsate samples be collected to

  - Evaluate the decontamination procedure representing different equipment applications (pumps versus drilling equipment) and different decontamination applications.

  - Single use disposable equipment – The number of samples should represent different types of equipment as well as different Lot Numbers of single use articles.

The collection and the frequency of collection of rinsate samples are as follows:

- Per decontamination method
- Per disposable article/Batch number of disposable articles

It is recommended that an initial rinsate sample be collected early in the project to ensure that the decontamination process is functioning properly and in an effort to avoid using a contaminated batch of single use articles. It is recommended that a follow up sample be collected during the execution of the project to insure those conditions do not change. Lastly, rinsate samples collection may be driven by types of and/or contaminant levels. Hard to remove contaminants, oils/greases, some PAHs/PCBs, etc. may also support the collection of additional rinsates due to the obvious challenges to the decontamination process. This is a field consideration to be determined by the FOL.