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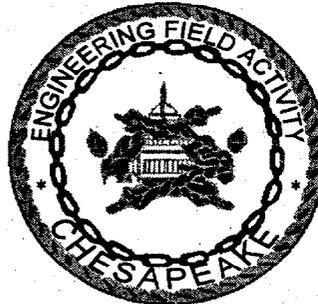
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Work Plans for Site Screening at Area of Concern 2

former

Naval Surface Warfare Center

White Oak Silver Spring, Maryland



Engineering Field Activity Chesapeake
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Contract Task Order 0273

March 1999



TETRA TECH NUS, INC.

**WORK PLANS
FOR SITE SCREENING AT
AREA OF CONCERN 2**

**FORMER
NAVAL SURFACE WARFARE CENTER - WHITE OAK
SILVER SPRING, MARYLAND**

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

**Submitted to:
Engineering Field Activity Chesapeake
Environmental Branch Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121**

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

**CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0273**

MARCH 1999

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ATTACHMENT

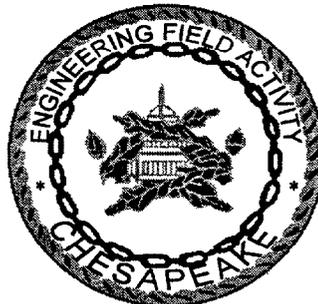
- A FIELD SAMPLING PLAN
- B QUALITY ASSURANCE PROJECT PLAN
- C HEALTH AND SAFETAY PLAN

**Field Sampling Plan
for Site Screening at
Area of Concern 2**

former

Naval Surface Warfare Center

**White Oak
Silver Spring, Maryland**



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ACRONYMS

AOC	Area of Concern
BRAC	Base Realignment and Closure
BCT	BRAC Cleanup Team
B&R	Brown and Root
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
COMAR	Code of Maryland Regulations
CTO	Contract Task Order
DPT	Direct-push Technology
EBS	Environmental Baseline Survey
EFACHES	Engineering Field Activity Chesapeake
EM	Electromagnetic
FDEM	Frequency Domain Electromagnetic
FSP	Field Sampling Plan
FID	Flameionization Detector
gpd	Gallons Per Day
GSA	General Services Administration
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
IRP	Installation Restoration Program
MDE	Maryland Department of the Environment
NAVFAC	Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NPDES	National Pollution Discharge Elimination System
NSWC	Naval Surface Warfare Center
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppt	parts per thousand
QAPP	Quality Assurance Project Plan
RFA	RCRA Facility Assessment
RCRA	Resource Conservation and Recovery Act

SI	Site Inspection
SOP	Standard Operating Procedure
SVOC	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TNT	2,4,6-trinitrotoluene
TtNUS	Tetra Tech NUS
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
USNR	United States Naval Reserve Training Center
VLF	Very Low Frequency
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

1.1 PROJECT SCOPE

The following Field Sampling Plan (FSP) provides the rationale behind the investigation of 14 waste management sites, 12 Areas of Concern (AOCs), and two other sites at the former Naval Surface Warfare Center (NSWC) - White Oak, located in Silver Spring, Maryland. The report has been completed under Contract Task Order No. 0273 (CTO 273) as part of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62472-90-D1298. The CLEAN Contract is part of the Navy's Installation Restoration Program (IRP), which is designed to identify contamination of Navy and Marine Corps facilities resulting from past operations and to institute corrective measures as needed. CTO 273 is being administered by the Naval Facilities Engineering Command, Northern Division (NAVFAC), through Engineering Field Activity - Chesapeake (EFACHES).

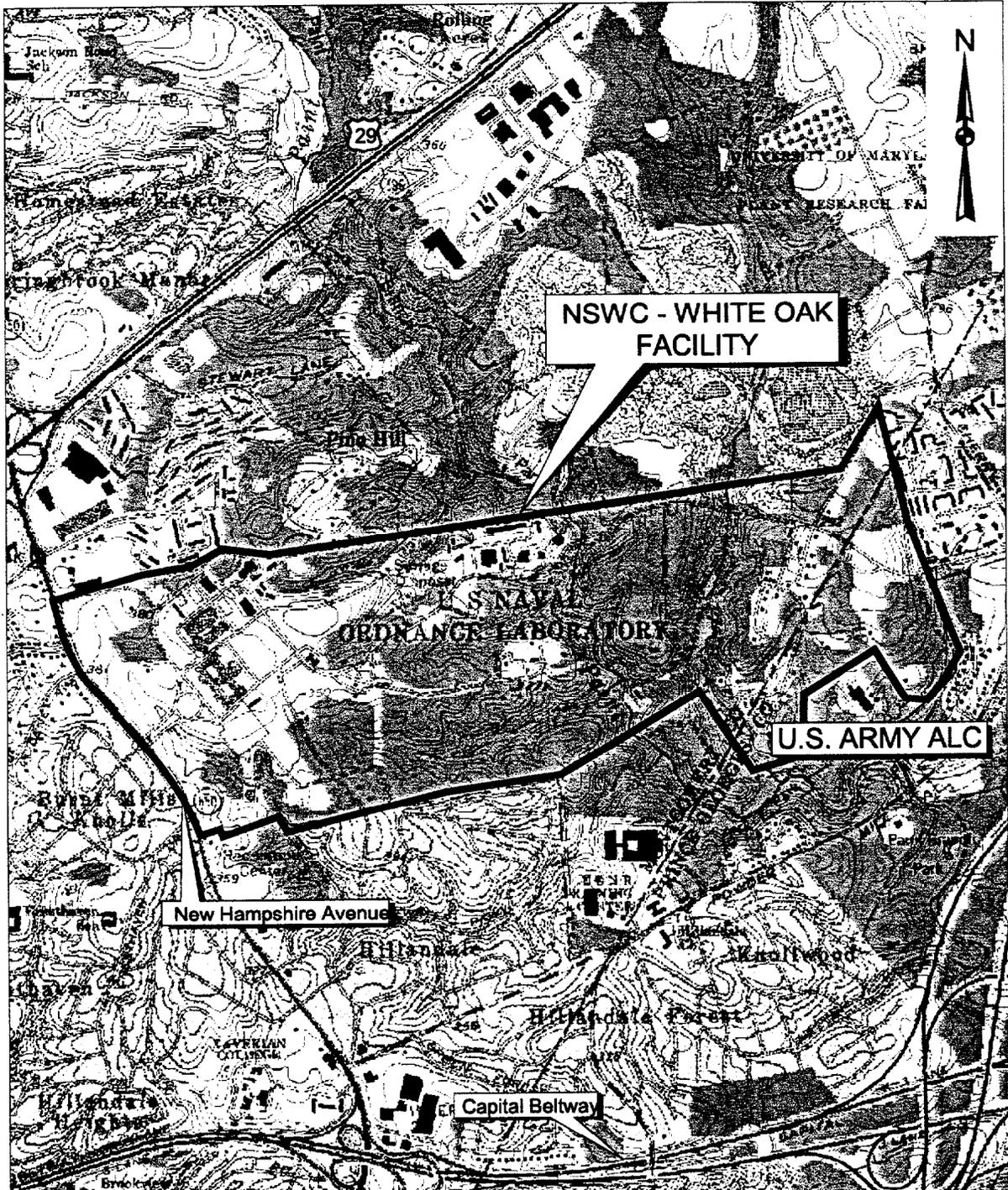
1.2 FACILITY BACKGROUND

NSWC-White Oak was a Navy owned and operated laboratory for naval surface warfare research, located north of Washington, D.C., off New Hampshire Avenue in Silver Spring, Maryland (see Figure 1-1). The facility is located in both Prince George's and Montgomery Counties. The NSWC-White Oak property is bordered by the Adelphi Laboratory Center and the United States Naval Reserve (USNR) Training Center, together with a mixture of residential, park, and industrial/commercial properties. The NSWC-White Oak property covered approximately 710 acres.

The Navy conducted research activities at this facility beginning in 1944. NSWC-White Oak was listed on the Base Realignment and Closure (BRAC) list in the fall of 1995. The facility has been closed; research activities have been moved to other naval facilities. The property has been transferred to the General Services Administration (GSA) and the U.S. Army Adelphi Research Laboratory.

1.3 PURPOSE

Additional characterization of the IRP sites, Solid Waste Management Units (SWMUs), and AOCs is required for the closure of the base and the transfer of the property. The objective of this FSP is to provide supplemental characterization of the IRP sites, SWMUs, and AOCs. This objective will be met through collecting and analyzing environmental data.



SOURCE: BASEMAP IS A PORTION OF THE USGS BELTSVILLE, MD QUAD (037035E.TIF, 7.5' SERIES, PHOTOREVISED 1979).

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CHECKED BY	DATE		APPROVED BY <i>SHP</i>	DATE 3/1		
COST/SCHEDULE-AREA	SITE VICINITY MAP NSWC - WHITE OAK SILVER SPRING, MARYLAND			APPROVED BY 	DATE 	
SCALE AS NOTED	DRAWING No. FIGURE 1-1			REV 0		

FIG15WHITEOAK\74271000.APR 9-MAR-98 CPG LOCATION MAP LAYOUT 2

1.4 WASTE MANAGEMENT SITES

The FSP identifies the proposed field efforts to be used to assess the sites. These sites require expedited evaluation to facilitate reuse of the property that is now in the possession of GSA. Based on information provided in previous investigations, the BRAC Cleanup Team (BCT) determined that field sampling is required to characterize each site. This FSP represents a level of effort equivalent to a Site Inspection (SI) in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) process. The results of this field investigation will be used to evaluate the risk for each site, resulting in either a no-further-action or additional study recommendation.

The sites have been used to manage and/or dispose of wastes or waste-containing materials. Due to the planned reuse/development of these sites, they will be investigated to characterize the potential risks, if any, to future tenants.

1.4.1 SWMUs

The following sites were identified as SWMUs during the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) conducted during 1990 (Kearney, 1990) and IRP sites by the Navy in 1984 (NEESA, 1984). These sites include:

- SWMU 8/Site 15 - Building 310A Waste Disposal Area
- SWMU 20/Site 17 - Former Building 130 South Leaching Well
- SWMU 29/Site 24 - Building 308 Washdown System
- SWMU 34 - Building 377 Demilitarization Site
- SWMU 35/Site 21 - Stoneyard
- SWMU 36 - Building 108 Incinerator
- SWMU 40/Site 22 - Building 305 Wastewater Collection System
- SWMU 41/Site 23 - Building 311 Oxidation Ditch
- SWMU 47 - Former Wastewater Treatment Plant Site
- SWMU 50 - Building 112 Oil/Water Separator
- SWMU 51 - Building 113 Oil/Water Separator
- SWMU 52 - Building 201 Oil/Water Separator
- SWMU 56 - Building 327 Wastewater Underground Storage Tank
- SWMU 87 - Building 611 Solid Waste Storage Unit

Potential contamination at these sites may also have resulted from past waste management activities.

1.4.2 AOCs

The scope of the field investigation includes AOCs identified during the RFA, Environmental Baseline Study (EBS) AOCs identified during the EBS, and two additional sites identified by the BCT. These sites include:

- AOC M - Former Outfall 004 at Building 611
- AOC N - Former Outfall 006 at Building 201
- AOC P - Former Outfall 012 at Building 312
- AOC Q - Former Outfall 014 at Building 328
- AOC R - Former Outfall 017F at Building 318
- AOC S - Former Outfall 018 at Building 310A
- EBS AOC 150 - Stressed Vegetation Area
- EBS AOC 151 - Uncovered Storage Area
- EBS AOC 303 - Explosives Test Area
- EBS AOC 304-3 - Staining, Substance on Floor
- EBS AOC 334 - Outdoor Paint and Battery Storage
- EBS AOC 500B - Former Pistol Range
- Building 615 - Hazardous Machining/Blending Area
- Building 355 - Magazine Explosion Area

Potential contamination at these sites may also have resulted from past waste management activities.

1.5 FIELD SAMPLING PLAN

This plan is intended to be used in conjunction with the existing Master Work Plans for NSWC-White Oak (B&R Environmental, 1998). This plan describes the technical approach to the project. Section 1 provides an introduction to the project and includes a discussion of the scope and objectives, a general facility description, and an overview of the sites investigated. Section 2 includes a more detailed description of each site, the field sampling rationale, and a description of the proposed scope of work for the project. Section 3 identifies the proposed field sampling methods. The project schedule is presented in Section 4. The appendix to the FSP is the Sampling List (Appendix A). A site specific Quality Assurance Project Plan (QAPP) and site specific Health and Safety Plan (HASP) are attached to this FSP.

2.0 SAMPLING STRATEGY

Section 2 provides the rationale for the sampling methods and locations selected to further characterize potential contamination at NSWC-White Oak IRP Sites, SWMUs, AOCs, and EBS AOCs. Tables detailing the scoping and investigation of each site are provided in Appendix A and B respectively. The specific sampling methods are provided in Section 3.

2.1 SITE 15/SWMU 8 - BUILDING 310A WASTE DISPOSAL AREA

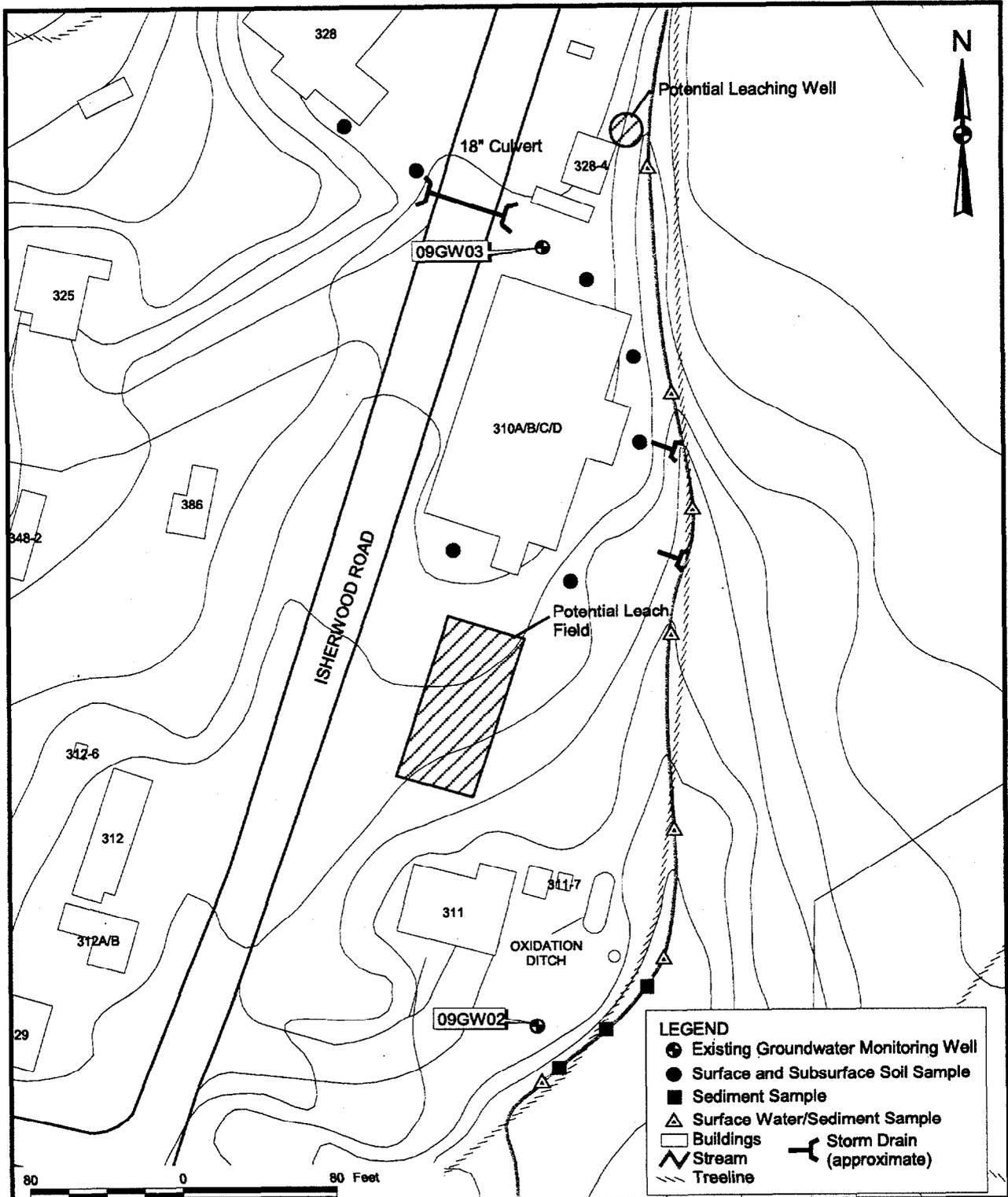
2.1.1 Background

This site was used from approximately 1950 to 1978 to dispose of laboratory waste (Figure 2-1). Waste from laboratory operations was routinely disposed by two means. The first disposal method was by pouring the waste down the laboratory sink, with subsequent discharge to the storm drain and intermittent stream. The other method reportedly involved toxic compounds being poured directly onto the soil. Some of the chemicals used in Building 310A include: phosgene, thiophosgene, ethyl chlorothioformate, chlorine, hydrogen chloride, hydrogen sulfide, nitrogen oxides, bromine, hydrogen bromide, nitrobenzene, fluorodinitroethanol, fluorodinitroacetonitrile, methyl iodide, monomethylamine, dimethylamine, thionyl chloride, carbon tetrachloride, chloroform, ammonia, benzene, ethylene dichloride, sulfuryl chloride, ethylene diamine, and halogenated hydrocarbons.

In addition, historic site drawings identify the presence of a leaching well and a leaching field near Building 310A. It is not certain if either or both were ever present at the site.

2.1.2 Sampling Approach

Multiple media samples will be collected to determine the presence or absence of contamination. Surface and subsurface soil sampling locations were selected within or downgradient of the waste management unit. Five surface soil samples will be collected from the ground surface to 0.5-foot deep using hand trowels from areas of stressed vegetation and/or near possible sources of contamination. Five subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil (color, staining) and photoionization detector (PID) readings. The samples will be collected at locations around the Building 310 complex to address the potential for contamination from all buildings.



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CHECKED BY	DATE		APPROVED BY <i>SAN</i>	DATE 3/11
COST/SCHEDULE-AREA		PROPOSED SAMPLING SITE LOCATION MAP SWMU 8 (IR SITE 15) - BLDG 310A WASTE DISPOSAL AREA SWMU 41 (IR SITE 23) - BLDG 311 OXIDATION DITCH AOC S - FORMER OUTFALL 018 AT BLDG 310A NSWC WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1	REV 0

P:\GIS\WHITEOAK\7427_PROPOSAL\APR 11-MAR-99_CPG AREA.J LAYOUT

Efforts will also be made to locate the leach field and or leaching well associated with Building 310. A terrain conductivity survey will be performed at the suspected locations. Following the geophysical survey a test pit(s) will be placed to identify if the leach fields or leaching well is present.

Two sediment samples will be collected to determine if any of the contaminants reached the stream bed. Two surface water samples will also be collected. One will be collected upstream of the storm drain; the other will be collected downstream from the storm drain. The same method of sampling will be applied to the sediment samples. This will aid in determining if any contamination is originating from Building 310A or if it is coming from an upstream source. Both soil and water samples will be tested for the following: Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semivolatile Organic Compounds (SVOCs), TCL Pesticide/polychlorinated biphenyls (PCBs), total (unfiltered) Target Analyte List (TAL) metals, and SW 846 method 8330 explosives. If the turbidity in the samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-1.

Subsurface soil samples will be collected at the leach field/leach well locations if found. Two samples will be collected at each site and analyzed for TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, TAL metals, and SW846 method 8330 explosives.

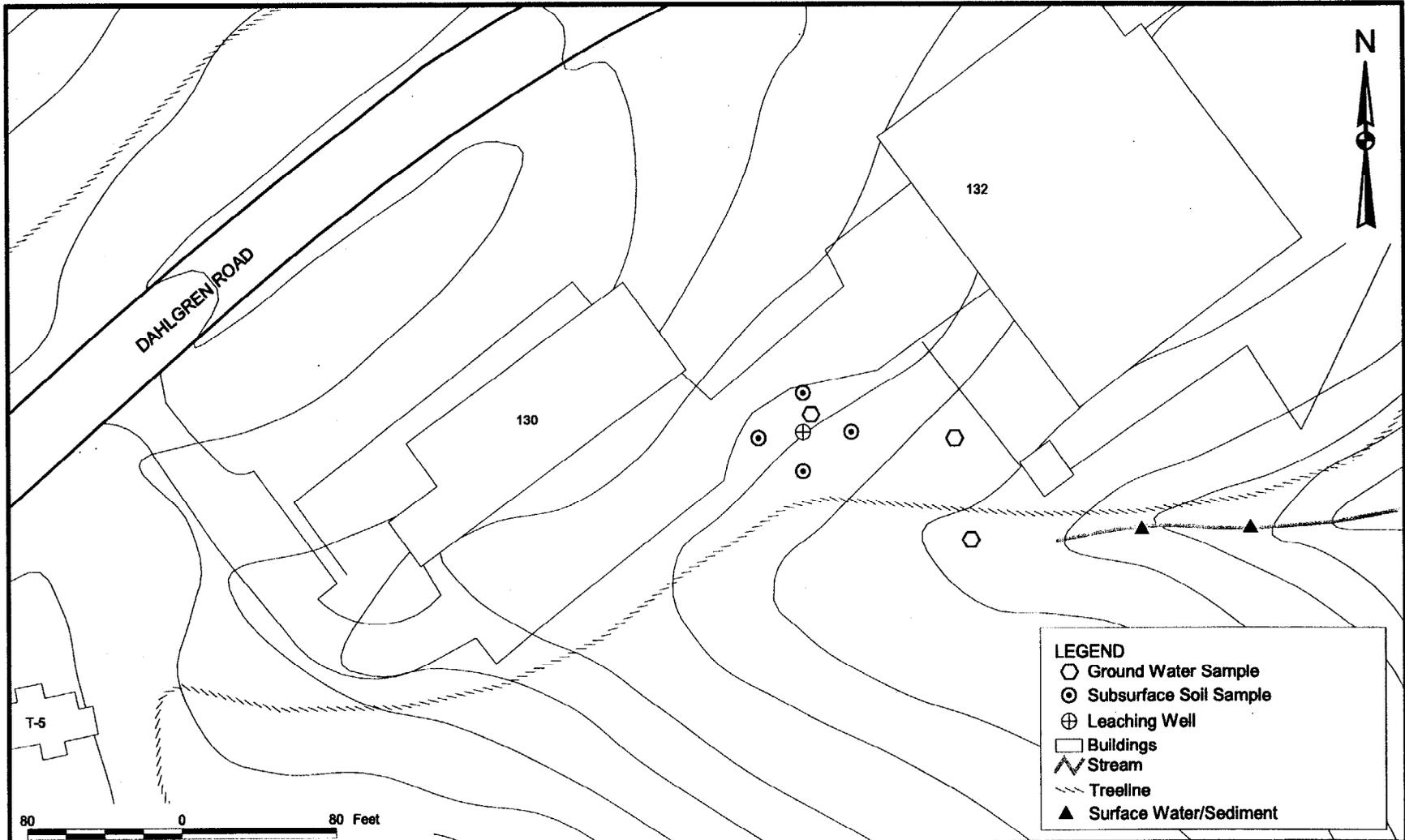
2.2 SITE 17/SWMU 20 - FORMER BUILDING 130 SOUTH LEACHING WELL

2.2.1 Background

This site consists of a leaching pit located south of Building 130 that may have received battery acids from operations in the area (Figure 2-2). The pit reportedly began receiving waste liquids in 1945. The unit reportedly ceased operations in the late 1970s, and was reportedly deactivated between 1982 and 1984.

2.2.2 Sampling Approach

The objectives of the investigation at Site 17 include delineating the limits of disposal and preliminarily assessing the presence or absence of contaminant migration from the leaching pit and leaching wells to the surrounding environment. A geophysical survey (terrain conductivity) will be conducted at the site to determine if the leaching well is still present below the surface. It is believed that the variance in conductivity between waste materials and natural soils will enable the site wastes and areas of contaminated soil to be mapped.



LEGEND	
○	Ground Water Sample
⊙	Subsurface Soil Sample
⊕	Leaching Well
□	Buildings
~	Stream
- - -	Treeline
▲	Surface Water/Sediment

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COST/SCHEDULE-AREA	
SCALE AS NOTED	

 Tetra Tech NUS, Inc.
PROPOSED SAMPLING SITE LOCATION MAP
 SWMU 20 (SITE 17) - FORMER BLDG 130 S. LEACHING WALL
 NSWC WHITE OAK
 SILVER SPRING, MARYLAND

CONTRACT NUMBER 7427	OWNER NUMBER 0273
APPROVED BY <i>S. A. J.</i>	DATE 3/11
APPROVED BY	DATE
DRAWING NO. FIGURE 2-2	REV 0

Subsurface soil and groundwater sampling has been proposed to evaluate the potential presence or absence of contaminants at the site. Since similar leaching pits constructed at NSWC-White Oak were reportedly 4 feet deep, surface soil samples will not be collected. Four subsurface soil samples will be collected between a depth of 4 feet and 10 feet. The samples will be obtained following the excavation of test pits in anomalous areas identified during the geophysical survey. The test pits will be used to determine if the leaching well is still present. The specific depth of the samples will be based on the field observations and field screening activities (PID readings).

Two surface water and sediment samples will be collected from the stream located east of the site.

Three groundwater samples will also be collected at temporary groundwater monitoring wells to determine if groundwater at the site has been contaminated. The soil, sediment, surface water, and groundwater samples will be analyzed for the following parameters: TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, and total (unfiltered) metals. If the turbidity in the samples is found to be high, then a total (filtered) metals sample will also be collected. The sampling locations are provided on Figure 2-2.

2.3 SITE 24/SWMU 29 - BUILDING 308 WASHDOWN SYSTEM

2.3.1 Background

The unit is located at the rear of Building 308 in the east-central portion of the facility (Figure 2-3). The unit is an undefined area of ground that received washdown wastewater from the Building 308 floor drains following explosive mixing and machining in the building. The floor drain is reportedly connected to a french drain system that discharges to the surface approximately 50 feet south of the building near the adjacent explosive lockers. The unit was operated from 1947 to 1980. The wastewater from the washdown would contain 2, 4, 6,-trinitrotoluene (TNT) and other hazardous constituents.

2.3.2 Sampling Approach

To determine the presence or absence of contamination at Building 308, surface and subsurface soil sampling locations were selected within or downgradient of the waste management area. Four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected between the ground surface at a depth of 0.5-foot using hand trowels. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil samples will then be analyzed for the following: TCL VOCs, TAL Metals, and SW 846 method 8330 Explosives. The sampling locations are provided on Figure 2-3.

2.4 SWMU 34 - BUILDING 377 - DEMILITARIZATION SITE

2.4.1 Background

The unit is located on the ground in front of former Building 377, which was a 10-foot by 10-foot structure that was demolished in 1989 (Figure 2-4). Explosives were reportedly steamed out of the weapons casings, spilled onto the ground, and collected for disposal after drying.

2.4.2 Sampling Approach

To determine the presence or absence of contamination at the former Building 377 location, surface and subsurface soil sampling locations were selected within or downgradient of the ground in front of Building 377. Four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected from the ground surface to 0.5-foot deep using hand trowels. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings. The soil samples will be analyzed for SW 846 method 8330 Explosives since explosives were known to have been present at this site. If the results indicate contamination is present, then future soil and groundwater sampling may be required to determine the extent of the contamination. The sampling locations are provided on Figure 2-4.

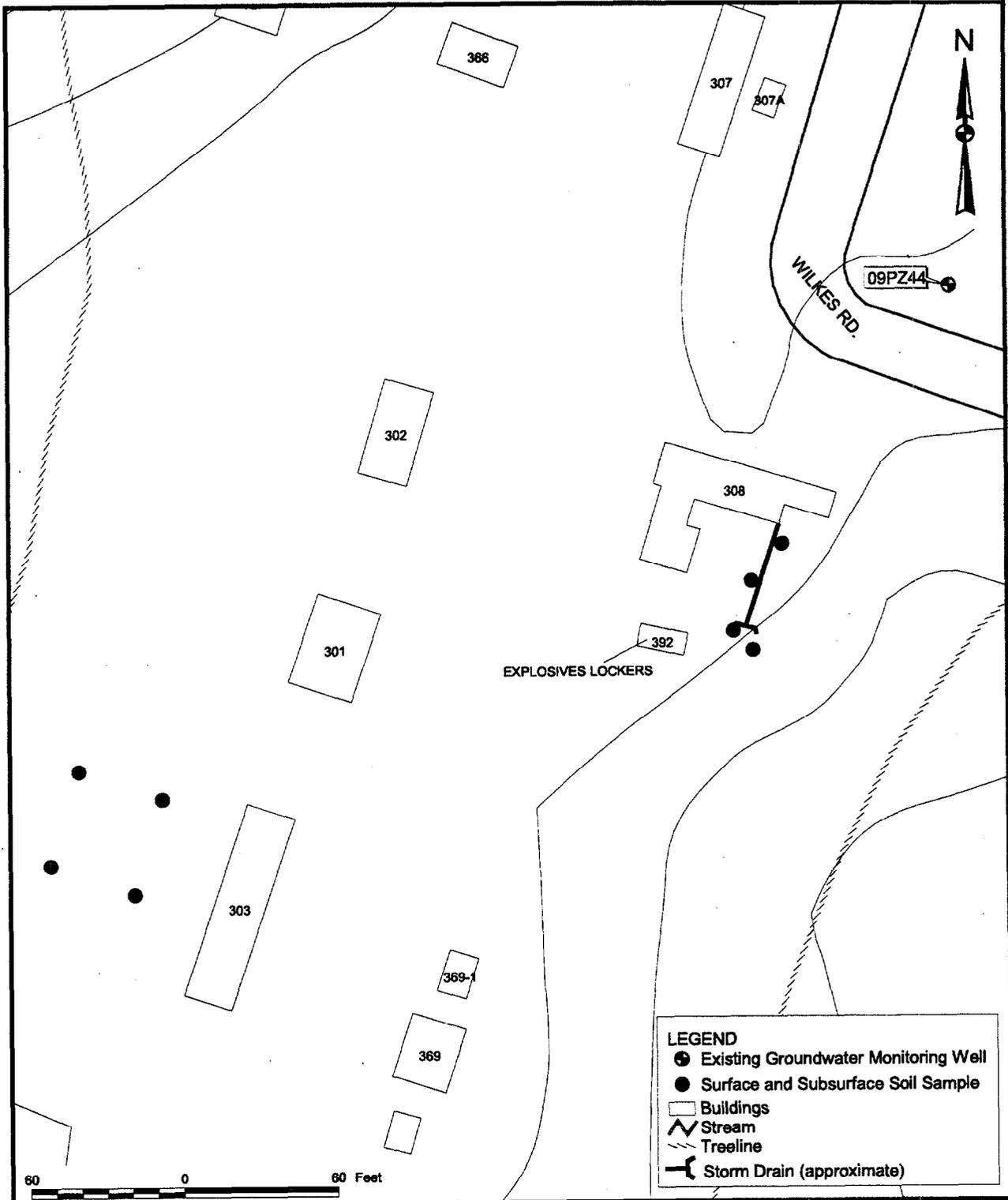
2.5 SITE 21/SWMU 35 - STONEYARD

2.5.1 Background

This site is located west of Blandy Road, adjacent to Building 115, and south of Building 140 (salt storage dome) in the north-central section of the facility (Figure 2-5). This is an open area used to sandblast ordnance items. The area is about 20 feet by 30 feet, and it is located in front of a metal and brick shed (Building 115). The sandblasting was performed using glass beads. Until 1983, the glass beads and material removed from sandblasted items were disposed at the Apple Orchard Landfill.

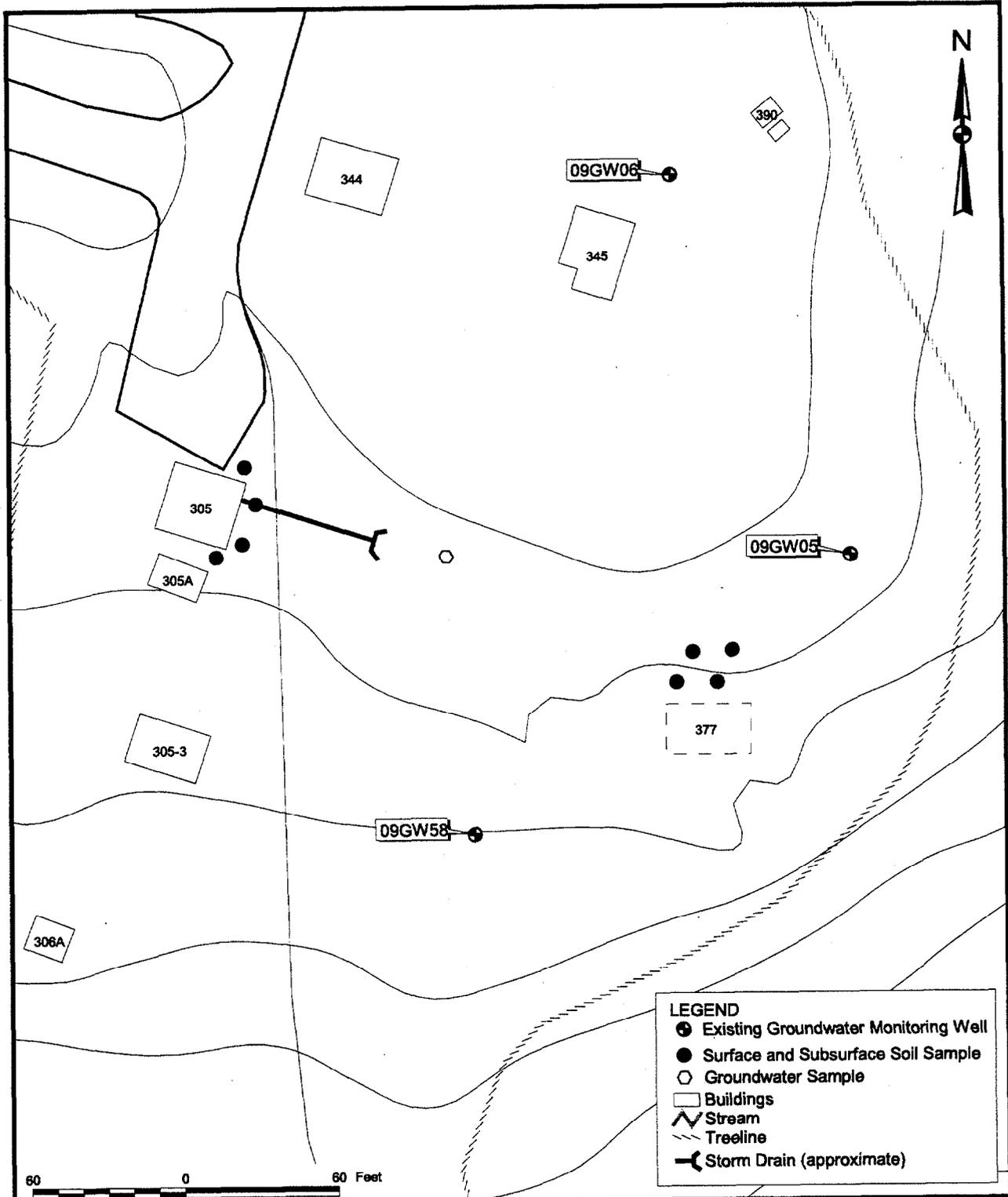
2.5.2 Sampling Approach

To identify the presence or absence of contamination, multiple media samples will be collected. Surface and subsurface soil sampling locations were selected within or downgradient of the waste management



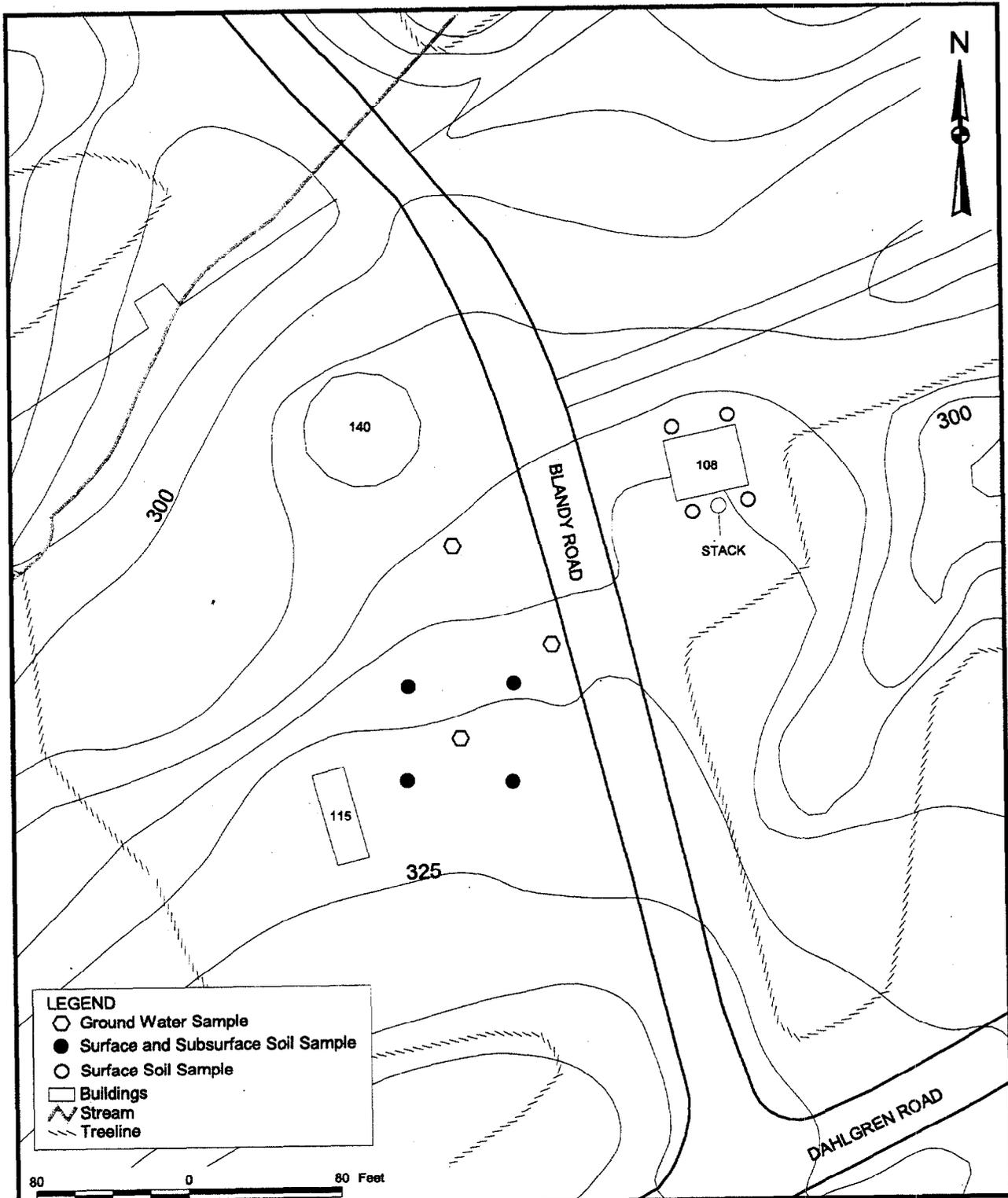
DRAWN BY D. PERRY		DATE 21-AUG-98		Tetra Tech NUS, Inc.		CONTRACT NUMBER 7427		OWNER NO. 0273			
CHECKED BY		DATE				APPROVED BY <i>SPM</i>		DATE <i>3/11</i>			
COST/SCHEDULE-AREA		PROPOSED SAMPLING SITE LOCATION MAP SWMU 29 (IR SITE 24) - BLDG 308 WASHDOWN SYSTEM EBS AOC 303 - EXPLOSIVES TEST AREA AT BLDG 303 NSWC WHITE OAK SILVER SPRING, MARYLAND						APPROVED BY		DATE	
SCALE AS NOTED								DRAWING NO. FIGURE 2-3		REV 0	

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DRAWN BY D. PERRY	DATE 21-AUG-98	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP SWMU 40 (IR SITE 22) - BUILDING 305 WASTEWATER COLLECTION SYSTEM SWMU 34 - BLDG 377 DEMILITARIZATION SITE NSWC WHITE OAK SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427	OWNER NO. 0273
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COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-4	REV 0

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LEGEND	
○	Ground Water Sample
●	Surface and Subsurface Soil Sample
○	Surface Soil Sample
▭	Buildings
~	Stream
- - -	Treeline



DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 25-AUG-98 DATE DATE DATE	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP SWMU 35 (IR SITE 21) - STONEYARD ACROSS FROM BLDG 108 SWMU 36 - BLDG 108 INCINERATOR NSWC WHITE OAK SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427 APPROVED BY <i>SAN</i> APPROVED BY DRAWING NO. FIGURE 2-5	OWNER NO. 0273 DATE 3/11 DATE REV 0
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unit. Four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected from the ground surface to 0.5-foot deep using hand trowels. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

Three groundwater samples will also be collected from temporary monitoring wells to determine if any of the contaminants from the surface reached the groundwater. Soil and groundwater samples will be tested for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and total (unfiltered) TAL metals. If the turbidity of sample water is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-5.

2.6 SWMU 36 - BUILDING 108 INCINERATOR

2.6.1 Background

The unit is attached to the south side of Building 108, in the north-central section of the facility, within 600 feet of the north boundary road (Figure 2-5). The unit consists of a brick oven with an attached 35-foot-tall stack. The unit incinerated municipal-type wastes until 1973, when incineration was stopped to comply with Maryland air pollution regulations.

2.6.2 Sampling Approach

A phased approach will be used in the investigation of Building 108. Since extensive subsurface contamination from the incinerator is unlikely, the study will focus on surface soil. Four surface soil sampling locations were selected around the incinerator area since most of the pollutants would fall close to the incinerator stack. The four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected at depth between the ground surface and 0.5-foot, using hand trowels. The soil samples will then be analyzed for the following: TCL SVOCs, TAL Metals, and dioxins. If significant surface soil contamination is identified at the site, further characterization of subsurface conditions will be performed. The sampling locations are provided on Figure 2-5.

2.7 SITE 22/SWMU 40 - BUILDING 305, WASTEWATER COLLECTION SYSTEM

2.7.1 Background

The site is located at Building 305 in the east-central portion of the facility (Figure 2-4). The unit managed explosive-contaminated wastewater from cleanup of the TNT melt-casting operation in the Former

Building 305 Demilitarization Site (SWMU 33). It operated on a daily basis, processing approximately 100 pounds of TNT. The unit consisted of a wastewater channel, a sump, and an overflow pipe. During the 1950s and 1960s, sludge from the sump was collected and deposited in the Ordnance Burn Area (Site 7/SWMU 31).

2.7.2 Sampling Approach

To determine the presence or absence of contamination at Building 305, surface and subsurface soil sampling locations were selected within or downgradient of the waste management unit. Four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected at a depth between the ground surface and 0.5-foot, using hand trowels. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

In addition a groundwater sample will be collected downgradient of Building 305. The samples will then be analyzed for the following: TCL VOCs, TAL Metals, and SW 846 method 8330 Explosives. Based on the sampling results, further testing may be necessary, depending on the level of contamination. The sampling locations are provided on Figure 2-4.

2.8 SITE 23/SWMU 41 - BUILDING 311, OXIDATION DITCH

2.8.1 Background

The site is located behind Building 311 in the southeastern portion of the facility (Figure 2-1). This site was used to evaluate bioremediation processes for TNT in wastewater. Effluent from the site drained into an adjacent settling tank. The tank's effluent was later discharged into an adjacent intermittent tributary of Paint Branch. Solids were disposed either at Site 7 (Ordnance Burn Area) or taken off site for disposal.

2.8.2 Sampling Approach

To determine whether there is any residual contamination present resulting from oxidation ditch activities, three surface water samples and six sediment samples will be collected from the intermittent tributary of Paint Branch. The samples will be collected upstream and downstream of the oxidation ditch to determine if the contamination is coming from previous treatment activities or from an upstream source. The surface water and sediment samples will both be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, total (unfiltered) TAL metals, and SW 846 Method 8330 Explosives. If the turbidity in the

surface water samples is found to be high, a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-1.

2.9 SWMU 47 - FORMER WASTEWATER TREATMENT PLANT SITE

2.9.1 Background

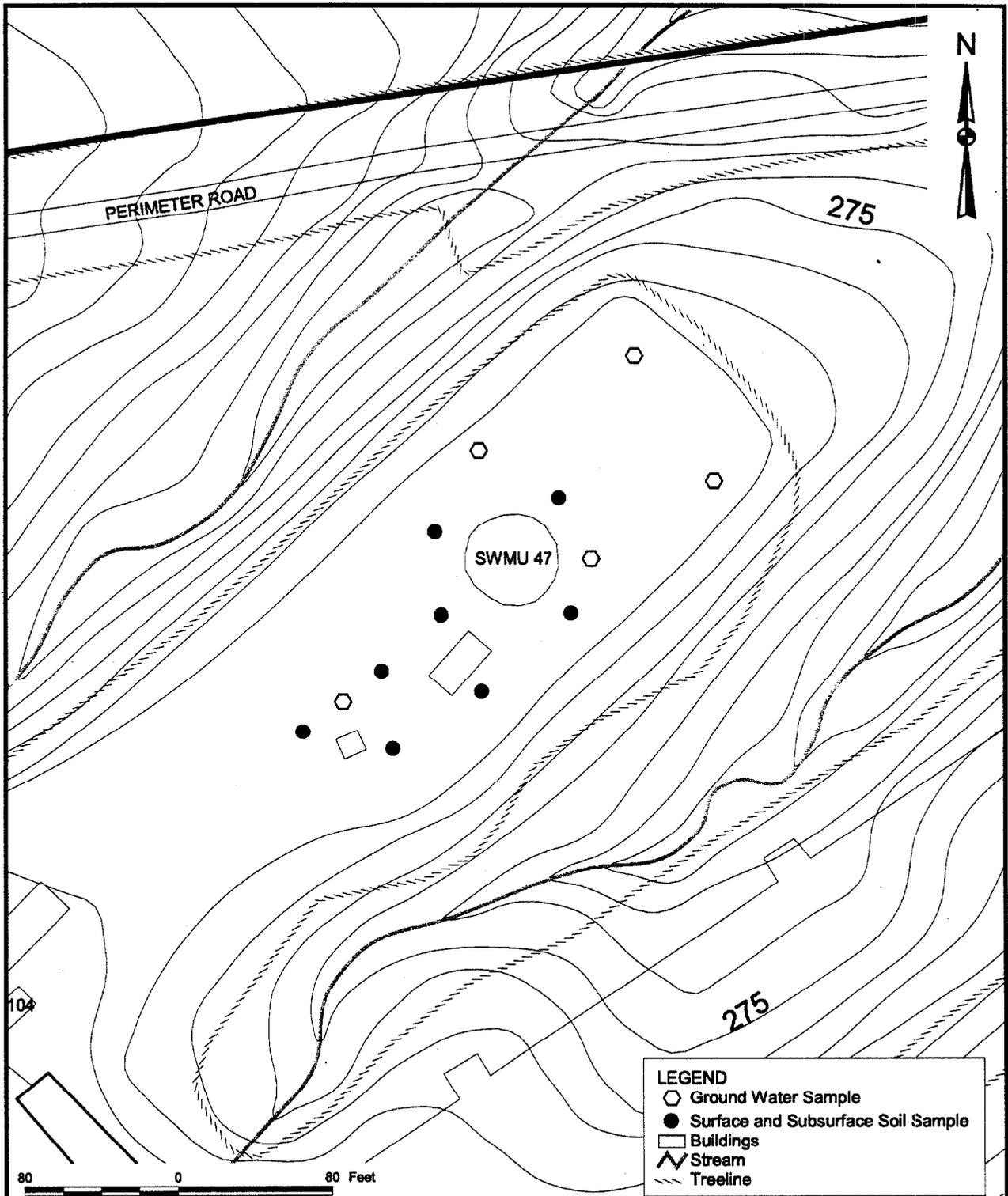
The unit is located in the north-central portion of the facility off Blandy Road (Figure 2-6). The treatment plant consisted of an Imhoff Tank, four sand filters, a chlorine contact chamber, and a tile-lined sludge drying bed. The concrete sub-units were connected by terra cotta pipe. Following permit approval, the plant discharges were regulated under the facility's National Pollutant Discharge Elimination System (NPDES) permit, with the wastewater discharging to Paint Branch.

2.9.2 Sampling Approach

The objectives of the investigation at the former Wastewater Treatment Plant include delineating the limits of disposal and preliminarily assessing the presence or absence of contaminant migration from the Wastewater Treatment Plant to the surrounding environment. A geophysical survey (terrain conductivity) will be conducted at the site to assess the areal extent of the Wastewater Treatment Plant. It is believed that the geophysical survey will reveal the variance in conductivity between waste materials and natural soils and enable the site wastes to be mapped.

To evaluate the potential presence or absence of contaminants at the site, multiple media samples will be collected. Eight surface soil samples will be collected at a depth between the ground surface and 0.5-foot, using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Eight subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil, PID readings, and the results of the geophysical survey.

Five groundwater samples will also be collected from temporary monitoring wells to determine if groundwater contamination is present at the site. Both the soil and groundwater samples will then be analyzed for the following parameters: TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, total (unfiltered) TAL metals, and SW846 Method 8330 Explosives. If the turbidity in the samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-6.



DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 25-AUG-98 DATE DATE	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP SWMU 47 - FORMER WASTEWATER TREATMENT PLANT SITE SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427 APPROVED BY <i>SAN</i> APPROVED BY DRAWING NO. FIGURE 2-6	OWNER NO. 0273 DATE <i>3/11</i> DATE REV 0
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2.10 SWMU 50 - BUILDING 112, OIL/WATER SEPARATOR

2.10.1 Background

The unit is located on the southwest corner of Building 112 in the northwest portion of the facility (Figure 2-7). The unit managed oily wastewater that may contain hazardous constituents of petroleum and heavy metals.

2.10.2 Sampling Approach

To determine the presence or absence of contamination from the Building 112 oil/water separator, surface and subsurface soil sampling locations were selected within or downgradient of the waste unit area. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings. The soil samples will then be analyzed for TCL SVOCs and TAL Metals. The sampling locations are provided on Figure 2-7.

2.11 SWMU 51 - BUILDING 113, OIL / WATER SEPARATOR

2.11.1 Background

The unit is located on the northeast side of Building 113 in the northwest portion of the facility (Figure 2-7). The unit is an underground tank that received oily wastewater from Building 100 via the Building 112 Grease Interceptor. The unit managed oily wastewater that may contain hazardous constituents of petroleum and heavy metals.

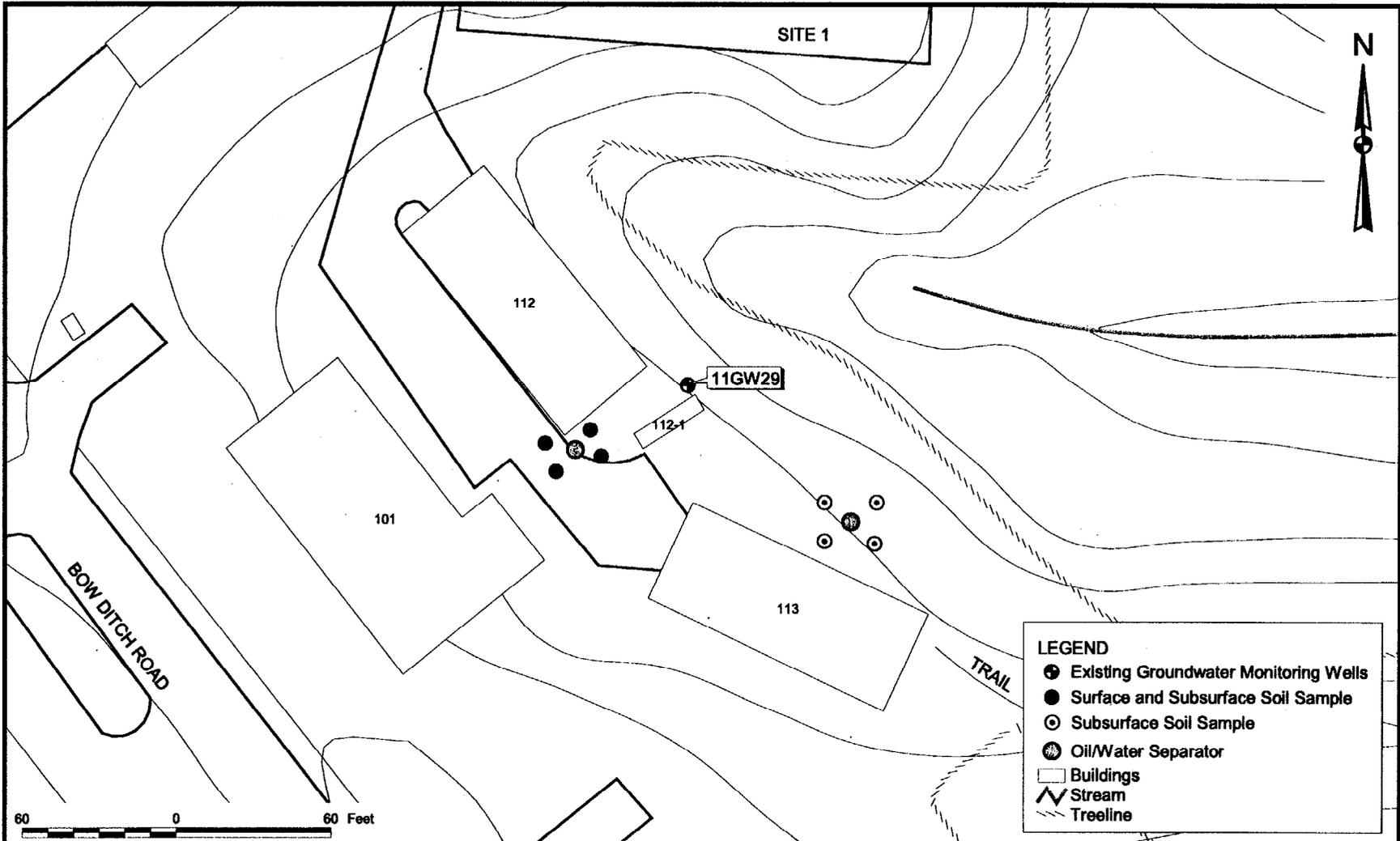
2.11.2 Sampling Approach

To determine the presence or absence of contamination from the Building 113 oil/water separator, subsurface soil sampling locations were selected in proximity to the waste management unit. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Four subsurface soil samples will be collected at a depth between 1-foot and 15 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

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COST/SCHEDULE-AREA 		PROPOSED SAMPLING SITE LOCATION MAP SWMU 50 - BUILDING 112 OIL/WATER SEPARATOR SWMU 51 - BUILDING 113 OIL/WATER SEPARATOR NSWC WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY 	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-7	REV 0

The soil samples will then be analyzed for TCL SVOCs and TAL Metals. The results will determine whether further study of the site will be necessary. The sampling locations are provided on Figure 2-7.

2.12 SWMU 52 - BUILDING 201, OIL / WATER SEPARATOR

2.12.1 Background

The unit is located on the southwest corner of Building 201 in the central portion of the facility (Figure 2-8). The unit is an above-grade, 275-gallon, closed steel tank that managed waste oil which overflowed from the upgradient boiler fuel tanks on the west end of the building. The unit stands on a poured concrete pad inside a 3-foot concrete containment wall. The unit managed oil that may contain hazardous constituents of petroleum and heavy metals.

2.12.2 Sampling Approach

To determine the presence or absence of contamination from the Building 201 oil/water separator, subsurface soil sampling locations were selected in proximity to the waste management unit. Four subsurface soil samples will be collected at a depth between 1 foot and 15 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil samples will then be analyzed for TCL SVOCs and TAL Metals. The results will determine whether further study of the site will be necessary. The sampling locations are provided on Figure 2-8.

2.13 SWMU 56 - BUILDING 327, WASTEWATER UNDERGROUND STORAGE TANK

2.13.1 Background

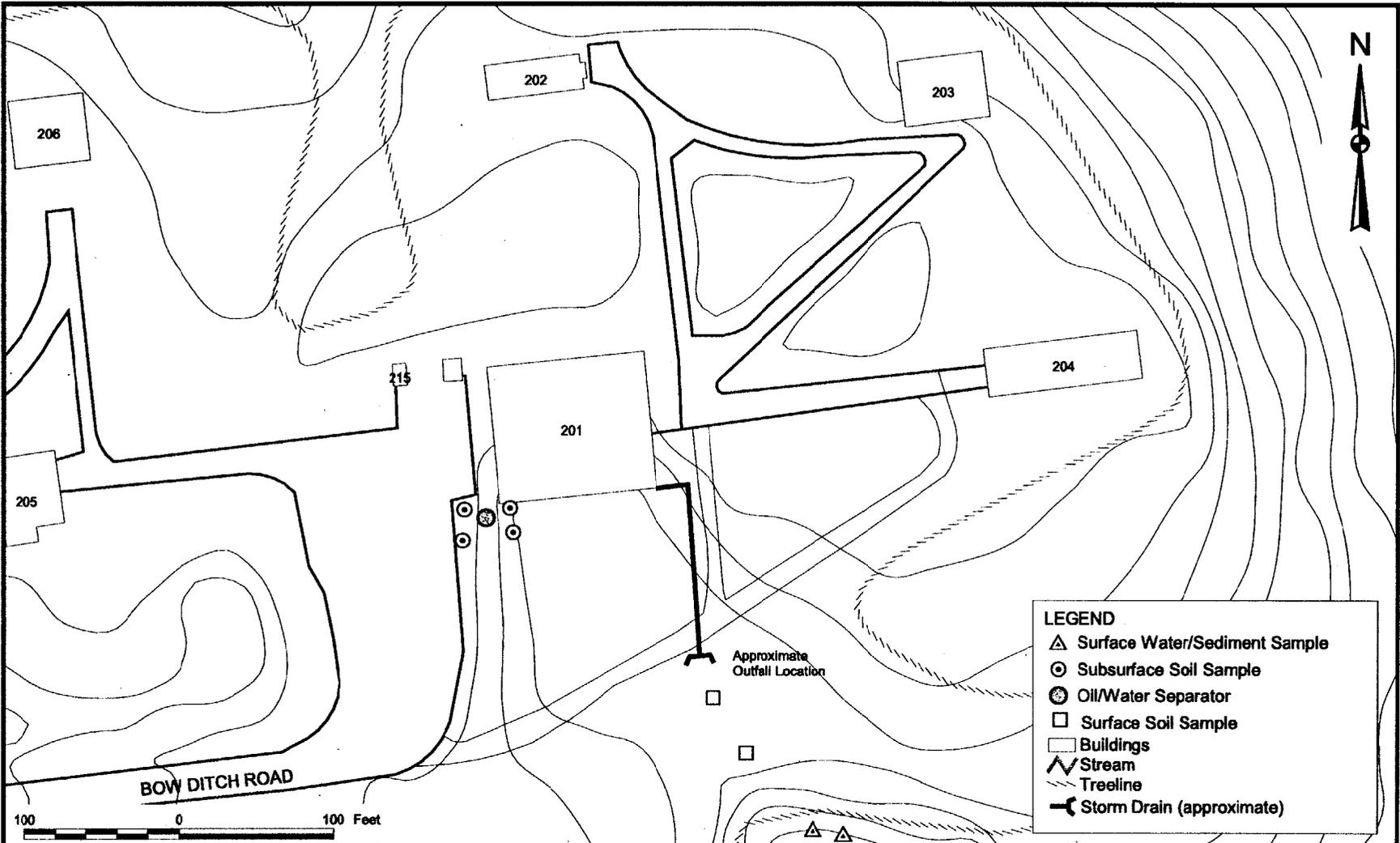
An underground wastewater storage tank was formerly located at the eastern corner of Building 327 (Figure 2-9). The tank had a 10,000 gallon capacity, and managed the wastewater from the cleaning of the explosive test chambers. When the unit was last emptied in 1987, no explosives were found in a sample of the tank contents.

2.13.2 Sampling Approach

Subsurface soil sampling locations were selected within or downgradient of the waste management unit to determine if contamination is present as a result of the tank operation. Four subsurface soil samples will

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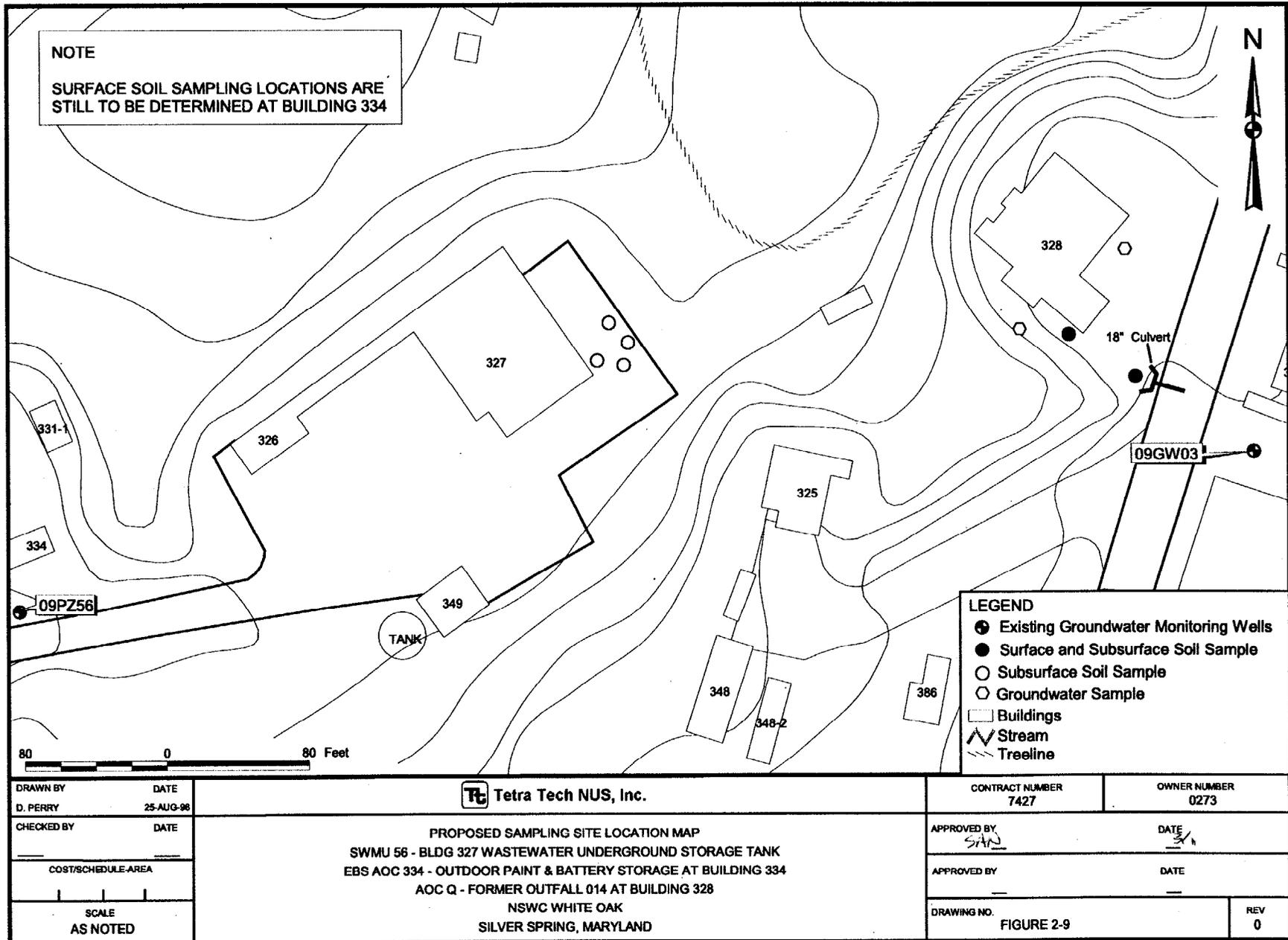


LEGEND

- △ Surface Water/Sediment Sample
- ⊙ Subsurface Soil Sample
- ⊗ Oil/Water Separator
- Surface Soil Sample
- ▭ Buildings
- ~ Stream
- - - Treeline
- ← Storm Drain (approximate)

DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 19-AUG-98 DATE DATE DATE	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP SWMU 52 - BUILDING 201 OIL/WATER SEPARATOR ACC N - FORMER OUTFALL 006 AT BUILDING 201 NSWC WHITE OAK SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427 APPROVED BY <i>[Signature]</i> APPROVED BY DRAWING NO. FIGURE 2-8	OWNER NUMBER 0273 DATE 2/0 DATE REV 0
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be collected at a depth between 1-foot and 15 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

All soil samples will be analyzed for TCL SVOCs and SW 846 Method Explosives. The results will determine whether further study of the site will be necessary. The sampling locations are provided on Figure 2-9.

2.14 SWMU 87 - BUILDING 611, SOLID WASTE STORAGE UNIT

2.14.1 Background

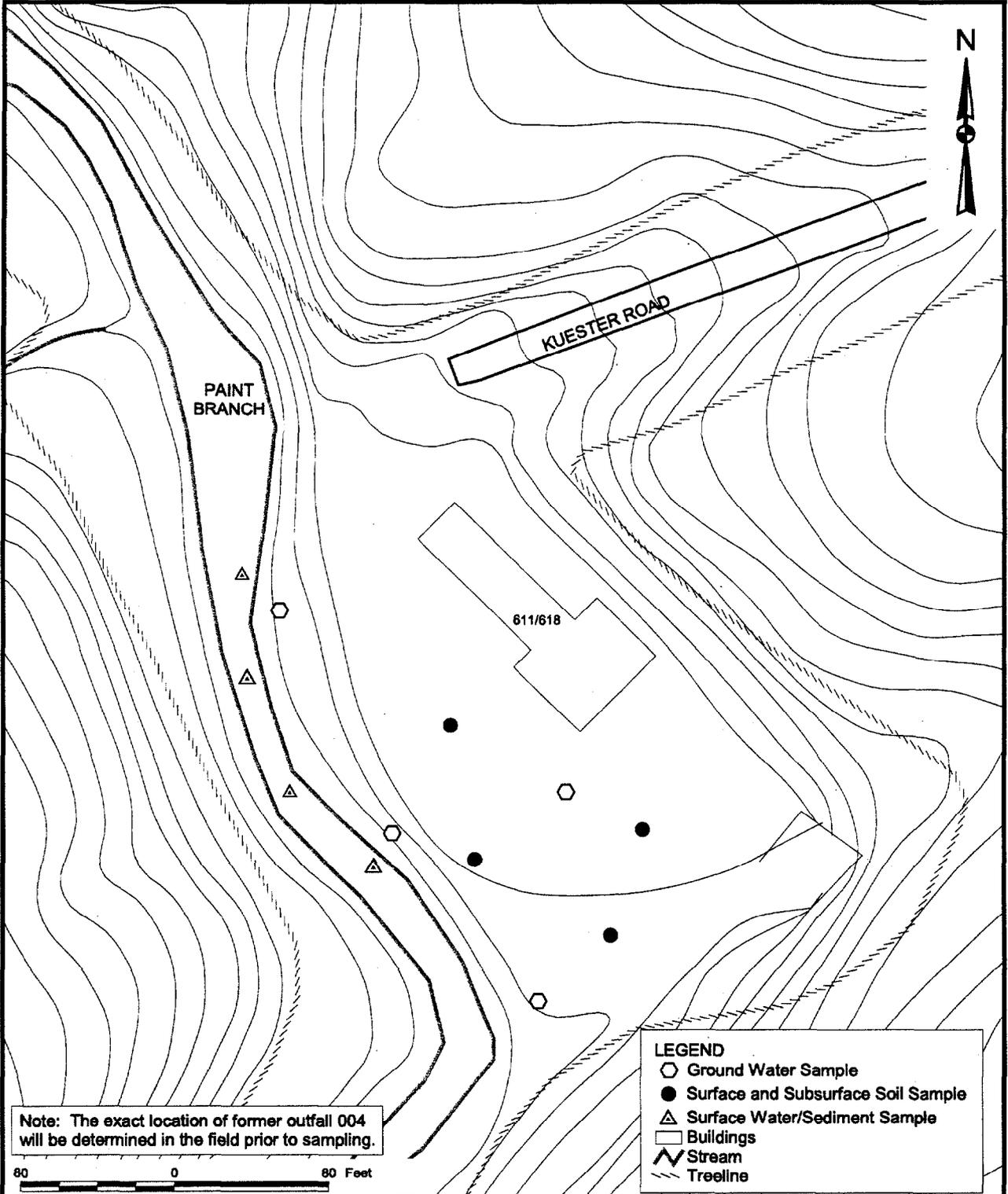
The unit is located west of Building 611 in the south-central portion of the facility (Figure 2-10). The area is a patch of ground within 50 feet of Paint Branch, reportedly used to dispose of wood, metal waste, and other debris.

2.14.2 Sampling Approach

The objectives of the investigation at SWMU 87 include delineating the limits of disposal and preliminarily assessing the presence or absence of contaminant migration to the surrounding environment. A geophysical survey will be conducted at the site to assess the areal extent of SWMU 87. It is believed that the variance in conductivity between waste materials and natural soils will enable the mapping of the site wastes through the completion of the geophysical survey.

To identify the potential presence or absence of contaminants at the site, multiple media samples will be collected. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil PID readings, and the results of the geophysical survey.

Four groundwater samples will also be collected through hydropunch methods to determine if there has been any groundwater contamination at the site. The groundwater samples will be located between the SWMU and Paint Branch. Both the soil and groundwater samples will then be analyzed for the following parameters: TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, and total (unfiltered) TAL metals. If the turbidity in the groundwater samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The results of these samples will determine the need for further study. The sampling locations are provided on Figure 2-10.



Note: The exact location of former outfall 004 will be determined in the field prior to sampling.

LEGEND

- Ground Water Sample
- Surface and Subsurface Soil Sample
- △ Surface Water/Sediment Sample
- ▭ Buildings
- ~ Stream
- - - Treeline

DRAWN BY D. PERRY		DATE 18-AUG-88		Tetra Tech NUS, Inc.		CONTRACT NUMBER 7427		OWNER NO. 0273			
CHECKED BY		DATE				APPROVED BY <i>SAN</i>		DATE 3/11			
COST/SCHEDULE-AREA				PROPOSED SAMPLING SITE LOCATION MAP SWMU 87 - BLDG 611 SOLID WASTE STORAGE UNIT AOC M - FORMER OUTFALL 004 AT BLDG 611 NSWC WHITE OAK SILVER SPRING, MARYLAND				APPROVED BY		DATE	
SCALE AS NOTED								DRAWING NO. FIGURE 2-10		REV 0	

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2.15 AOC M - FORMER OUTFALL 004 AT BUILDING 611

2.15.1 Background

This unit is a storm drain in front of Building 611 (Figure 2-10). Building 611 was a shock test facility requiring high pressure air. Public water was used for cooling and then discharged. The discharge rate for this unit was 1,000 gallons per day. This unit managed explosive compounds.

2.15.2 Sampling Approach

To evaluate the potential presence of contamination at the outfall location, two surface water and two sediment samples will be collected. Collecting the surface water/sediment pairs, in conjunction with the planned field investigation at Building 611, Solid Waste Storage Unit, should provide adequate information to characterize the conditions in the areas adjacent to the outfall and within the receiving drainageway. If the location of the outfall pipe can be identified, a sediment sample will be collected from the pipe, if present.

The surface water and sediment samples will be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, SW846 8330 explosives, and total (unfiltered) TAL metals. If the turbidity in the surface water samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-10.

2.16 AOC N - FORMER OUTFALL 006 AT BUILDING 201

2.16.1 Background

This unit is located 50 feet south of Building 201 (Figure 2-8). The unit consists of an outfall for Building 201. The discharge was primarily cooling water from a storage battery research operation, and floor drains from a large battery room. The permitted discharge rate for this unit is unknown.

2.16.2 Sampling Approach

To evaluate the potential presence of contamination at the outfall location, two surface water and two sediment samples will be collected. Collecting the surface water/sediment pairs, in conjunction with the planned field investigation at Building 201, Oil/Water Separator Unit, should provide adequate information to characterize the conditions in the areas adjacent to the outfall and within the receiving drainageway. If

the location of the outfall pipe can be identified, two surface soil samples will be collected between the pipe, and drainageway.

The surface water, sediment, and soil samples will be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and total (unfiltered) TAL metals. If the turbidity in the surface water samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-8.

2.17 AOC P - FORMER OUTFALL 012 AT BUILDING 312

2.17.1 Background

This unit is located between Buildings 312A and 312B (Figure 2-11). The unit consists of an outfall for Buildings 312A and 312B, which managed explosive compounds. Boiler blowdown and condensate from an 80 horsepower steam boiler within Building 312B was discharged at this site. The permitted discharge rate was 150 gallons per day.

2.17.2 Sampling Approach

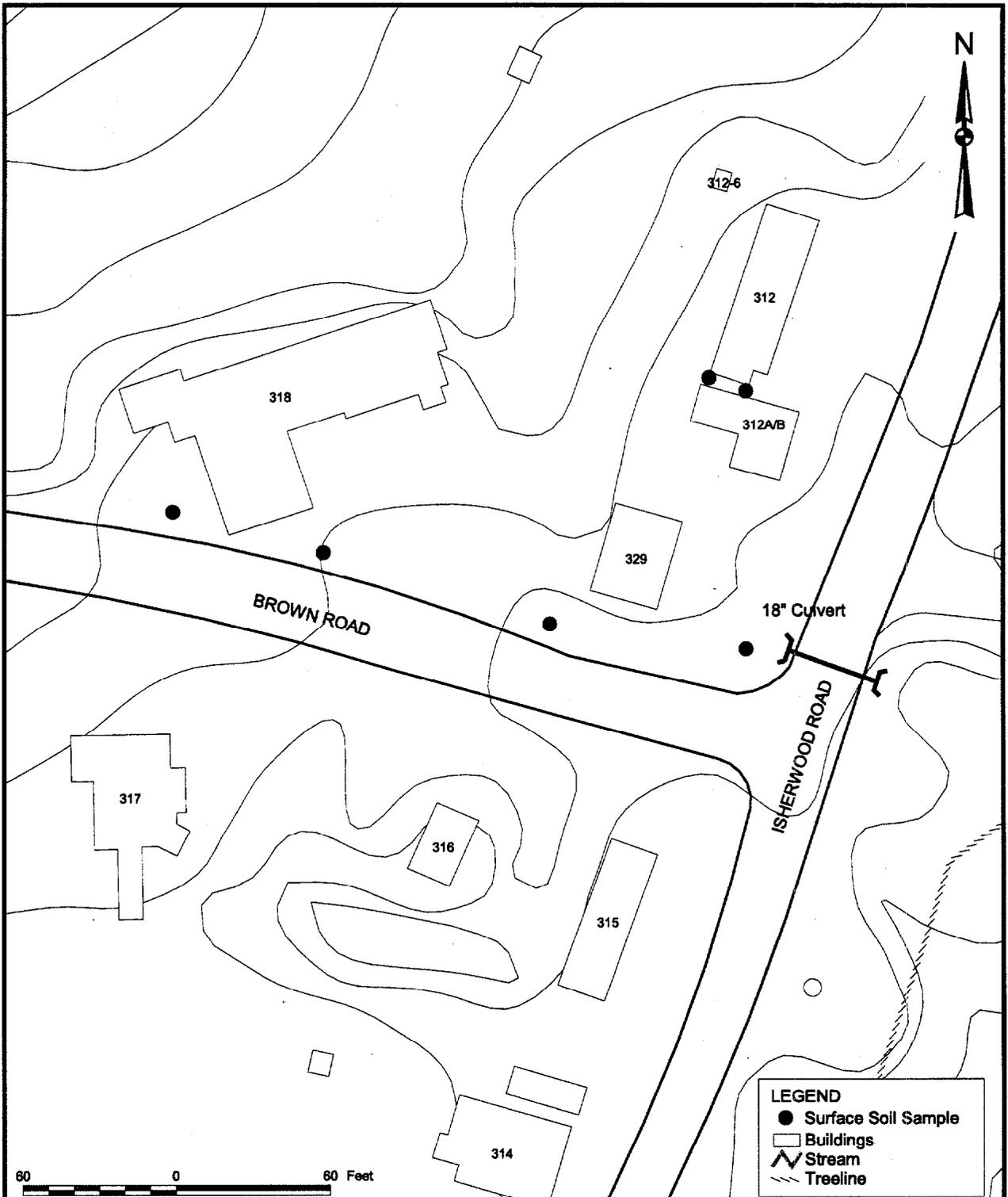
To evaluate the potential presence of contamination at the outfall location, two surface soil samples will be collected. Collecting the soil samples should provide adequate information to characterize conditions in the area adjacent to the outfall and within the receiving drainageway. If the location of the outfall pipe can be identified, a soil/sediment sample will be collected from the pipe, if present. Surface water samples will also be collected if surface water is present in this area.

The surface water and soil/sediment samples will be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, SW846 8330 explosives, and total (unfiltered) TAL metals. If the turbidity in the surface water samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-11.

2.18 AOC Q - FORMER OUTFALL 014 AT BUILDING 328

2.18.1 Background

This unit is located adjacent to a sanitary sewer at Building 328 (Figure 2-9). The discharge to this outfall was from floor drains, cooling tower bleed-off, evaporative cooling wastewater, and groundwater. The discharge rate for this unit was 8,000 gallons per day. This unit managed explosive compounds.



DRAWN BY D. PERRY	DATE 25-AUG-98	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7427	OWNER NO. 0273
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COST/SCHEDULE-AREA		PROPOSED SAMPLING SITE LOCATION MAP AOC P - FORMER OUTFALL 012 AT BLDG 312 AOC R - FORMER OUTFALL 017F AT BLDG 318 NSW WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-11	REV 0

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2.18.2 Sampling Approach

Surface and subsurface soil sample locations were selected downgradient of the Building 328 outfall. Specific locations of the soil samples will be based on field observations of the area surrounding the building. Two surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Two subsurface soil samples will be collected at a depth between 1-and 4 foot using direct push sampling methods. The soil samples will then be analyzed for the following TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, TAL Metals, and SW 846 method 8330 Explosives. The results will determine the need for future study. The sampling locations are provided on Figure 2-9.

In addition, 2 groundwater samples will be collected near Building 328 and analyzed for the same parameters as the soil samples.

2.19 AOC R - FORMER OUTFALL 017F AT BUILDING 318

2.19.1 Background

This unit is located adjacent to Explosive Mix Building 318 (Figure 2-11). The discharge pipes from the explosive research laboratory and the drinking fountain drain emptied into the stormwater spillway. The discharge rate for this unit was 150 gallons per day.

2.19.2 Sampling Approach

To evaluate the potential presence of contamination from this outfall, four surface soil samples will be collected. Collecting the surface soil samples should provide adequate information to characterize conditions in the area adjacent to the outfall. If the location of the outfall pipe can be identified, a sediment sample will be collected from the pipe, if present.

The surface soil samples will be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, total (unfiltered) TAL metals and SW 846 method 8330 Explosives. The sampling locations are provided on Figure 2-11.

2.20 AOC S - FORMER OUTFALL 018 AT BUILDING 310A

2.20.1 Background

This unit is a wastewater outfall located 20 feet north of Building 310A (Figure 2-1), which managed solvents, corrosives, and explosive wastes. The discharge rate for this unit was 6,000 gallons per day.

2.20.2 Sampling Approach

To evaluate the potential presence of contamination at the outfall location, two surface water and two sediment samples will be collected. Sample pairs will be collected upstream of the outfall and one at the outfall or immediately downgradient. Collecting the surface water/sediment pairs, in conjunction with the planned field investigation at Building 310A, Waste Disposal Area, should provide adequate information to characterize conditions in the area adjacent to the outfall and within the receiving drainageway. If the location of the outfall pipe can be identified, a sediment sample will be collected from the pipe, if present.

The surface water and sediment samples will be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, total (unfiltered) TAL metals and SW 846 method 8330 Explosives. If the turbidity in the samples is found to be high, then a dissolved (filtered) TAL metals sample will also be collected. The sampling locations are provided on Figure 2-1.

2.21 BUILDING 615 - HAZARDOUS MACHINING/BLENDING AREA

2.21.1 Background

The site was used for the remote machining of explosives. The site consists of an arch culvert constructed into the hillside west of Kuester Road.

2.21.2 Sampling Approach

To determine the extent of contamination at Building 615, sediment, surface and subsurface soil sampling locations were selected within or downgradient of the waste management area. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Two sediment samples will be collected within the drainageway downstream of the site.

Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil and sediment samples will then be analyzed for the following: TCL VOCs, TCL SVOCs, TAL Metals, and SW 846 method 8330 Explosives. The sampling locations are provided on Figure 2-12.

2.22 FORMER BUILDING 355 - MAGAZINE EXPLOSION AREA

2.22.1 Background

Former Building 355 (Figure 2-13) had been used as an explosive storage shed until the improper storage of two non-compatible materials resulted in the units explosion in 1992. The explosion resulted in the deposition of building materials (concrete, steel) near the building site and resulted in minor damage to surrounding properties.

2.22.2 Sampling Approach

To evaluate the potential contamination resulting from the explosion of Building 355, eight surface soil locations were selected in proximity to the former location of Building 355. A surface sweep of the area will be performed prior to sampling to ensure that unexploded ordnance is not present in the sampling area. The eight surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination identified during the surface sweep. The samples will then be analyzed for TAL Metals and SW 846 Method 8330 explosives. The sampling locations are provided on Figure 2-13.

2.23 EBS AOC 150 - STRESSED VEGETATION AREA

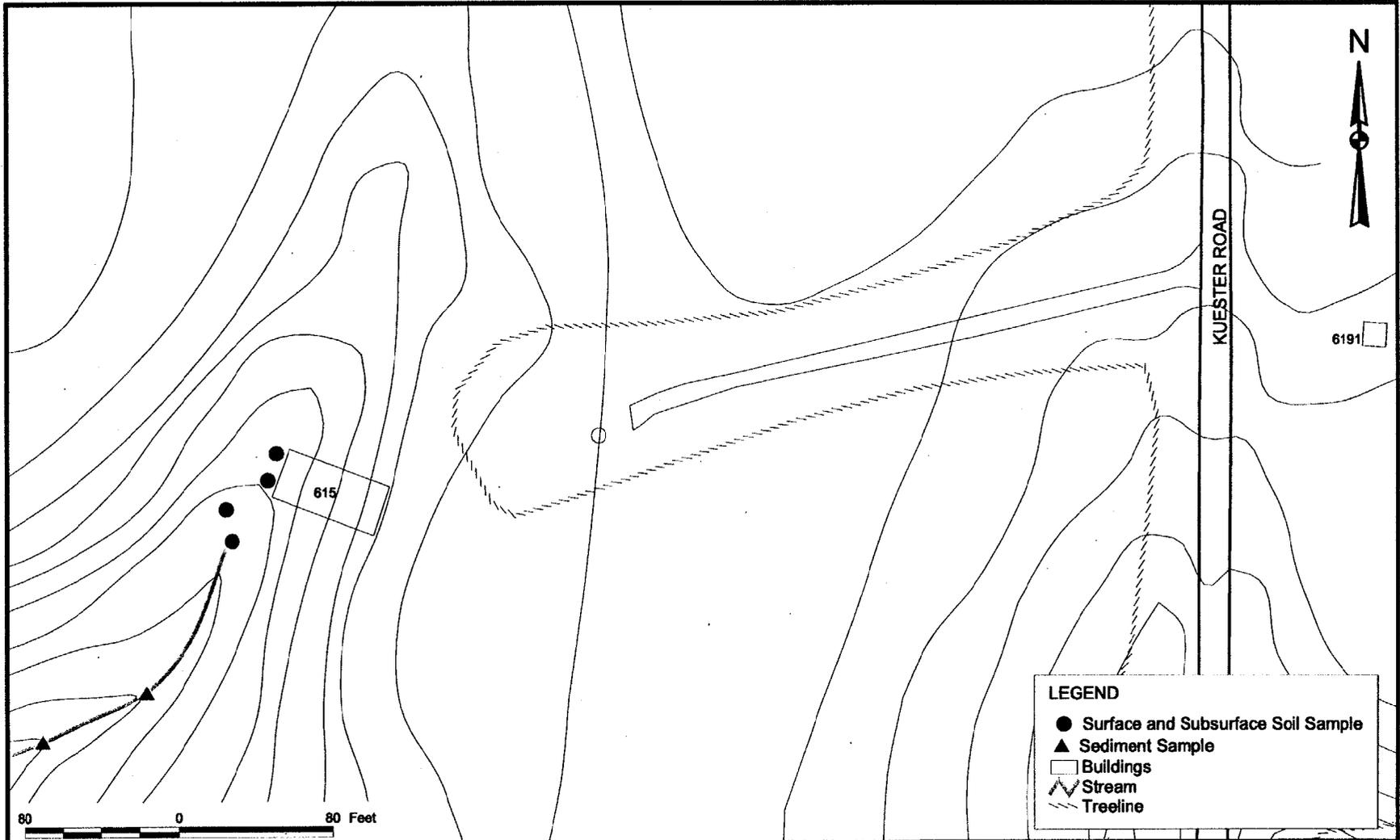
2.23.1 Background

EBS AOC 150 is a grassy area located between Buildings 150 and T1, south of Bowditch Road (Figure 2-14). The AOC is approximately 47 feet by 47 feet. This area was used to store various items (including underwater mine casings) on wooden pallets or directly on the ground.

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2-27

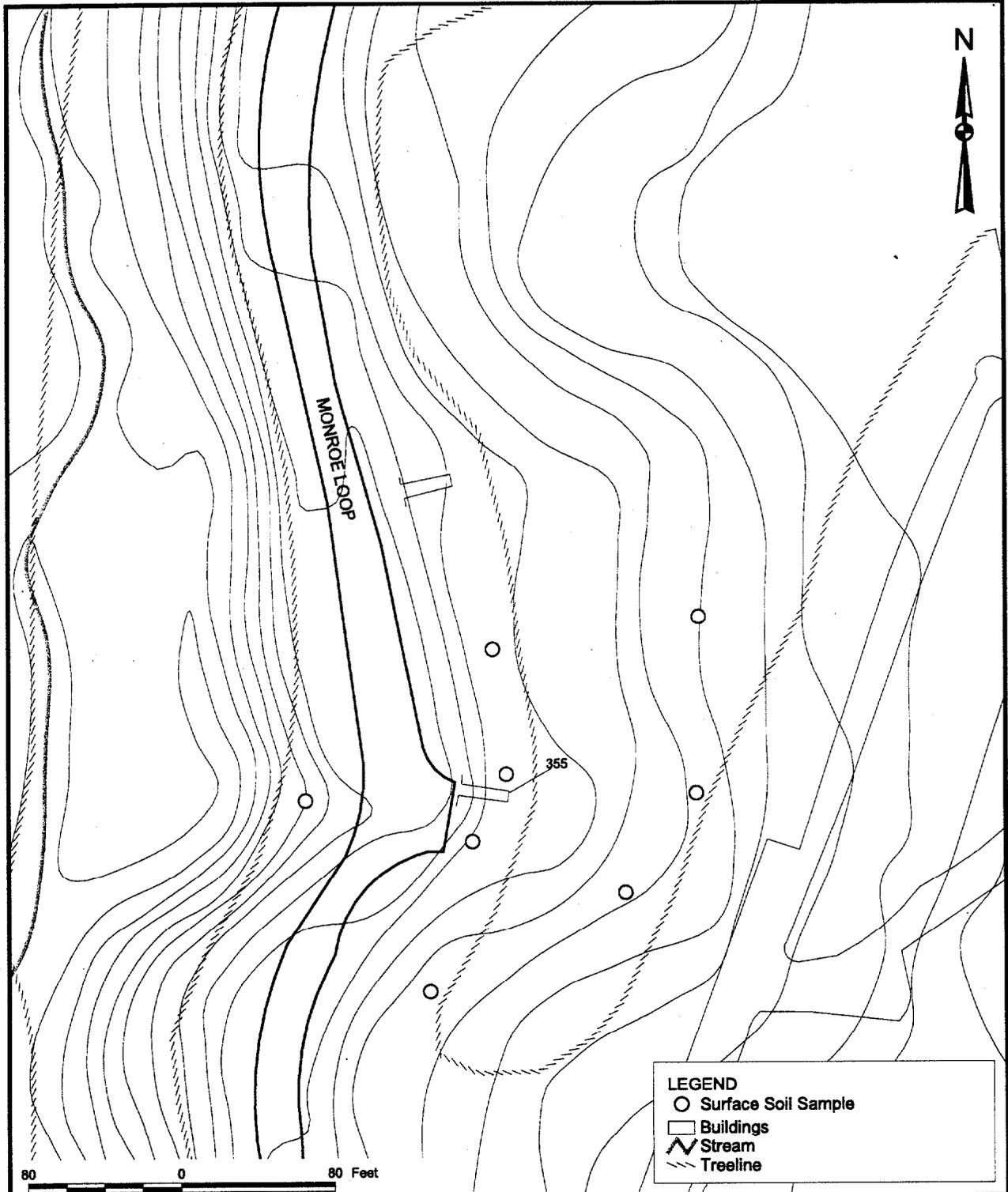
CTO 0273



LEGEND

- Surface and Subsurface Soil Sample
- ▲ Sediment Sample
- Buildings
- ~ Stream
- - - Treeline

DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 19-AUG-98 DATE DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7427	OWNER NUMBER 0273
PROPOSED SAMPLING SITE LOCATION MAP BUILDING 615 - HAZARDOUS MACHINING/BLENDING AREA NSWC WHITE OAK SILVER SPRING, MARYLAND			APPROVED BY <i>SAW</i>	DATE 3/11
			APPROVED BY 	DATE
			DRAWING NO. FIGURE 2-12	REV 0

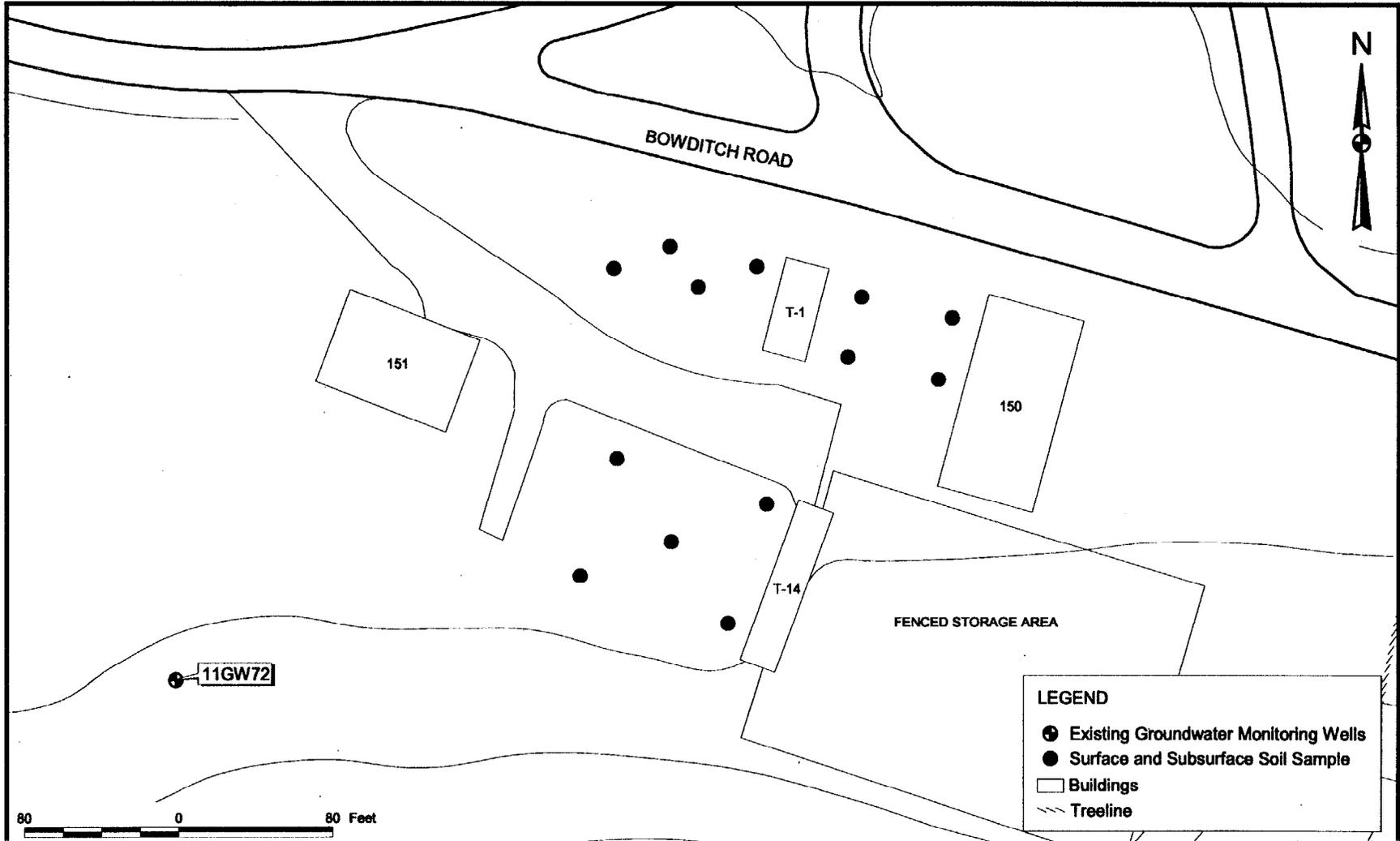


LEGEND

- Surface Soil Sample
- Buildings
- ~ Stream
- - - Treeline

DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 18-AUG-98 DATE DATE DATE	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP BUILDING 355 - MAGAZINE EXPLOSION AREA NSWC WHITE OAK SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427 APPROVED BY <i>SAN</i> APPROVED BY DRAWING NO. FIGURE 2-13	OWNER NO. 0273 DATE <i>3/11</i> DATE REV 0
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P:\GIS\WHITE\DAK7427_PROPOSAL\APR 19-AUG-98 DNP AREA LAYOUT



DRAWN BY C. GLICK	DATE 11-MAR-88	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7427	OWNER NUMBER 0273
CHECKED BY _____	DATE _____		APPROVED BY 	DATE 3/11
COST/SCHEDULE-AREA _____		PROPOSED SAMPLING SITE LOCATION MAP EBS 150 - STRESSED VEGETATION EBS 151 - UNCOVERED STORAGE AREA NSWC WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY _____	DATE _____
SCALE AS NOTED			DRAWING NO. FIGURE 2-14	REV 0

2.23.2 Sampling Approach

Surface and subsurface soil sampling locations were selected within or downgradient of the AOC. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil samples will then be tested for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and TAL Metals. The results from the samples will determine whether or not further study of this site will be necessary. The sampling locations are provided on Figure 2-14.

2.24 EBS AOC 151 - UNCOVERED STORAGE AREA

2.24.1 Background

EBS AOC 151 is a grassy area located to the west of Building T1, east of Building 151, and south of Bowditch Road (Figure 2-14). The AOC covers an approximate 100-foot by 50-foot rectangular area in which various items had been stored outside on the ground. Some of the items included rusted metallic ordnance shapes, many labeled as torpedoes. Many of the items had been broken open, exposing electrical wires, concrete, asbestos-like materials, and other unknown substances. These items have since been removed from the property.

2.24.2 Sampling Approach

Surface and subsurface soil sampling locations were selected within or downgradient of the AOC. Four surface soil samples from areas of stressed vegetation and/or near possible sources of contamination will be collected from the ground surface to 0.5-foot deep using hand trowels. Four subsurface soil samples will be collected at a depth between 0.5-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based upon field observations of the soil and PID readings. In addition five surface and subsurface soil samples will be collected from the storage area west of Building T-14.

The soil samples will then be tested for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and TAL Metals. The results from the samples will determine whether or not further study of this site will be necessary. The sampling locations are provided on Figure 2-14.

2.25 EBS AOC 303 - EXPLOSIVES TEST AREA

2.25.1 Background

AOC 303 is a debris field measuring approximately 200 feet by 200 feet located, in an empty, moderately wooded area to the west of Building 303 (Figure 2-3). The area contains old building foundations and miscellaneous debris, metal, and plastic items, including bomb casings and bomblet-shaped items. The AOC is bordered to the north by an unused large concrete and steel test firing chamber and on the south by old building foundations.

2.26.2 Sampling Approach

Surface and subsurface soil sampling locations were selected within or downgradient of the AOC. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination.

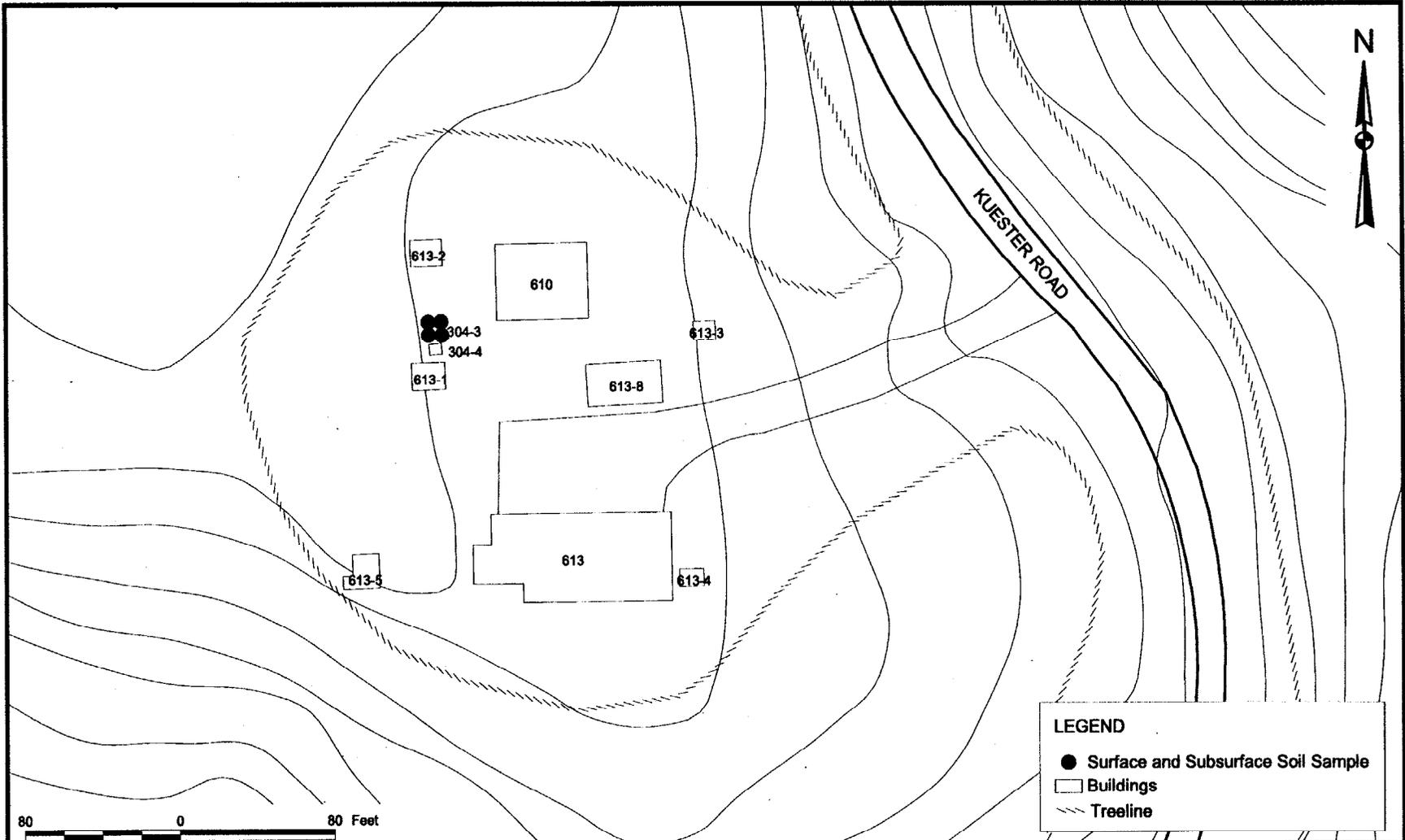
Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil samples will then be tested for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, TAL Metals, and SW 846 Method 8330 Explosives. The results of these samples will determine the need for future study. The sampling locations are provided on Figure 2-3.

2.26 EBS AOC 304-3 - STAINING, SUBSTANCE ON FLOOR

2.26.1 Background

EBS AOC 304-3 is the floor of Building 304-3, which is a former chemical storage shed. The AOC is located next to the parking lot used for Building 613 (Figure 2-15). The floor measures approximately 5 feet by 6 feet. The floor of the shed is stained and emits a strong chemical odor. Cracks in the floor would allow spills inside the building to be released to the underlying and/or adjacent soil.



DRAWN BY D. PERRY	DATE 21-AUG-98	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7427	OWNER NUMBER 0273
CHECKED BY 	DATE 		APPROVED BY S/A	DATE 3/1
COST/SCHEDULE-AREA 	PROPOSED SAMPLING SITE LOCATION MAP EBS AOC 304-3 - STAINS, SUBSTANCE ON FLOOR OF BUILDING 304-3 NSWC WHITE OAK SILVER SPRING, MARYLAND		APPROVED BY 	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-15	REV 0

2.26.2 Sampling Approach

Since the possibly contaminated soil is located underneath the storage shed, it is proposed that the shed be demolished and the area cleared of debris to gain access to the underlying soil. Surface and subsurface soil sampling locations will be selected within the location of the former shed. Four surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Four subsurface soil samples will be collected at a depth between 1-foot and 10 feet through direct push sampling methods. The specific depth of these samples will be based on field observations of the soil and PID readings.

The soil samples will then be tested for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and TAL Metals. The results of these samples will determine the need for future study. The sampling locations are provided on Figure 2-15.

2.27 EBS AOC 334 - OUTDOOR PAINT AND BATTERY STORAGE

2.27.1 Background

The EBS AOC consists of an outdoor concrete walkway on which batteries and paint cans were stored (Figure 2-9). The walkway, adjacent to Building 334, measures approximately 40 feet by 5 feet. The unit is no longer used as a storage area. Rust stains indicating the former location of paint cans and an automotive battery were present at the time of a site survey.

2.27.2 Sampling Approach

Surface and subsurface soil sample locations were selected at the downgradient edge of the concrete walkway. Specific locations of the soil samples will be based on field observations of the rust stains on the concrete walkway, and how water would run off the walkway. Two surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Two subsurface soil samples will be collected at a depth between 1- and 4-foot using direct push sampling methods. The soil samples will then be analyzed for the following: TCL VOCs, TCL SVOCs, TCL Pesticide/PCBs, and TAL Metals. The results will determine the need for future study. The sampling locations are provided on Figure 2-9.

2.28 EBS AOC 500B - FORMER PISTOL RANGE

2.28.1 Background

The EBS AOC500B is an area formerly used as a pistol range. This unit measured approximately 200 feet by 100 feet, and is located in the northeastern portion of the facility, directly east of the Pistol Range Landfill (Figure 2-16). It is unknown whether soil containing bullets has been removed from the site. There is no evidence of release at the AOC. In addition, no bullets, shell casings, or other items consistent with the operation of a pistol range were observed during a site survey.

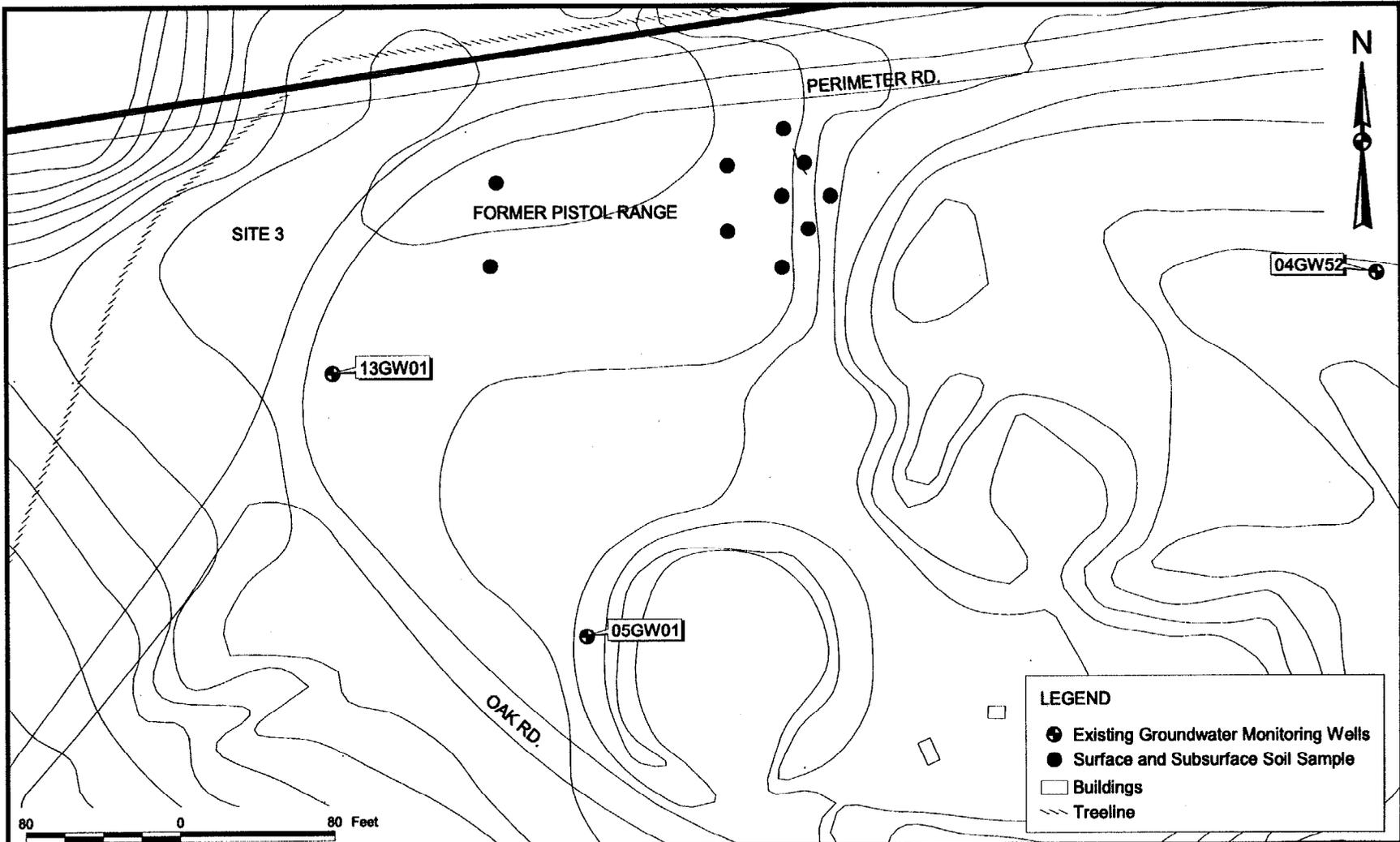
2.28.2 Sampling Approach

Surface and subsurface soil sample locations were selected within the AOC. Due to the large area of the pistol range, 10 surface soil samples will be collected at a depth between the ground surface and 0.5-foot using hand trowels. The samples will be collected within areas of stressed vegetation and/or near possible sources of contamination. Ten subsurface soil samples will be collected from a depth of 1-foot and 2 feet using direct push sampling methods. Eight soil samples will be collected from the backstop area of the site, while two samples will be collected near the firing line. The soil samples will then be analyzed for TAL metals to determine the need for further study. The sampling locations are provided on Figure 2-16.

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DRAWN BY D. PERRY CHECKED BY COST/SCHEDULE-AREA SCALE AS NOTED	DATE 21-AUG-98 DATE DATE	Tetra Tech NUS, Inc. PROPOSED SAMPLING SITE LOCATION MAP EBS AOC 500B - FORMER PISTOL RANGE NSWC WHITE OAK SILVER SPRING, MARYLAND	CONTRACT NUMBER 7427 APPROVED BY <i>[Signature]</i> APPROVED BY DRAWING NO. FIGURE 2-16	OWNER NUMBER 0273 DATE 3/11 DATE REV 0
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3.0 FIELD ACTIVITIES AND PROCEDURES

The field activities associated with this investigation will include the following tasks:

- Mobilization/demobilization
- Site clearing
- Test pit excavation
- Soil sampling
- Sediment sampling
- Surface water sampling
- Groundwater sampling
- Geophysical survey
- Sample handling
- Sample custody
- Decontamination
- Equipment calibration
- Investigation-derived waste (IDW) disposal
- Field survey

Field forms to be used throughout the project are provided in Appendix A of the Master FSP for NSWC-White Oak.

3.1 MOBILIZATION/DEMOBILIZATION

In general, mobilization/demobilization activities will follow the guidelines discussed in Section 2.1 of the Master FSP for NSWC-White Oak. TtNUS will prepare specifications and obtain subcontractors for test pit excavation, direct push sampling, monitoring well construction, laboratory analyses, surveying, and IDW disposal. All field team members will review the project FSP and HASP, and the Master FSP prior to mobilizing to the site. A field team orientation meeting will be held to familiarize personnel with the scope of the field activities.

TtNUS will verify the presence or absence of underground utilities in the vicinity of each site by reviewing NSWC-White Oak utility maps. Underground utilities that are identified through this review will be marked in the field and checked with an underground cable locator prior to initiating intrusive activities.

All site restoration activities will be performed by TtNUS's subcontractors. Site restoration may include, but will not be limited to, regrading and reseeding areas where test pits were excavated and general IDW clean up.

3.2 SITE CLEARING

As required areas near each site will be cleared of vegetation to facilitate the investigation. Site clearing will primarily consist of removing dense grass and shrubs. Removal of trees will be minimized. Cleared vegetation will be chipped for use as mulch during site restoration activities.

3.3 TEST PITS

Test pits will be excavated during the field work. Soil grab samples may be collected from test pits based on visual observations or screening with the PID/flame-ionization detector (FID). Samples will be collected directly from the backhoe bucket. Under no circumstances will field personnel be permitted to enter a test pit. Test pits will be backfilled with the excavated material before completing each day's work activities. The field geologist will complete a Test Pit Log for each test pit. Test pit excavation and sampling will be performed in accordance with Section 2.2.2 of the Master FSP and TtNUS SOP SA-1.3.

3.4 SOIL SAMPLING

Direct-push Technology (DPT) drilling equipment (e.g., Geoprobe[®] and Hydropunch[®]) will be used during the completion of the planned field investigation. The DPT investigation services will be subcontracted and supervised by TtNUS personnel. Soil samples will be collected using DPT methods. All samples obtained will be visually examined, monitored with PID/FID, and collected for chemical analysis. The selection of sampling depths will be biased in an attempt to identify areas of contamination. Visual analysis and evaluated PID/FID readings will be used to select the sample interval. Where clay or impermeable soils are identified, samples will be collected at the interface of the impermeable soil layer. All samples collected will be discrete grab samples.

Sample collection will be performed in accordance with Section 3 of the Master FSP. Upon sample retrieval, the samples to be analyzed for volatile constituents will be containerized first and immediately sealed. All pertinent field data will be recorded using a Soil and Sediment Sample Log Sheet.

Surface soil samples will be collected by hand using hand trowels or other hand tools. The location of surface and subsurface soil sampling locations are subject to change based upon field conditions.

TABLE 3-1
 SUMMARY OF PROPOSED SAMPLING
 AREA OF CONCERN 2
 FORMER NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Site ID	Soil Samples		Sediment	Surface Water	Groundwater	Test Pits	Geophysics	Analyzed	Figure #
	Surface	Subsurface							
SWMU 20 (site 17) - Former Building 130 S. Leaching Well		4	2	2	3	X	X	Full CLP	2-2
SWMU 35 (IR site 21) - Stoneyard across from Building 108	4	4			3			Full CLP	2-5
SWMU 47 - Former Wastewater Treatment Plant Site	8	8			5			Full CLP, E	2-6
SWMU 87 - Building 611 Solid Waste Storage Unit	4	4			4			Full CLP	2-10
Building 615 - Hazardous Machining/Blending Area	4	4	2					SVOCs, E, VOCs, M	2-12
SWMU 29 (IR site 24) - Building 308 Washdown System	4	4			1			E, VOCs, M	2-3
SWMU 40 (IR site 22) - Bldg 305 Wastewater Collection System	4	4						E, VOCs, M	2-4
SWMU 34 - Building 377 Demilitarization Site	4	4						E	2-4
SWMU 50 - Building 112 Oil/Water Separator	4	4						SVOCs, M	2-7
SWMU 51 - Building 113 Oil/Water Separator		4						SVOCs, M	2-7
SWMU 52 - Building 201 Oil/Water Separator		4						SVOCs, M	2-8
SWMU 56 - Building 327 Wastewater Underground Storage Tank		4						SVOCs, E	2-9
EBS AOC 150 - Building 150 Stressed Vegetation Area	4	4						Full CLP	2-14
EBS AOC 151 - Building 151 Uncovered Storage Area	9	9						Full CLP	2-14
EBS AOC 334 - Outdoor Paint & Battery Storage at Building 334	2	2						Full CLP	2-9
EBS AOC 303 - Explosives Test Area at Building 303	4	4						Full CLP, E	2-3
SWMU 8 (site 15) - Building 310A Waste Disposal Area	5	9	2	2		X	X	Full CLP, E	2-1
SWMU 41 (IR site 23) - Building 311 Oxidation Ditch			6	3				Full CLP, E	2-1
AOC M - Former Outfall 004 at Building 611			2	2				Full CLP, E	2-10
AOC N - Former Outfall 006 at Building 201	2		2	2				Full CLP	2-8
AOC P - Former Outfall 012 Building 312			2	2				Full CLP, E	2-11
AOC Q - Former Outfall 014 at Building 328	2	2			2			Full CLP, E	2-9
AOC R - Former Outfall 017F at Building 318	4							Full CLP, E	2-11
AOC S - Former Outfall 018 at Building 310A			2	2				Full CLP, E	2-1
EBS AOC 304-3 - Stains, Substance on Floor of Building 304-3	4	4						Full CLP	2-15
EBS AOC 500B - Former Pistol Range	10	10						Metals	2-16
SWMU 36 - Building 108 Incinerator	4							D, M, SVOCs	2-5
Building 355 - Magazine Explosion Area	8							E, M	2-13

Key: Full CLP - VOCs, SVOCs, Pesticides/PCBs, Metals
 M - Metals
 D - Dioxins
 E - Explosives

Table 3-1 provides a summary of the proposed sampling for all media during the field investigation, including sample media, analytical parameters, and a cross-reference to the figures where the sampling locations are identified. Appendix A provides a complete list of the proposed samples and associated analyses.

3.5 SEDIMENT SAMPLING

Sediment samples will be collected at several sites during the field efforts. Sediment samples will be collected from stream/drainage bottoms by hand using hand trowels or other hand tools. Where multiple sediment samples are collected within a stream, sampling will be performed in an up stream direction. Upon sample retrieval, a sufficient volume will be obtained for volatile organics analysis, if required, and sealed with zero headspace in the sample container. Sediment sample data will then be recorded on a Single Sample Log Sheet and the field logbook. Sampling will be performed in accordance with Section 3.1.5 of the Master FSP.

3.6 SURFACE WATER SAMPLING

Surface water samples will be grab samples collected from surface water drainages, discharge ponds, and low, wet areas. Prior to sampling, the temperature, pH, dissolved oxygen, and conductivity of the water will be measured and recorded on the surface water sample logsheet. To collect the sample, the sample bottle will be submerged below the water surface and allowed to fill. After the sample bottle has been filled, preservatives will be added if required, and the sample bottle will be capped. Where multiple surface water samples are collected within a stream, sampling will be performed in an upstream direction. Sampling will be performed in accordance with Section 3.1.2 of the Master FSP.

If there is an insufficient depth of water to use the direct fill method of sample collection, a stainless-steel beaker will be used to fill the sample bottles.

All pertinent field data will be recorded using a surface water sample logsheet and the field logbook.

3.7 GROUNDWATER SAMPLING

Groundwater samples will be collected from temporary groundwater monitoring wells. Samples will be collected using low flow sampling techniques in accordance with the Section 3.0 of the Master FSP. Temporary groundwater monitoring wells will be constructed similar to permanent wells, with exclusion of the surface casing, protective casing and lock, and concrete pad.

3.8 GEOPHYSICAL INVESTIGATIONS

Geophysical investigations will be conducted at several sites during the planned field activities within AOC 2. The surveys will be performed as the first phase of the field efforts, to allow sufficient time for data reduction, analysis, interpretation and subsequent use in soil sampling activities at the sites. The following techniques will be used in completion of the activities.

3.8.1 Geophysical Reference Grid

A geophysical reference grid will be established at the site to methodically collect and report data. The grid will be staked at a constant interval in units of feet using a transit, electronic distance measure (EDM), or tape measure. Stakes will consist of pin flags or other semi-permanent markers labeled with the grid coordinates in units of feet.

The reference grid will be tied into an existing site grid system, if present, and to any permanent site features such as buildings or fence corners. This will facilitate resumption of subsequent subsurface investigations. Pin flags or other semi-permanent markers will also be left in place at the completion of the survey to also allow reuse of the grid for future investigations, if necessary. Notes taken during the establishment of the reference grid will be maintained in a field book and copies will be submitted to the onsite representative, if requested.

3.8.2 High-Resolution Geonics EM31 Terrain Conductivity Survey

A Geonics EM31 Terrain Conductivity meter (EM31) and digital data logger will be used to characterize shallow subsurface materials less than 15 feet deep. The EM31 is a one-man-operated, frequency domain electromagnetic (FDEM) device that uses principle of electromagnetic (EM) induction to measure the apparent conductivity and magnetic susceptibility of surface and subsurface materials and their pore fluids. The instrument is equipped with very low frequency (VLF) radio transmitter and receiver coil. These coils are separated by a distance of 12 feet and are located at the ends of a ridged, non-metallic pole.

Quadrature and in-phase component data are simultaneously collected with a digital data logger. Quadrature component data, commonly referred to as terrain conductivity or bulk conductivity data, are a measure of the apparent electrical conductivity of the subsurface materials and their pore fluids. A map of quadrature component data will assist in delineating areas of fill materials, contaminated soils, shallow contaminated groundwater, changes in soil types, changes in soil moisture content relative to undisturbed

soils, and the presence of most buried ferrous and nonferrous metals. Quadrature component data are presented in units of conductivity, millimhos/meter (mmhos/m) or milliSiemens per meter (mS/m).

The EM31 device also records the in-phase component of the EM field. The in-phase component data are a measure of the presence of highly conductive material and are often referred to as the metal detection component. Buried metal within 15 feet of surface, such as steel drums or metallic pipes, can be mapped in this mode. In-phase data are presented in units of parts per thousand (ppt).

Data are collected by holding the instrument at waist height and parallel to ground surface and orienting the coils vertically. Data is collected along parallel survey lines with station spacings of 2 to 3 feet. Digital data recorded in the digital data logger is downloaded daily to a laptop computer with the manufacturer's software DAT31.

3.8.3 High-Resolution Geonics EM38 Terrain Conductivity Survey

A Geonics EM38 Terrain Conductivity meter (EM38) and digital data logger will also be used to characterize shallow subsurface materials less than 5 feet deep. The EM38 is a one-man-operated, FDEM device that uses the principle of EM induction to measure the apparent conductivity and magnetic susceptibility of surface and subsurface materials and their pore fluids. The instrument is equipped with a fixed frequency VLF radio transmitter and receiver coil. These coils are separated by a distance of approximately 3.3 feet and are located at the ends of the device's ridged, non-metallic frame.

Quadrature and in-phase data are collected separately by a digital data logger. The quadrature data are used to map subtle soil moisture content changes often associated with disturbed soils or fill materials, shallow soil stratigraphic changes, the presence of shallow metallic objects, and metallic pipes/utilities. The in-phase data are often used to further identify and confirm the presence of buried metallic objects, pipes, and utilities.

Data is collected by orienting the instrument parallel to the survey line at ground surface and orienting the coils vertically. Data is collected along parallel survey lines with station spacings of 1 to 2 feet. Digital data recorded by the data logger is downloaded daily to a laptop computer with the manufacturer's software, DAT38.

3.8.4 EM Data Reduction and Presentation

The downloaded data is initially processed on site using the equipment manufacturer's software to ensure the project objectives are achieved and the data coverage is sufficient. Digital data is edited and viewed in

profile format to assist the onsite geophysicist in making preliminary data interpretations prior to demobilization. In the office, the raw data are converted into an ASCII "xyz" file format and then imported into the software OASIS, where they are digitally filtered, if necessary. The data are then imported into GEOSOFT software, where a cubic, akima or linear spline is applied to the data, and they are gridded using the BIGRID algorithm. The data are then color contoured, assigned an equal area, linear or log-linear color zone, and reviewed in map view format. An AutoCADD DXF map of the site, if available at the time of the survey, is imported and overlain onto the color contour data. Observed anomalous responses are annotated on each map, and a discussion of the interpretation of each anomaly is provided in the text of the report.

3.9 SAMPLE HANDLING

Sample handling procedures and practices will be conducted as outlined in Section 3.2 of the Master FSP (B&R Environmental, 1997). Table 3-2 summarizes analytical parameters and methods, and requirements for bottleware, sample preservation, and allowable holding times.

The sample identification numbers will be defined as follows. The first characters indicate the site from which the samples will be collected, i.e., 18 for Site 18, 33 for SWMU 33. The next two characters indicate the sample media (TP - test pit, SW - surface water, and SD - sediment). The next two characters indicate the sample location, beginning at 01 for each sampling location and increasing sequentially as a function of the total number of samples to be collected, while the final four characters denote the sample depth at each location. Sample depths will be determined in the field, at which time a four digit sample depth indicator will be added to the identification number.

3.10 SAMPLE CUSTODY

Custody of samples must be maintained and documented at all times. Chain of custody begins with collecting field samples. TtNUS SOP SA-6.1 and Section 5.0 of the Master QAPP for NSWC-White Oak provide further detail on sample custody procedures (B&R Environmental, 1997).

3.11 DECONTAMINATION

The equipment involved in the field sampling activities will be decontaminated prior to and during sampling activities in accordance with TtNUS SOP SA-7.1. Section 2.10.1 of the Master FSP contains specific decontamination procedures for activities at NSWC-White Oak (B&R Environmental, 1997). The backhoe bucket will be swept clean of all visible soil between each test pit. The backhoe will be pressure washed

TABLE 3-2

REQUIREMENTS FOR SAMPLE BOTTLEWARE, PRESERVATION, AND HOLDING TIME
 SITE SCREENING AOC 2
 former NSWC-WHITE OAK, SILVER SPRING, MARYLAND
 1 of 1

Analysis	Method	Sample Volume	Container Material	Preservation	Holding Time ⁽¹⁾
SOIL					
TAL Metals	CLP SOW ILM04.0	240 mL (8 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	6 months Mercury - 28 days
TCL VOCs	CLP SOW OLM03.2	120 mL (4 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	14 days
TCL SVOCs	CLP SOW OLM03.2	240 mL (8 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	Extract 7 days Analyze 40 days
Explosives	SW8330	240 mL (8 oz.)	Amber wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	Extract 7 days Analyze 40 days
Dioxins		32 oz.	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	
pH	SW 846 9045 C	120 mL (4 oz.)	Wide-mouth glass jar	None	None
Total Organic Carbon (TOC)	Lloyd Kahn	120 mL (4 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	28 days
AQUEOUS					
TAL Total Metals	CLP SOW ILM04.0	1 Liter	Polyethylene bottle; plastic cap	HNO ₃ ⁽³⁾ to pH <2	6 months Mercury - 28 days
TAL Metals (Dissolved)	CLP SOW ILM04.1	1 Liter	Polyethylene bottle; plastic cap	HNO ₃ ⁽³⁾ to pH <2	6 months Mercury - 28 days
Cyanide	CLP SOW ILM04.0	1 Liter	Polyethylene bottle; plastic cap	Cool to 4°C; NaOH ⁽⁴⁾ to pH >12	14 days
Explosives	SW8330	2.5 Liter	Amber wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	Extract 7 days Analyze 40 days
TCL VOCs	CLP SOW OLM03.2	Two 40 mL	Glass vial; teflon-lined septa	Cool to 4°C; HCl ⁽⁵⁾ to pH <2	14 days
TCL SVOCs	CLP SOW OLM03.2	2.5 Liter	Amber glass with teflon- lined cap	Cool to 4°C	Extract 7 days Analyze 40 days
pH	SW 846 9045 C	120 mL (4 oz.)	Polyethylene bottle; plastic cap	None	None
SEDIMENT					
TAL Total Metals	CLP SOW ILM04.0	240 mL (8 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	6 months Mercury - 28 days
TCL VOCs	CLP SOW OLM03.2	120 mL (4 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	14 days
TCL SVOCs	CLP SOW OLM03.2	240 mL (8 oz.)	Wide-mouth glass jar; Teflon-lined lid	Cool to 4°C	Extract 7 days Analyze 40 days

1 Holding times are measured from the time of collection.

3 HNO₃ = Nitric Acid.

4 NaOH = Sodium Hydroxide.

5 HCl = Hydrochloric Acid.

Note: VOC samples shall be collected such that there is 0 to minimal head space in the sample container.

on arrival at the site and at the completion of test pit excavation activities, prior to being demobilized from the facility.

3.12 EQUIPMENT CALIBRATION

Field instruments will be calibrated according to the manufacturer's procedures, TtNUS SOPs, and procedures outlined in Section 2.5.1 of the Master FSP (B&R Environmental, 1997).

3.13 IDW HANDLING

As stated in Section 2.11 of the NSWC-White Oak Master FSP, all IDW will be handled in accordance with the USEPA guidance document, Management of Investigation-Derived Wastes During Site Inspections (USEPA, 1991), Maryland's Environment Article, 7-201(t), and the Code of Maryland Regulations (COMAR) 26.13.02.02.

The types of IDW expected to be generated during this field effort are decontamination fluids and field personnel personal protective equipment (PPE). Fluids generated during cleaning of hand operated sampling equipment and the backhoe bucket will be containerized in 55-gallon drums for disposal. PPE and other debris will be collected in garbage bags and disposed in a trash receptacle.

3.14 FIELD SURVEY

All sampling locations, including soil borings, surface water, and sediment samples will be surveyed at the completion of the field investigation activities. Existing survey monuments within NSWC-White Oak will be used as reference points. The field survey will be performed in accordance with requirements set forth in the Master FSP for NSWC-White Oak (B&R Environmental, 1997).

4.0 PROJECT SCHEDULE

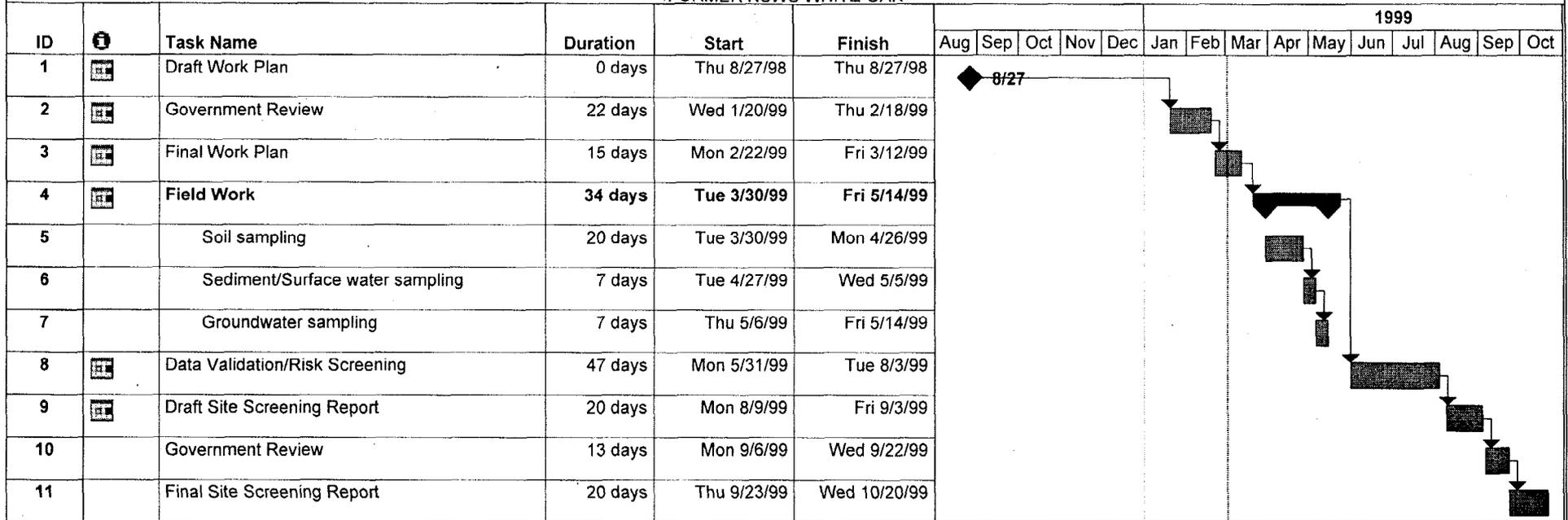
Figure 4-1 provides the schedule for the project, including field activities and development of project reports. The schedule is based on assumptions regarding the review and approval of project planning documents and draft reports.

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4-2

CTO-0273

**FIGURE 4-1
PROJECT SCHEDULE - SITE SCREENING AT AREA OF CONCERN 2
FORMER NSW WHITE OAK**



Project: aoc23 Date: Tue 3/2/99	Task		Rolled Up Task		Project Summary	
	Progress		Rolled Up Milestone		Split	
	Milestone		Rolled Up Progress		Rolled Up Split	
	Summary		External Tasks			

REFERENCES

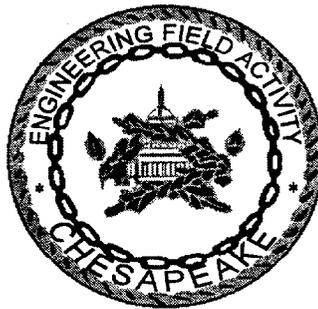
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**Quality Assurance Project Plan
for Site Screening
Area of Concern 2
former
Naval Surface Warfare Center
White Oak
Silver Spring, Maryland**



**Engineering Field Activity Chesapeake
Naval Facilities Engineering Command**

Contract Number N62472-90-D-1298

Contract Task Order 0273

March 1999

**QUALITY ASSURANCE PROJECT PLAN
FOR SITE SCREENING
AREA OF CONCERN 2**

**NAVAL SURFACE WARFARE CENTER, WHITE OAK
SILVER SPRING, MARYLAND**

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

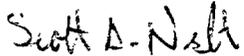
**Submitted to:
Engineering Field Activity Chesapeake
Environmental Branch Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121**

**Submitted by:
Tetra Tech NUS
600 Clark Avenue, Suite 3
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**CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0273**

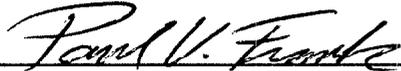
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ACRONYMS/ABBREVIATIONS

ASTM	American Society for Testing and Materials
B&R	Brown & Root
BRAC	Base Realignment and Closure
CLEAN	Comprehensive Long-term Environmental Action Navy
CTO	Contract Task Order
EE/CA	Engineering Evaluation/ Cost Analysis
EFACHES	Engineering Field Activity Chesapeake
FID	Flame Ionization Detector
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IDW	Investigation Derived Waste
IRP	Installation Restoration Program
MDE	Maryland Department of the Environment
NFESC	Naval Facilities Engineering Service Center
NSWC	Naval Surface Warfare Center
PID	Photoionization Detector
PQL	Practical Quantitation Limit
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
SOP	Standard Operating Procedure
SVOC	Semivolatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TtNUS	Tetra Tech NUS
USEPA	United State Environmental Protection Agency
VOC	Volatile Organic Compounds

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by Tetra Tech NUS (TtNUS), formerly Brown & Root Environmental, on behalf of the United States Navy Northern Division Naval Facilities Engineering Command and the former Naval Surface Warfare Center (NSWC) White Oak, Silver Spring, Maryland, under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62472-90-D-1298, Contract Task Order (CTO) 0273.

This QAPP is intended to be used in conjunction with the project-specific Field Sampling Plan (FSP) and Health and Safety Plan (HASP) submitted herewith, as well as the existing Master project planning documents (Master QAPP, Master Work Plan, Master FSP, and Master HASP) for NSWC-White Oak (B&R Environmental, 1998).

This QAPP presents the organization, objectives, planned activities, and specific Quality Assurance/Quality Control (QA/QC) procedures associated with the Site Screening of Area of Concern 2 at the former NSWC-White Oak facility. Specific protocols for sampling, sample handling and storage, chain-of-custody, and laboratory and field analyses are described. All QA/QC procedures are structured in accordance with applicable technical standards, the Naval Facilities Engineering Service Center (NFESC) guidance document "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 1996), and United States Environmental Protection Agency (USEPA) Region III and Maryland Department of the Environment (MDE) requirements, regulations, guidance, and technical standards.

1.2 FACILITY DESCRIPTION

A description of the former NSWC-White Oak facility, including its location, size and borders, site condition, and natural and manmade features, is provided in Sections 1.1 and 1.2 of the CTO 0273 FSP (TtNUS, 1998).

1.3 PROJECT OBJECTIVES

This section discusses the overall project objectives and the target parameters and intended data uses for both field and laboratory analytical data.

1.3.1 Overall Project Objective

The primary objective of the Site Screening is to obtain information as to the extent, type, and levels of contamination present at 28 sites at the former NSWC-White Oak facility. These data will be used to characterize each site as to potential risks to human health and the environment associated with each site.

1.3.2 Project Target Parameters and Intended Data Uses

This section discusses the field and laboratory analytical information to be generated during the course of the investigation. Field parameters and intended data uses are discussed in Section 1.3.2.1. Laboratory parameters and intended data uses are discussed in Section 1.3.2.2.

1.3.2.1 Field Parameters

Field parameters will include those associated with soil and water sampling and analysis. Field measurements will include only those completed using simple field instrumentation.

Field measurements of total volatile organics will be completed using a Photoionization Detector (PID) or Flame Ionization Detector (FID). These measurements will be used to monitor breathing zone conditions of site workers, to locate potential source areas using soil gas screening, and to screen for high concentrations of contaminants in order to alert the laboratory. In addition, water samples collected at various sites will be tested in the field for pH.

1.3.2.2 Laboratory Parameters

The analytical methods to be used for sample analysis at the former NSWC-White Oak facility have been selected based on existing information regarding the use of the facility. The suite of analyses for the Site Screening activities include Target Compound List (TCL) volatile organic compounds (VOCs); TCL semivolatle organic compounds (SVOCs); TCL Pesticides and Polychlorinated Biphenyls (Pest/PCB); TCL Dioxins; Target Analyte List (TAL) metals, and explosives. Data generated from these analyses will be used to determine the nature and extent of contamination in soils, surface water, sediment and groundwater at the sites being investigated.

Tables 1-1 and 1-2 list the specific analytical methods to be used for the analysis of aqueous and solid samples collected during this investigation. Analytical detection limits for TCL organic, TAL inorganic, and

TABLE 1-1

**SUMMARY OF ORGANIC AND INORGANIC ANALYTICAL PROCEDURES
AQUEOUS MATRICES
NSWC-WHITE OAK, SILVER SPRING, MARYLAND**

Parameter	Aqueous Samples	
	Preparation Method	Analytical Method
TCL Volatile Organics	OLC02.1 ⁽¹⁾	OLC02.1
TCL Semivolatile Organics	OLC02.1	OLC02.1
TCL Pesticides/PCBs	OLC02.1	OLC02.1
Explosives	SW-846 8330 ⁽²⁾	SW-846 8330
TAL Metals	ILM04.0 ⁽³⁾	ILM04.0

1 USEPA, 1994.

2 USEPA, 1997.

3 USEPA, 1995.

TABLE 1-2

**SUMMARY OF ORGANIC AND INORGANIC ANALYTICAL PROCEDURES
SOLID MATRICES
NSWC-WHITE OAK, SILVER SPRING, MARYLAND**

Parameter	Solid Samples	
	Preparation Method	Analytical Method
TCL Volatile Organics	OLM03.2 ⁽¹⁾	OLM03.2
TCL Semivolatile Organics	OLM03.2	OLM03.2
TCL Pesticides/PCBs	OLM03.2	OLM03.2
TAL Metals	ILM04.0 ⁽²⁾	ILM04.0
TCL Dioxins	DFLM01.0 ⁽³⁾	DFLM01.0
Explosives	SW-846 8330 ⁽⁴⁾	SW-846 8330

- 1 USEPA, 1994.
- 2 USEPA, 1995.
- 3 USEPA, 1991.
- 4 USEPA, 1997

explosives analyses are provided in Tables 1-2, 1-4, 1-9, and 1-14 of the Master QAPP. Analytical methods are further discussed in Section 7.0 of the Master QAPP.

1.4 SAMPLE NETWORK DESIGN AND RATIONALE

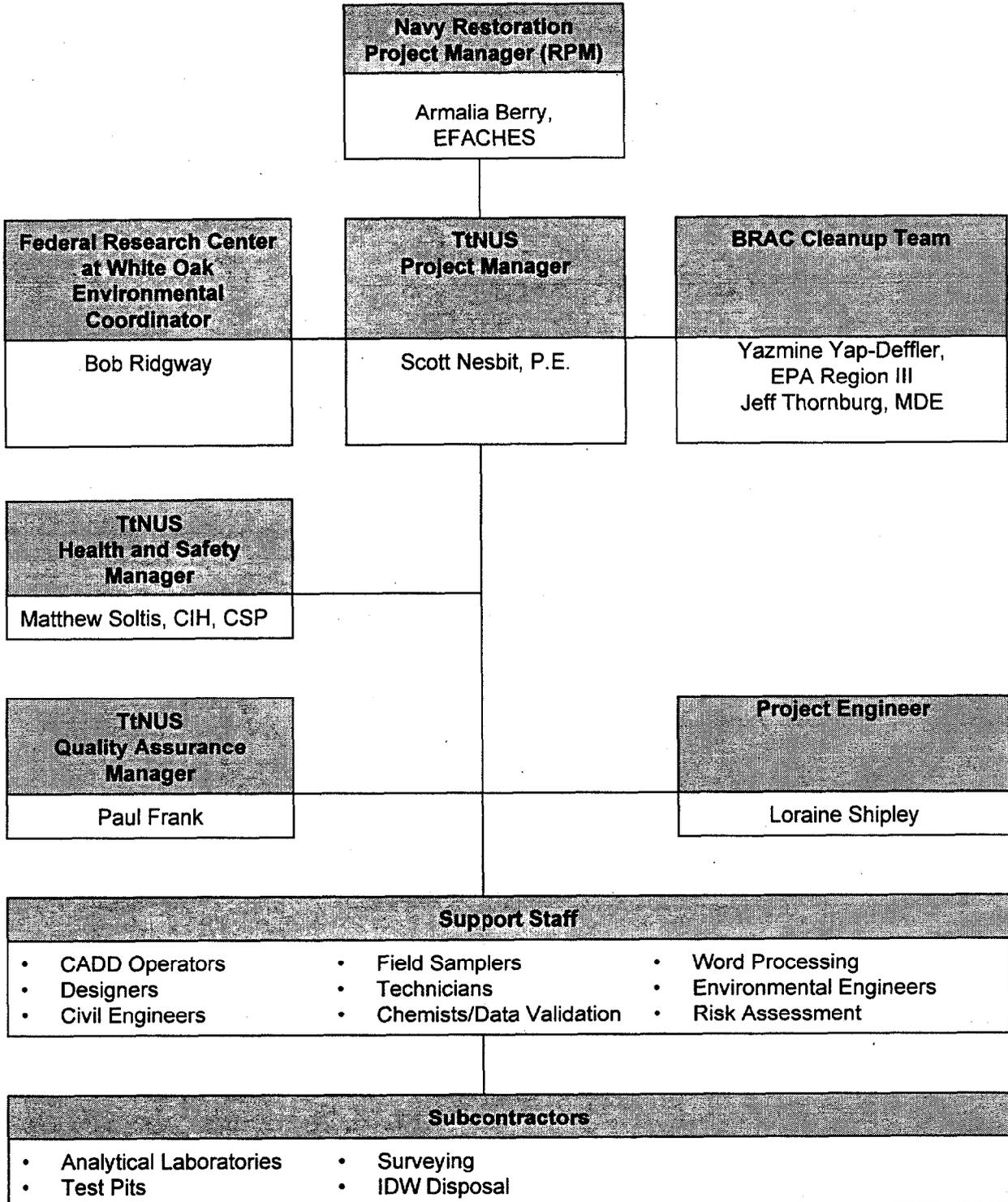
The sample network design and rationale is discussed in detail in Section 2.0 of the CTO 273 FSP. Figures displaying proposed sampling locations are provided therein.

2.0 PROJECT ORGANIZATION

The project organization chart for the Site Screening is provided in Figure 2-1. Further information regarding project organization is provided in Section 2.0 of the Master QAPP.

FIGURE 2-1

PROJECT ORGANIZATION CHART
NSWC-WHITE OAK, SILVER SPRING, MARYLAND



3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

See Section 3.0 of the Master QAPP.

4.0 SAMPLING PROCEDURES

Field sampling procedures for the former NSWC-White Oak facility are discussed in detail in Section 3.1 of the Master FSP. In addition, the CTO 0273 FSP addresses the following sampling procedures and field investigation tasks:

Mobilization/demobilization - Section 3.1

Site clearing - Section 3.2

Test pit excavation/soil sampling - Section 3.3

Soil Sampling – Section 3.4

Surface Water sampling - Section 3.6

Sediment sampling - Section 3.5

Groundwater Sampling – Section 3.7

Sample handling - Section 3.9

Sample custody - Section 3.10

Investigation-derived waste (IDW) - Section 3.13

Equipment calibration - Section 3.12

Field survey - Section 3.14

Standard Operating Procedures (SOPs) regarding sampling, record keeping, and field investigation tasks are included in Appendices to the Master FSP.

Sample container, preservation, volume and holding time requirements specific to this investigation are provided in Table 3-2 of the CTO 0273 FSP.

5.0 CUSTODY PROCEDURES

See Section 5.0 of the Master QAPP.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

See Section 6.0 of the Master QAPP.

7.0 ANALYTICAL AND MEASUREMENT PROCEDURES

See Section 7.0 of the Master QAPP.

8.0 QUALITY CONTROL CHECKS

See Section 8.0 of the Master QAPP.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

This section describes the procedures to be used for data reduction, validation, and reporting for the investigation of the former NSWC-White Oak facility. All data generated during the course of the investigation will be maintained in hardcopy form by TtNUS in the Naval Facilities Engineering Command Northern Division central files located in Pittsburgh, Pennsylvania.

In addition to the central files, photocopies of all hardcopy data (as well as electronic data) will be maintained in the Chemistry/Toxicology/Risk Assessment Department database records files located in Pittsburgh. Upon completion of the contract, all files will be relinquished to the United States Navy.

9.1 DATA REDUCTION

Data reduction will be completed for both field measurements and laboratory-generated analytical data. Field data reduction will be relatively limited versus the degree of laboratory data reduction required for the project. Reduction of both field data and laboratory data are discussed in the remainder of this section.

9.1.1 Field Data Reduction

See Section 9.1.1 of the Master QAPP.

9.1.2 Laboratory Data Reduction

Laboratory analytical data will be reported using standard concentration units to ensure comparability with regulatory standards/guidelines and previous analytical results. Reporting units for solid and aqueous matrices for the classes of chemicals under consideration are as follows:

Aqueous samples:

- TCL volatiles, semivolatiles, and pesticides/PCB - $\mu\text{g/L}$
- TAL metals - $\mu\text{g/L}$
- explosives - $\mu\text{g/L}$

Soil samples:

- TCL volatiles, semivolatiles, and pesticide/PCB - µg/kg
- TAL metals - mg/kg
- TCL Dioxins - ppt
- explosives - µg/Kg

For further information regarding laboratory data reduction refer to Section 9.1.2 of the Master QAPP.

9.2 DATA VALIDATION

Validation of field measurements and laboratory analytical data are discussed in this section. Validation of field data will be limited to real time "reality" checks whereas laboratory analytical data will be validated in accordance with current U.S. EPA guidance. Validation of field measurements is discussed in Section 9.2.1 of the Master QAPP. Validation of laboratory analytical data is discussed in Section 9.2.2 of the Master QAPP.

9.2.1 Field Measurement Data Validation

Field measurements will not be subjected to a formal data validation process. However, field technicians will ensure that the equipment used for field measurement is performing accurately via compliance with SOPs included in Appendix B of the Master FSP. All field data entered into the electronic database will be independently reviewed for transcription errors.

9.2.2 Laboratory Data Validation

All laboratory data will be validated. Validation of analytical data will be completed by the TtNUS Chemistry Department located in the TtNUS Pittsburgh office. Final review and approval of validation deliverables will be completed by the Department's Data Validation Coordinator. For further information refer to Section 9.2.2 of the Master QAPP.

9.3 DATA REPORTING

Refer to Section 9.3 of the Master QAPP.

10.0 PERFORMANCE AND SYSTEM AUDITS

See Section 10.0 of the Master QAPP.

11.0 PREVENTIVE MAINTENANCE PROCEDURES

See Section 11.0 of the Master QAPP.

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

See Section 12.0 of the Master QAPP.

13.0 CORRECTIVE ACTION

See Section 13.0 of the Master QAPP.

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

See Section 14.0 of the Master QAPP.

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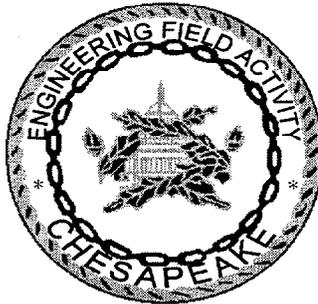
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Health and Safety Plan for Site Screening at Area of Concern 2

for the former
Naval Surface Warfare Center
White Oak
Silver Spring, Maryland



Engineering Field Activity Chesapeake
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Contract Task Order 0273

March 1999

**DRAFT HEALTH AND SAFETY PLAN
FOR SITE SCREENING AREA OF CONCERN 2
for the former
NAVAL SURFACE WARFARE CENTER
WHITE OAK
SILVER SPRING, MARYLAND**

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

**Submitted to:
Engineering Field Activity Chesapeake
Environmental Branch Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121**

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**CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0273**

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide the minimum safety and health practices and procedures for Tetra Tech NUS, Inc. (TtNUS) and subcontractor personnel engaged in investigatory activities at the former Naval Surface Warfare Center - White Oak (NSWC White Oak), Silver Spring, Maryland.

The following general investigatory activities will be conducted at NSWC White Oak:

- Multi-media sampling
 - Surface and subsurface soil sampling - This sampling will be accomplished through Direct Push Technology (Geoprobe), test pit excavations, or by hand.
 - Sediment sampling
 - Surface water sampling
 - Groundwater sampling

- Demolition of Building 304-3 for the purpose of gaining access to potentially contaminated soils underneath the storage shed

This HASP discusses personnel responsibilities and establishes requirements to be incorporated into the above planned activities for the purpose of protecting personnel from hazards which may be inherent to the site or task associated with the scope of work.

The TtNUS Health and Safety Guidance Manual supports this HASP. The Guidance Manual provides detailed information pertaining to the HASP, as well as, applicable 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) and applicable portions of 29 CFR 1926 (OSHA's Construction Industry Standards), as they may apply. In order to be in compliance with the above standards. Both of these documents must be present at the site during the performance of all site activities.

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 at the site. This HASP will be modified if new information becomes available. All changes to the HASP will be made with the approval of the TtNUS Project Health and Safety Officer (PHSO) and the TtNUS Health and Safety Manager (HSM). Requests for modifications to the HASP will be directed to the SSO who will make

appropriate recommendations to the PHSO. All changes made by the PHSO will be communicated to the Project Manager (PM), who will notify all affected personnel of changes.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in on-site activities. Personnel assigned to these positions will exercise the primary responsibility for all on-site health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for on-site activities.

- The TtNUS PM is responsible for the overall direction of health and safety for this project.
- The PHSO is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
 - Providing information regarding site contaminants and physical hazards associated with the site.
 - Establishing air monitoring and decontamination procedures.
 - Assigning personal protective equipment.
 - 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 work.
 - Making any changes to this document as it may apply to site conditions or tasks to be conducted.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- The SSO supports site activities by advising the FOL on all aspects of health and safety on-site. These duties may include:
 - Coordinates all health and safety activities with the FOL.
 - Selects, applies, inspects, and maintains personal protective equipment.
 - Establishes work zones and control points.
 - Implements air monitoring program for on-site activities.

- Verifies training and medical clearance of on-site personnel status in relation to site activities.
- Implements Hazard Communication and Respiratory Protection and other associated safety and health programs, as they may apply to the operations identified as part of this project.
- Coordinates emergency services.
- Provides site-specific training for all on-site personnel.

Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TiNUS CLEAN HSM.

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

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

TtNUS will provide the following response measures:

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

2.2 PRE-EMERGENCY PLANNING

Through the initial hazard/risk assessment efforts, injuries or illnesses resulting from exposure to chemical or physical hazards or fire are the most probable emergencies that could be encountered during site activities. To minimize and eliminate these potential emergency situations, pre-emergency planning activities associated with this project include the following (which are the responsibility of the SSO and/or the FOL):

- Coordinating with local Emergency Response personnel to ensure that TtNUS emergency action activities are compatible with existing 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 (used on-site), with Material Safety Data Sheets.
 - On-site personnel medical records (Medical Data Sheets).
 - A log book identifying personnel on site each day.

It will be the responsibility of the TtNUS FOL to:

- Identify a chain of command for emergency action.
- Educate site workers to the hazards and control measures associated with planned activities at the site, and to provide early recognition and prevention where possible.

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 visual observation. Visual observation is primarily relevant for physical hazards that may be associated with the proposed scope of work. Visual observation may also play a role in detecting some chemical exposures. To adequately recognize exposures to site contaminants, site personnel must have a clear knowledge of signs and symptoms of exposure associated with potential site contaminants. This information is provided in Table 6-1 of this HASP. Potential site hazards associated with site activities and the recommended control methods are discussed in detail in Section 5.0 and 6.0 of this HASP. Additionally, early recognition of emergency situations will be supported by periodic site surveys to eliminate any situation predisposed to an emergency. The FOL, SSO, and the subcontractor supervisor will be responsible for performing surveys. Site surveys will be conducted at all work locations prior to the commitment of resources and personnel. This will be done for the purpose of removing or barricading identified physical hazards. Additionally, site surveys will be conducted at least once a week at all resource/staging areas. All site surveys conducted during this effort and will be documented in the Field Operations Logbook.

The above actions will provide early recognition for potential emergency situations. Should an incident occur, TtNUS will take measures in the beginning stages to control these situations. However, if the FOL and the SSO determine that an incident has progressed to a serious emergency situation, TtNUS will withdraw and notify the appropriate response agencies listed in Table 2-1.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by following the direction and guidance provided within the HASP and applicable OSHA regulations as they apply to the tasks to be conducted. Additionally, prevention will be facilitated through employment of offensive and defensive measures in removing or denying access to hazards identified through the site survey activities.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, all personnel will immediately stop activities and report to the designated safe place of refuge. Safe places of refuge will be identified prior to the commencement of site activities and will be conveyed to personnel as part of issuing a Safe Work Permit (SWP) to conduct exclusion zone activities within an identified area. As part of this issuance, a safety meeting will be conducted to preview hazards and control measures identified on the SWP and through the site survey for that particular area. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the TtNUS FOL or the on-site Incident Commander of the Emergency Response Team. The FOL or the SSO will take a head count at this location to account for and to confirm the location of all site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel.

2.5 EVACUATION ROUTES AND PROCEDURES

An evacuation to the identified refuge location will be initiated whenever the health, safety or welfare of site workers is compromised. Specific examples of conditions that may initiate an evacuation include (but are not limited to) the following: severe weather conditions; a fire or explosion; readings on monitoring instruments indicating levels of contamination that are greater than instituted action levels; and personnel showing signs or symptoms of overexposure to potential site contaminants. In the event of an evacuation, personnel will proceed immediately to the designated place of refuge unless doing so would further jeopardize the welfare of workers. In such an event, personnel will proceed to a designated alternate location and remain until further notification from the TtNUS FOL.

Evacuation procedures will be discussed prior to the initiation of any work at the site. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed.

2.6

DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During an evacuation, decontamination procedures will be performed only, if doing so does not further jeopardize the welfare of site workers. However, it is unlikely that an evacuation would occur at this site which would require workers to evacuate the site without first performing decontamination procedures. TtNUS will provide medical treatment to the level of first-aid. Personnel requiring treatment greater than first-aid will constitute an emergency situation for which the appropriate agency must be notified. First-aid kits will be maintained on-site and accessible to all field personnel during operations as described within this document.

2.7

EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

At each site, TtNUS personnel will be working in close proximity to each other. As a result, hand signals, voice commands, and air horns will be sufficient to alert site personnel of an emergency. If teams will be working simultaneously as part of this project, two-way radios will be used to communicate between teams of workers. The use of two-way radio communication at NSWC, will require prior approval by NSWC.

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

- Initiate an evacuation by hand signals, voice commands, air horn, or two-way radios. Report to the designated refuge point.
- Describe to the FOL (who will serve as the Incident Coordinator) what has occurred and as many details as possible. Once all personnel are evacuated, appropriate beginning stage response procedures will be enacted to control the situation.

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

- Call 911 or other emergency contacts (Table 2-1) and report the emergency. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of what occurred. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.
- Call GSA Physical Security, after notifying the appropriate emergency response agency, to inform them of the condition or situation which lead to the notification of the emergency response agency.

2.8 PPE AND EMERGENCY EQUIPMENT

A first-aid kit, eye wash units, and fire extinguishers will be maintained on-site at all active work locations and shall be immediately available for use in the event of an emergency. PPE used in day-to-day activities will be used will serve as the primary defense for all chemical hazards encountered. Emergency situations surpassing the level of protection offered by the PPE used on a daily basis again will constitute an emergency and require evacuation and notification of the appropriate response agency.

2.9 EMERGENCY CONTACTS

Prior to performing work at any of the sites, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted on site where it is readily available to all site personnel.

2.10 INJURY AND ILLNESS REPORTING

After the initial response (e.g. first aid) to an injury or illness has taken place, the incidence and details of the injury or illness must be properly reported and documented. Within 24 hours of occurrence, any occupational injury or illness must be reported to the HSM at (412) 921-8912. An OSHA 101 form (Attachment III) must be completed and submitted to the HSM within three working days of the event. A copy of this form will be maintained at the site.

It should be noted that "near misses" as well as actual injuries and illnesses should be reported. By identifying near miss situations, possible recommendations for preventing a recurrence can be made.

TABLE 2-1
EMERGENCY CONTACTS
NSWC WHITE OAK, SILVER SPRING MARYLAND

CONTACT	PHONE NUMBER
EMERGENCY(1st Contact) GSA Physical Security, Washington, D.C. - Federal Protective Services National Capital Region	(202) 708-1111
EMERGENCY(Alternative Contact) (Silver Spring / Montgomery County - Police, Fire, Ambulance Service)	911
Hospital - Holy Cross Hospital (Emergency Room) Holy Cross Hospital (Information)	(301) 905-1225 (301) 905-0100
Chemtrec National Response Center	(800) 424-9300 (800) 424-8802
NSWC White Oak (Point-of-Contact) Robert Ridgway	(301)344-8120
Unexploded Ordnance Frank Peters – EFACHES	(202) 685-3245
TtNUS, Pittsburgh Office	(412) 921-7090
Project Manager Scott Nesbit, P.E.	(412) 921-7134
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Donald J. Westerhoff, CSP	(412) 921-7281
Utilities Gas Water Sewage Telephone Fiber Optics	TBD

NOTE: All emergency contacts to emergency services off-base require the notification of GSA Physical Security. Information to be provided will include the type and extent of the emergency and agencies notified.

Directions to Holy Cross Hospital:

Exit base, make a left onto New Hampshire Rd. Continue 3 miles to I-495, take East to Exit 31, Georgia Avenue. Make a right at the first light (Forrest Glen Rd.). The Hospital is four blocks ahead on the right side. Prior to site mobilization for field activities, a legible map indicating the travel route from the site to the Hospital will be obtained and inserted as Figure 2-1 of this HASP.

3.0 SITE BACKGROUND

3.1 SITE DESCRIPTION/HISTORY

NSWC White Oak is located east of Maryland Route 650 (New Hampshire Avenue), approximately one mile north of Interstate 495 (Washington, DC beltway). The facility encompasses approximately 710 acres and is located in Silver Spring, Maryland, in both Montgomery and Prince George counties. Approximately 635 acres of land at NSWC White Oak is undeveloped. Adjacent to the south end of the property is the U.S. Army's Adelphi Laboratory Center (ALC). Additional properties adjacent to NSWC White Oak include residential, commercial, and wooded parcels.

NSWC White Oak was originally established in 1944 as the Naval Ordnance Laboratory (NOL), with a mission to carry out research in guns and explosives. Throughout the years, the mission was expanded to include research involving torpedoes, mines, and projectiles. In September 1974, NOL combined with the Naval Weapons Laboratory, Dahlgren, Virginia, to become the Naval Surface Weapons Center, which was renamed the Naval Surface Warfare Center, Dahlgren Division, in 1988. Since that time, it has functioned as the principal Navy Research Development, Test, and Evaluation Center for surface warfare weapon systems, ordnance technology, strategic systems, and underwater weapons systems.

NSWC White Oak was identified as a Base Realignment and Closure (BRAC) facility and was closed in 1997, with the property transferred to the GSA and the U.S. Army. GSA is currently investigating plans for the reuse and development of the NSWC White Oak property.

Site activities will be performed at 29 individual areas of the NSWC White Oak facility. Specific Installation Restoration Program (IRP) sites, Solid Waste Management Units (SWMUs), and Areas of Concern (AOC) where site activities are to be performed at NSWC White Oak are discussed in detail in Section 2.0 of the Field Sampling Plan.

4.0 SCOPE OF WORK

This section discusses the activities that are to be performed at the NSWC White Oak. Table 5-1 of this HASP provides information related to each of the tasks that are to be performed as part of the scope of work. Additionally, partially completed SWPs for site tasks are provided in Attachment IV. These SWPs discuss hazards associated with tasks performed at each site location and the appropriate controls measures that are to be implemented during the performance of site activities. Additional information (such as site personnel) will be added to the SWP prior to the commencement of site activities. The planned activities involved in this effort are presented in detail in the Work Plan developed for this project. If new tasks are to be performed at the site, Table 5-1 and this section will be modified accordingly and additional SWPs will be developed. If tasks other than those described below are performed at the site, this section and the HASP will be modified accordingly.

Field activities to be performed by TtNUS and subcontractor personnel will be as follows:

- Multi-media sampling (to determine the vertical and lateral extent of contamination)
 - Surface and subsurface soil sampling - Sample acquisition by direct push techniques, test pitting operations, hand trowels (surface soils), or by hand augering.
 - Sediment sampling - Sample acquisition by direct collection
 - Surface water sampling
 - Groundwater sampling - Sample acquisition will be accomplished through the use of low-flow peristaltic pumps (primary), redi-flow pumps, and/or by hand through the use of disposable or stainless steel bailers.
- Mobilization/demobilization activities
- Decontamination of sampling and heavy equipment
- Investigative Derived Waste (IDW) sampling
- Geographical/geophysical surveying
- Excavation of test pits (4 to 10 foot depths) at Site 17/SWMU 20
- Demolition of Building 304-3

4.1 SITE-SPECIFIC ACTIVITIES

Table 4-1 identifies activities that will be performed at specific sites of NSWC White Oak.

**TABLE 4-1
SITE-SPECIFIC ACTIVITIES**

Site Identifier	Surface Soil Samples	Subsurface Soil Samples	Sediment Samples	Surface Water Samples	Groundwater Samples
SWMU 20 (Site 17) - Former Building 130 S Leaching Well		4			3
SWMU 35 (IR Site 21) - Stoneyard across from Building 108	4	4			3
SWMU 47 - Former Wastewater Treatment Plant Site (N. of 108)	8	8			5
SWMU 87 - Building 611 Solid Waste Storage Unit	4	4			4
Building 615 - Hazardous Machining/Blending Area	4	4	2		
SWMU 29 (IR Site 24) - Building 308 Washdown System	4	4			
SWMU 40 (IR Site 22) - Bldg. 305 Wastewater Collection System	4	4			1
SWMU 34 - Building 377 Demilitarization Site (Near Bldg. 305)	4	4			
SWMU 50 - Building 112 Oil/Water Separator	4	4			
SWMU 51 - Building 113 Oil/Water Separator	4	4			
SWMU 52 - Building 201 Oil/Water Separator	4	4			
SWMU 56 - Building 327 Wastewater Underground Storage Tank	4	4			
EBS AOC 150 - Building 150 Stressed Vegetation Area	4	4			
EBS AOC 151 - Building 151 Uncovered Storage Area	4	4			
EBS AOC 334 - Outdoor Paint & Battery Storage at Bldg. 334	2	2			
EBS AOC 303 - Explosives Test Area at Bldg. 303	4	4			
SWMU 8 (Site 15) - Building 310A Waste Disposal Area	5	9	2	2	
SWMU 41 (IR Site 23) - Building 311 Oxidation Ditch			6	3	
AOC M - Former Outfall 004 at Bldg. 611			2	2	
AOC N - Former Outfall 006 at Bldg. 201			2	2	
AOC P - Former Outfall 012 at Bldg. 312			2	2	
AOC Q - Former Outfall 014 at Bldg. 328			2	2	2
AOC R - Former Outfall 017F at Bldg. 318			2	2	
AOC S - Former Outfall 018 at Bldg. 310A			2	2	
EBS AOC 304-3 - Stains, Substance on floor of Building 304-3	4	4			
EBS AOC 500B - Former Pistol Range	10	10			
SWMU 36 - Building 108 Incinerator	4				
Building 355 - Magazine Explosion Area	8				

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of the site specific HASP which identifies the tasks that are to be performed as part of the scope of work. The anticipated hazards, recommended control measures, air monitoring recommendations, required Personal Protective Equipment (PPE), and decontamination measures for each site task are discussed in detail. This table and the associated control measures shall be revised, if the scope of work, contaminants of concern, or other conditions change.

Through using the table, site personnel can determine which hazards are associated with each task and at each site, and what associated control measures are necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which PPE and decontamination procedures to use based on proper air monitoring techniques and site-specific conditions.

As discussed earlier, a Health and Safety Guidance Manual accompanies this table and HASP. The manual is designed to further explain supporting programs and elements for other site-specific aspects as required by 29 CFR 1910.120. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of TtNUS's SOPs are also provided in this Guidance Manual.

SWPs issued for all exclusion zone activities (See Section 10.10 and Attachment IV) will be based on elements defined in Table 5-1. Additional site-specific information will be added by the FOL and/or the SSO completing the SWP.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARIZATION
NAVAL SURFACE WARFARE CENTER - WHITE OAK, SILVER SPRINGS, MARYLAND
PAGE 1 OF 6

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring Type/Action Levels	Personal Protective Equipment	Decontamination Procedures
Mobilization/ Demobilization	<p>Chemical hazards:</p> <p>Exposure to potential site contaminants is not anticipated during this activity. However, chemicals brought on site in support of field activities are to be identified, logged, accompanied by an appropriate MSDS, properly stored, and evaluated for purposes of hazard communication.</p> <p>Physical hazards:</p> <p>Potential physical hazards associated with this task may include:</p> <ol style="list-style-type: none"> 1) Lifting (muscle strains and pulls) 2) Pinches and compressions 3) Slip, trips, and falls 4) Moving machinery 5) Vehicular and foot traffic <p>Natural Hazards:</p> <ol style="list-style-type: none"> 6) Insect, animal bites and stings, poisonous plants, etc. 	<p>Chemical hazards:</p> <p>To eliminate potential chemical hazards associated with this task ensure the following:</p> <ul style="list-style-type: none"> - A chemical inventory list is generated for all chemicals brought on site (Complete Section 5.0 of the Health and Safety Guidance Manual). - MSDS must be available for all chemicals brought on site. - Materials are stored in accordance with recommended practices and according to compatibility (See MSDS for storage and compatibility recommendations). <p>Physical hazards:</p> <ol style="list-style-type: none"> 1) Employ machinery or multiple personnel for heavy lifts. <ul style="list-style-type: none"> - Use proper lifting techniques. 2) Keep any machine guarding in place. Avoid moving parts. Secure loose clothing, jewelry, or long hair that could become entangled. 3) Preview and prepare work locations where unstable/uneven terrain exists. Barricade all excavations and embankments deeper than 2 feet. 4) All equipment to be employed will be <ul style="list-style-type: none"> - Inspected in accordance with OSHA and manufacturers design. The inspection will include the completion of the Equipment Record Sheet documenting the review and acceptance/failure of safety devices, guards, emergency stops. The Equipment Inspection Checklist is provided in Attachment II of this HASP. - Operated by knowledgeable operators, and knowledgeable ground crew, as applicable. - Establish safe zones of approach. - Secure all loose articles to avoid possible entanglement. 5) Identify all access/egress routes and locations to within established areas of operation. <ul style="list-style-type: none"> - All equipment capable of self propelled movement will be equipped with movement alarms as applicable. - Traffic regulations for NSWC - White Oak are to be followed as posted. 6) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to you skin. Wear light colored clothing so that ticks and other biting insects can be easily visible and be removed. Follow directions as specified in Section 6.3 concerning natural hazards. 	Not required during mobilization/demobilization.	<p>Mobilization/demobilization activities is intended to initiate and proceed in Level D protection:</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants; or coveralls) - Safety shoes or boots with steel toe - Safety glasses - Hardhat (when overhead hazards exists, or identified as an operation requirement) - Reflective vest for high traffic areas - Hearing protection for high noise areas, or as directed on an operation by operation scenario. As a general rule of thumb, if you need to raise your voice to be heard while engaged in conversation with someone who is within 2 feet of your position you may be exposed to excessive noise levels and should employ hearing protection until the SSO can quantify the potential hazard through sound level measurements or noise dosimetry. <p>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.</p>	<p>As potential site contaminants are not anticipated to be encountered as part of this task, personal decontamination is not required.</p> <p>All equipment arriving/leaving the site will be inspected prior to permitting this equipment to enter or exit the site. The SSO will inspect the equipment and give the clearance to allow the equipment to pass. Failure to pass inspection will prohibit entering or exiting the site as applicable. All equipment which fails the inspection will have to be decontaminated again to a level acceptable to the SSO prior to passage on or off site. All equipment permitted to pass on/off site will be documented using an Equipment Inspection Checklist. This form may be found in Attachment II of this HASP.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARIZATION
NAVAL SURFACE WARFARE CENTER - WHITE OAK, SILVER SPRINGS, MARYLAND
PAGE 2 OF 6**

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Level	Personal Protective Equipment*	Decontamination Procedures
<p>Direct push/hammer Soil Boring and Hydropunch using Direct Push Technology (Geoprobe)</p>	<p>Chemical hazards:</p> <p>Potential site contaminants vary from site to site. Specific contaminants of concern have not been accurately determined and no analytical data are available to evaluate contaminants that may pose an exposure concern.</p> <p>Section 2.0 of the Field Sampling Plan provides background information and general contaminants that may be associated with each site. Based on this historical information potential site contaminants may include metals, explosives and explosive compounds, waste oils and constituents of petroleum, VOCs (including solvents), and corrosives.</p> <p>Refer to individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities.</p> <p>2) Transfer of contamination into clean areas or onto clean persons.</p> <p>Physical hazards;</p> <p>3) Pinch/compression and traffic-related hazards</p> <p>4) Noise</p> <p>5) Energized systems</p> <p>6) Contact with UXO (only at the Former Building 355 - Magazine Explosion Area site)</p> <p>Natural Hazards:</p> <p>7) Insect, animal bites and stings, poisonous plants, etc.</p>	<p>1) Use real-time monitoring instrumentation, action levels, identified PPE, and work practices to control exposures to potentially contaminated medias (e.g. air, water, soils, etc.).</p> <p>2) Decontaminate all equipment and supplies between borings and prior to leaving the site.</p> <p>3) All equipment to be used will be</p> <ul style="list-style-type: none"> - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600,.601,.602), and manufacturer's design. All inspections will be documented using the Equipment Inspection Checklist found in Attachment II of this HASP. - Operated and supported by knowledgeable operators, and ground crew. - One person handling the push rods and controls - Used within establish safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 25 feet from the point of operation. This will be the area identified as the exclusion zone. <p>In addition to equipment considerations, the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none"> - Hydraulic masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities. - Hand signals will be established prior to the commencement of the operation. - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (i.e., flight connectors etc.). - Work areas will be kept clear of clutter. - Secure all loose articles to avoid possible entanglement, during coring activities.. - All self propelled equipment shall be equipped with movement warning systems. - All personnel working in high equipment traffic areas are required to wear reflective vests for high visibility, and to establish unimpeded work areas around the operation. This activity may require areas of buildings to be cordoned off during this operation. - 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 periodically) to ensure its operational status. - Areas will be inspected prior to the movement of Geoprobe and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - The Geoprobe and support vehicles will be moved no closer than 3 feet to floor openings, unsupported side-walls of excavations and embankments. <p>4) Hearing protection will be used during all Geoprobe intrusive activities.</p> <p>5) All utility clearances shall be obtained prior to any subsurface investigation. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked. The FOL will obtain written permit clearance prior to all subsurface investigations.</p> <p>6) The Former Building 355 - Magazine Explosion Area will be screened to ensure no UXO items are present. Site activities will not be performed until the area is cleared by a UXO or EOD Specialist. If any suspicious items are uncovered or encountered, the area will be marked, personnel leave the area, and appropriate site contacts will be notified.</p> <p>7) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to you skin. Wear light colored clothing so that ticks and other biting insects can be easily visible and be removed. Follow directions as specified in Section 6.3 concerning natural hazards.</p>	<p>Elevated airborne concentrations that pose an exposure concern are not anticipated to be encountered during these operations given the limited disruption and intrusive nature of Geoprobe sampling.</p> <p>Direct reading instrument such as photoionization detectors with an 10.6 eV source or flame ionization detectors will be employed as a general screening instrument to detect volatile organic compounds, elemental decomposition products and carrier substances and to evaluate airborne concentrations of potential site contaminants:</p> <p>These instruments will only be employed as a screening devices. Monitor source areas (boleholes, test pits, sample media, etc.) using a PID with 10.6 eV lamp at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> • Monitor the breathing zone of at-risk and downwind employees. Any sustained reading (greater than 1 minute in duration) above background levels in worker breathing zones requires site activities to be suspended and site personnel to report to an unaffected area. • Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p>Some of the contaminants of concern are metals, explosives, etc., and may not be detectable using FID direct reading instruments. Also, site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. As a result, generation of dusts at all sites should be minimized to the greatest extent possible to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides).</p> <p>Where the utility clearance cannot be determined, subsurface activities shall proceed with extreme caution using a magnetometer for periodic down-hole surveys every 2 feet to a depth of at least 10 feet.</p>	<p>All subsurface Geoprobe operations are to be initiated in level D protection.</p> <p>Level D protection constitutes the following minimum protection</p> <ul style="list-style-type: none"> - Standard field dress (long pants, sleeved shirts) - Steel-toe safety shoes or boots <p>These following items will be incorporated during Geoprobe operations:</p> <ul style="list-style-type: none"> - Nitrile gloves with a cotton liner. - Hard-hat, safety glasses, and earplugs or muffs. - Tyvek coveralls will be worn if there is a possibility of soiling work attire. - PVC or PE coated Tyvek will be incorporated if there is a potential for saturation of work attire. <p>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.</p> <p>As site conditions may change the following equipment will be maintained during all on site activities</p> <ul style="list-style-type: none"> - Fire Extinguishers (Strategically placed) - Basket stretcher, blankets, and first-aid kit 	<p>Personnel Decontamination - Will consist of a soap/water wash and rinse for outer protective equipment (e.g. boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the drilling operations bordering the support zone.</p> <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none"> - Equipment drop - Remove and dispose of any disposable PPE (Tyvek coveralls, outer gloves, etc.) - Soap/water wash and rinse of reusable PPE items (e.g., splash suit, boots). - Wash hands and face; leave contamination reduction zone <p>Equipment Decontamination - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment, such as the Geoprobe, will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off so as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>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.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARIZATION
NAVALSURFACE WARFARE CENTER - WHITE OAK, SILVER SPRINGS, MARYLAND
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Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment	Decontamination Procedures
<p>Multi-media sampling including soils (surface and subsurface); sediments; surface water; groundwater; wipe sampling; and Investigative Derived Waste (IDW).</p> <p>The protective measures identified for this activity will also apply to miscellaneous activities such as water-level measurements, aquifer testing, etc.</p>	<p>Chemical hazards:</p> <p>Potential site contaminants vary from site to site. Specific contaminants of concern have not been accurately determined and no analytical data is available to evaluate contaminants that may pose an exposure concern.</p> <p>Section 2.0 of the Field Sampling Plan provides background information and general contaminants that may be associated with each site. Based on this historical information potential site contaminants may include metals, explosives and explosive compounds, waste oils and constituents of petroleum, VOCs including solvents, and corrosives.</p> <p>Refer to individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities.</p> <p>2) Transfer of contaminants into clean areas or onto persons</p> <p>Physical hazards:</p> <p>3) Lifting (muscle strains and pulls)</p> <p>4) Pinches and compressions</p> <p>5) Slip, trips, and falls</p> <p>6) Water hazards.</p> <p>Natural Hazards:</p> <p>7) Insect, animal bites and stings, poisonous plants, etc.</p>	<p>Chemical hazards:</p> <p>1) Employ real-time monitoring instrumentation, action levels, and identified PPE to identify, quantify, and control exposures to potentially contaminated medias (e.g., air, water, soils).</p> <p>2) Restrict the cross use of equipment and supplies between sampling locations without first going through a suitable decontamination.</p> <p>Physical hazards:</p> <p>3) Employ machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>4) Keep any machine guarding in place. Avoid moving parts. Secure loose clothing, jewelry, or long hair that could become entangled.</p> <p>5) Preview work locations for unstable/uneven terrain. Barricade all excavations deeper than 2 feet.</p> <p>6) Any activities conducted near or over bodies of water will require site personnel to use U.S. Coast Guard approved personal floatation devices and/or lifelines.</p> <p>7) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to you skin. Wear light colored clothing so that ticks and other biting insects can be easily visible and be removed. Follow directions as specified in Section 6.3 concerning natural hazards.</p>	<p>Elevated airborne concentrations in worker breathing zones that may pose an exposure concern to field crews or downwind receptors are not anticipated to be generated as a result of sampling activities. The following information is provided as a contingency action only.</p> <p>Direct reading instrument such as photoionization detectors with an 10.6 eV source or flame ionization detectors will be employed as a general screening instrument to detect volatile organic compounds, elemental decomposition products and carrier substances and to evaluate airborne concentrations of potential site contaminants:</p> <p>These instruments will only be employed as a screening devices. Monitor source areas (bokehholes, test pits, sample media, etc.) using a PID with 10.6 eV lamp at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> • Monitor the breathing zone of at-risk and downwind employees. Any sustained reading (greater than 1 minute in duration) above background levels in worker breathing zones requires site activities to be suspended and site personnel to report to an unaffected area. • Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p>Some of the contaminants of concern are metals, explosives, etc., and may not be detectable using FID direct reading instruments. Also, site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. As a result, generation of dusts at all sites should be minimized to the greatest extent possible to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides).</p>	<p>All sampling activities are anticipated to proceed in a modified Level D protection, or as specified on the Safe Work Permit (Attachment IV).</p> <p>Level D - (Minimum Requirements) For sampling activities:</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes or boots(Steel toe) - Safety glasses - Inner nitrile gloves (Clean pair for each sample location) - <i>Hard-hat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Reflective vest for high traffic areas</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> - <i>USCG approved personal floatation device or lifeline for surface water sampling over or near bodies of water which pose a drowning hazard.</i> <p><i>Italicize text represents optional equipment to be worn as conditions dictate.</i></p> <p>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.</p>	<p>Decontaminate sample containers in accordance with the Field Sampling Plan.</p> <p>Personnel decontamination:</p> <ul style="list-style-type: none"> - Equipment drop-off - Wash and rinse reusable outer protective garments - Remove and dispose of disposable PPE - Wash hands and face, leave contamination reduction zone. <p>Equipment decontamination:</p> <p>All sampling equipment will undergo a soap/water wash and rinse utilizing a suitable potable water source until visibly clean.</p> <p>Sampling equipment may also be high pressure soap/water wash and rinse or steam cleaned.</p> <p>All chemical decontamination will proceed in accordance with the other site documents such as Field Sampling Plan.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARIZATION
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Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring Type/Action Levels	Personal Protective Equipment	Decontamination Procedures
<p>Excavation of Test Pits at Site 17/SWMU 20 - Former Building 130 South Leaching Well.</p> <p>This table will also include the demolition of the shed at EBS AOC 304-3 - since similar equipment would likely be used to demolish the shed.</p> <p>It should be noted that at the time this plan was developed it was unknown whether the shed will be demolished. Additionally, specifics regarding who will demolish or how the demolition will occur are unknown. If necessary this table will be modified to reflect additional information regarding demolition activities.</p>	<p>Chemical hazards:</p> <p>Site 17: Historical information indicates that the two leaching wells may have received battery acids (sulfuric acid).</p> <p>EBS AOC 304-3: Historical information only indicates that Building 304-3 was a chemical storage shed. The floor of the building is stained and strong chemical odors have been reported to exist within the shed. No specific information regarding the type of chemicals stored in the shed is available.</p> <p>2) Transfer of contamination into clean areas or onto persons.</p> <p>Physical hazards:</p> <p>3) Moving machinery</p> <p>4) Collapse of the excavation (Site 17)</p> <p>5) Energized systems</p> <p>6) Noise</p> <p>7) Foot and equipment traffic</p> <p>8) Hazards associated with handling debris from the shed at EBS AOC 304-3 (contact with sharp objects, flying projectiles, etc.)</p> <p>Natural Hazards:</p> <p>9) Insect, animal bites and stings, poisonous plants, etc.</p>	<p>Chemical hazards:</p> <p>1) Employ dust suppression such as area wetting to control particulates. Employ identified PPE and control exposures to potentially contaminated media (e.g., air, water, soils). Use monitoring instruments to evaluate airborne concentrations of potential site contaminants.</p> <p>2) Restrict the cross use of equipment and supplies from remedial activities, handling clean fill, and general construction services without first going through a suitable decontamination.</p> <p>Physical hazards:</p> <p>3) All equipment to be employed will be: - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600, .601, .602), and manufacturer's design, and documented as such using Equipment Record Sheet (See Section 10.0 of the Health and Safety Guidance Manual. Complete the Equipment Inspection Checklist (Attachment II) for each piece of equipment used at the site. - Operated by knowledgeable operators and ground crew, as applicable.</p> <p>4) All excavations shall be in conformance with requirements established under 29 CFR 1926.650 - .652 concerning sloping, shoring, storage, and movement on and over and around trenches and excavations. - No personnel associated with this field effort will enter any excavations (including test pits). - All supplies, clean fill, vehicular traffic will be maintained at a minimum distance of 3 feet from the excavation, or 2 feet if a sidewall restraining device is employed. - Should intact containers be uncovered, the excavation activities shall be halted until contingency plans may be formulated and put in place for investigating intact containers.</p> <p>5) All utility clearances shall be obtained prior to any excavation or demolition activities. Where the utility clearance cannot be obtained in a reasonable period, or not located, excavations shall proceed with extreme caution and proceed using cable and piping locators and other geophysical detection methods to avoid utility damage. Demolition activities cannot be performed until electric and other utilities leading to the shed are disconnected.</p> <p>6) Excessive noise levels will be controlled through the use of hearing protection. Anticipated excessive noise level operations include the following: - Heavy equipment operation including backhoes and multi-axle vehicles, etc.</p> <p>7) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Secure all loose articles to avoid possible entanglement. - All equipment shall be equipped with movement warning systems. - Employ safety belts and follow the site traffic rules.</p> <p>8) Keep unauthorized personnel away from debris. Barricade the area prior to beginning demolition activities. Use safety glasses, steel-toe safety footwear, hard hats, and leather gloves when handling debris.</p> <p>9) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to you skin. Wear light colored clothing so that ticks and other biting insects can be easily visible and be removed. Follow directions as specified in Section 6.3 concerning natural hazards.</p>	<p>Elevated airborne concentrations in worker breathing zones are not anticipated to be generated as a result of test pit operations. However, given the limit information regarding the types of chemicals stored in Building 304-3 and the previously noted odors, elevated instrument readings may exist in the shed. As a result, personnel will avoid entering the shed.</p> <p>Direct reading instrument such as photoionization detectors with an 10.6 eV source or flame ionization detectors will be employed as a general screening instrument to detect volatile organic compounds, elemental decomposition products and carrier substances and to evaluate airborne concentrations of potential site contaminants:</p> <p>These instruments will only be employed as a screening devices. Monitor source areas (bokeh, test pits, sample media, etc.) using a PID with 10.6 eV lamp at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> • Monitor the breathing zone of at-risk and downwind employees. Any sustained reading (greater than 1 minute in duration) above background levels in worker breathing zones requires site activities to be suspended and site personnel to report to an unaffected area. • Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p>Some of the contaminants of concern are metals, explosives, etc., and may not be detectable using FID direct reading instruments. Also, site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. As a result, generation of dusts at all sites should be minimized to the greatest extent possible to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides).</p> <p>Where the utility clearance cannot be determined, test pit excavations shall proceed with extreme caution using a magnetometer for periodic surveys every 2 feet to a depth of at least 10 feet.</p>	<p>All test pitting and demolition operations are to be initiated in Level D protection.</p> <p>Level D protection constitutes the following minimum protection</p> <ul style="list-style-type: none"> - Standard field dress (long pants, sleeved shirts) - Steel toe safety shoes or boots <p>These following items will be incorporated during excavation operations or whenever debris from the shed is handled:</p> <ul style="list-style-type: none"> - Nitrile gloves with a cotton liner, - Hard-hat, safety glasses, and earplugs or muffs. - Tyvek coveralls will be worn if there is a possibility of soiling work attire - Impermeable boot covers - PVC or PE coated Tyvek will be incorporated if there is a potential for saturation of work attire. <p>(These items are optional as conditions dictate)</p> <p>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.</p> <p>As site conditions may change the following equipment will be maintained during all on site activities</p> <ul style="list-style-type: none"> - Fire Extinguishers (Strategically placed) - Basket stretcher, blankets, and first-aid kit 	<p>Personnel Decontamination - Will consist of a soap/water wash and rinse for outer protective equipment (e.g., boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the test pitting operations bordering the support zone.</p> <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of reusable PPE (e.g., splash suits), as applicable - Removal and disposal of disposable PPE items (gloves, disposable boot covers, etc) - Wash hands and face, leave contamination reduction zone.

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARIZATION
NAVAL SURFACE WARFARE CENTER - WHITE OAK, SILVER SPRINGS, MARYLAND
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Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment	Decontamination Procedures
Decontamination of sampling and heavy equipment	<p>Chemical hazards:</p> <p>Potential site contaminants vary from site to site. Specific contaminants of concern have not been accurately determined and no analytical data is available to evaluate contaminants that may pose an exposure concern.</p> <p>Section 2.0 of the Field Sampling Plan provides background information and general contaminants that may be associated with each site. Based on this historical information potential site contaminants may include metals, explosives and explosive compounds, waste oils and constituents of petroleum, VOCs including solvents, and corrosives.</p> <p>Refer to individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities.</p> <p>- Decontamination fluids - Liquinox (detergent), isopropanol, methanol, etc.</p> <p>Physical hazards:</p> <p>2) Lifting (muscle strains and pulls)</p> <p>3) Pinches and compressions</p> <p>4) Noise</p>	<p>1) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids.</p> <p>- Have a means by which the eyes and/or skin may be flushed (i.e., portable camp shower, emergency eyewash, etc.) readily accessible.</p> <p>- Obtain manufacturer's MSDS for any decontamination solvents used on-site. Users of solvents must review the MSDS and have ready access to it on-site. Maintain a Chemical Inventory and a file of MSDSs for all hazardous chemicals brought to the site. Users must observe MSDS requirements with regard to chemical use, storage, spill response, PPE, and other aspects.</p> <p>Use of solvents will be restricted to outdoor locations (i.e., this activity is restricted from inside a trailer or other small or poorly-ventilated space).</p> <p>2) Use multiple persons where necessary for lifting and handling heavy pieces of equipment for decontamination purposes.</p> <p>3) Place or stack equipment securely during decontamination and air drying to prevent unstable items from falling.</p> <p>4) Steam/pressure washer operators will wear hearing protection. Other personnel will be restricted from the area (i.e., no closer than 20 feet) to minimize their potentials to exposure to noise, overspray, and flying projectiles.</p>	<p>1) Use visual observation and real-time monitoring instrumentation to ensure all equipment and/or areas which has been cleaned and dried is properly cleaned of potentially contaminated medias (e.g., air, water, soils).</p> <p>Elevated airborne concentrations impacting field crews or downwind receptors are not anticipated for this task.</p>	<p>For Geoprobe and Backhoe: This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> - Standard field attire (sleeved shirt; long pants) - Safety shoes or boots(Steel toe) - Nitrile outer gloves - Safety glasses underneath a splash shield - <i>PVC Rain suits or PE or PVC coated Tyvek as protection from splash as required</i> - <i>Chemical resistant boot covers</i> - <i>Hearing protection (plugs or muffs)</i> <p><i>Italicized PPE specifies optional equipment to be used as conditions dictate.</i></p> <p>For sampling equipment including trowels, macro samplers, ballers, etc.:</p> <p>Observe MSDS requirements, but not less than Level D Minimum requirements -</p> <ul style="list-style-type: none"> - Standard field attire (sleeved shirt; long pants) - Safety shoes or boots(Steel toe) - Nitrile outer gloves - Safety glasses <p>In the event of overspray of chemical decontamination fluids employ PVC Rain suits or PE or PVC coated Tyvek as necessary.</p> <p>Respiratory protection is not anticipated for these activities.</p> <p>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.</p>	<p>This decontamination procedure for Level D protection will consist of</p> <p>This decontamination procedure for Level D protection will consist of:</p> <ul style="list-style-type: none"> - Remove and dispose of any disposable PPE (Tyvek coveralls, outer gloves, etc.) - Soap/water wash and rinse of reusable PPE items (e.g., splash suit, boots). - Wash hands and face; leave contamination reduction zone <p>Equipment Decontamination - All equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment such as the geoprobe and backhoes, will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or 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.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>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.</p> <p>Evaluation will consist of</p> <ul style="list-style-type: none"> - Visual inspection - Scanning equipment with monitoring instruments

TABLE 5-1

SKS/HAZARDS/CONTROL MEASURES SUMMARIZATION

NAVAL SURFACE WARFARE CENTER - WHITE OAK, SILVER SPRINGS, MARYLAND

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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment*	Decontamination Procedures
<p>Surveying activities (geographical, geophysical, surveys, etc.)</p>	<p>Chemical hazards:</p> <p>Exposure to potential site contaminants during surveying activities is unlikely given the nature of surveying work and the limited contact with potentially contaminated media. To further reduce the potential for exposure, site personnel performing surveying activities will minimize contact with potentially contaminated media (soils, sediments, surface water, etc.) and will avoid areas where chemical hazards may exist (eg., Buidling 304-3).</p> <p>Physical hazards:</p> <p>1) Slip, trips, and falls</p> <p>2) Inclement weather</p> <p>Natural Hazards:</p> <p>3) Insect, animal bites and stings, poisonous plants, etc.</p>	<p>1) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation, establish temporary means for traversing hazardous terrain(i.e., rope ladders, etc.)</p> <p>2) All operations will be temporarily suspended during electrical storms.</p> <p>- Personnel must be aware of the conditions of heat stress and make it a practice to re-hydrate periodically as elevated temperature conditions dictate.</p> <p>3) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to you skin. Wear light colored clothing so that ticks and other biting insects can be easily visible and be removed. Follow directions as specified in Section 6.3 concerning natural hazards.</p>	<p>No air monitoring is needed given the unlikelihood that volatile contaminants are present during surveying activities given the non-intrusive natures of the task. The potential for exposure to site contaminants during this activity is considered minimal.</p> <p>Minimize the generation of airborne dusts since many site contaminants are in the form of a particulate or may be bound to particulates.</p>	<p>Surveying activities shall be performed in Level D protection</p> <p>Level D Protection consists of the following:</p> <ul style="list-style-type: none"> - Standard field dress including sleeved shirt and long pants - Steel-toe work boots or shoes - Safety glasses, hard hats (if working near machinery) - 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. Work gloves may be worn if desired. <p>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.</p>	<p>Personnel Decontamination - A structured decontamination is not required as the likelihood of encountering contaminated 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.</p>

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical and physical hazards which may be associated with the NSWC White Oak site and the activities that are to be conducted as part of the scope of work. It should be noted that little information regarding the type and concentrations of potential site contaminants is available for the 29 areas that are to be investigated. The purpose of the sampling activities associated with this investigation is to determine the nature and extent of any contamination present. The information that is available consists of historical information regarding past activities conducted at each site, and possible chemicals that were used or disposed of at each site. This information is presented in Section 2.0 of the Field Sampling Plan. Since specific information related to potential contaminants and chemical hazards is not known, conservative air monitoring action levels have been established to prevent occupational exposures to site personnel.

Table 6-1 contains a partial list of chemicals known or suspected to be handled and/or disposed of at the various sites that are to be investigated. The table includes various explosive compounds, solvents, fuels, and metals. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in this table. Table 5-1 discusses what contaminants and physical hazards are associated with each of the proposed tasks that are to be performed as part of the scope of work. Additionally, Section 6.2 discusses potential natural hazards which may be encountered during field activities and the control measures necessary to minimize or eliminate these hazards.

6.1 CHEMICAL HAZARDS

As previously discussed, information regarding the type of site contaminants associated with the sites to be investigated is very limited. The focus of this field investigation is to determine if any contaminants are present at any of the 29 sites to be investigated. Given the absence of any laboratory analytical results, particular contaminants of concern cannot be positively identified. As a result, conservative air monitoring action levels have been established to minimize potential exposures to site personnel. Despite the limited information, significant concentrations of potential site contaminants are unlikely to be present given the available historical data and the long-term inactive status of many of the sites to be investigated. Furthermore, airborne concentrations of potential site contaminants are unlikely to be encountered given the limited intrusive nature and disruption of media during sample collection via hand trowels, direct push technology, and hydropunch groundwater sampling.

Tasks which are anticipated to create the greatest potential for exposure include the collection of samples and the demolition of Building 304-3 (the floor of the shed was reported to be stained and emitted a strong chemical odor). The most conceivable routes of exposure are anticipated to be through contact with the

skin or inhalation of airborne contaminants (either vapors or dusts) generated or released during site activities. To a lesser degree, incidental ingestion of site contaminants as a result of improper PPE usage or decontamination is another potential route of exposure. Table 5-1 and SWPs contained in Attachment IV provide various control methods that will be used to minimize potential exposures to site personnel.

Based on prior activities and historical information, various classes of chemicals were handled and/or disposed of at each of the sites. The chemical classes are:

- Metals
- Explosives and explosive compounds
- Waste oils and constituents of petroleum
- Volatile organic compounds (VOCs), including solvents and halogenated hydrocarbons
- Corrosives, including battery acids

Previous activities conducted in various areas of NSWC White Oak involved Explosive Ordnance Disposal (EOD) and related operations. Specifically, project activities associated with Building 355 (Magazine Explosion Area) must recognize RDX, HMX, TNT, and other explosives as potential contaminants.

Potential occupational exposures to field crews are not anticipated to occur given the proposed site activities and previously detected very low concentrations of site contaminants. In addition to the chemicals listed above, historical data also indicate that various operations existed which could likely have contributed other chemical contaminants. These operations, and potential contaminants, include: sandblasting (silica), disposal of municipal wastes, wastewater treatment, and disposal of laboratory wastes and photographic chemicals.

Table 6-1 provides information on some of the potential contaminants of concern at the 29 sites to be investigated. Included is information on the toxicological, chemical, and physical properties of these substances.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
EXPLOSIVE COMPOUNDS							
2,4,6-Trinitrotoluene (TNT) Synonyms: Trinitrotoluene (dry)	118-96-7	PID: Ionization Potential - 10.59 eV, relative response ratio is unknown. FID: Relative response ratio is unknown it is estimated that the response will be slightly less than benzene (150%) or toluene (110%).	Air sample using a Tenax GC tube; Acetone desorption; GC/TEA detection. Sample and analytical protocol in accordance with OSHA Method #44.	OSHA: 1.5 mg/m ³ (skin) ACGIH: 0.5 mg/m ³ (skin) NIOSH: 0.5 mg/m ³ (skin)	Rapid heating to 466°F; 240°C will cause detonation. Pale yellow crystals, subject to detonation by exposure to shock or temperatures exceeding 466°F; 240°C. Air purifying respirators recommended for escape purposes only. Recommended Gloves: Any glove which is impermeable to contact.	Boiling Pt: 466°F; 240°C Melting Pt: 176°F; 80°C Detonation Pt: 464°F; 240°C Solubility: 0.01% at 75°F; 25°C Specific Gravity: 1.65 Vapor Density: 7.8 Vapor Pressure: 0.057 mmHg @ 178°F; 81°C Flash Pt: Explodes 842°F; 450°C LEL: Not available UEL: Not available Incompatibles: Strong oxidizers, ammonia, combustible materials, and heat. Appearance and odor: Colorless to light yellow solid or crushed flakes.	Routes of Exposure: inhalation, absorption, ingestion, and skin & eye contact. The following symptoms may be experienced: Sneezing, coughing, sore throat, muscle pain, peripheral nerve sensitization, and irritation of the skin and mucous membranes. Chronic exposure may cause liver damage, jaundice, cyanosis, kidney damage, anemia, cataract, leukocytosis.
RDX Synonym: Cyclo-1,3,5-trimethylene-2,4,6-trinitramine; Cyclonite; Trimethylenetrini-tramine; T ₄ ; RDX	121-82-4	No information found.	Air sampling use particulate filter; gravimetric detection. Sampling and analytical procedures shall be in accordance with NIOSH Method #0500 (Nuisance Dust, Total).	OSHA/NIOSH/ACGIH: 1.5 mg/m ³ (skin); STEL 3 mg/m ³ (skin)	Sensitive to friction, as stable as TNT, explosive when heated to 260°C; 126.6°F Respiratory Protection: Can use air purifying respirator with an organic vapor cartridge for concentrations up to 75 mg/m ³ . Airborne concentrations above this level use an airline respirator or SCBA. Recommended Gloves: Impermeable gloves suitable to prevent skin contact. Nitrile gloves have been selected for most other applications.	Boiling Pt: Not available Melting Pt: Pure 399°F; 204.1°C Military grade ~10% HMX ~374°F; ~190°C Freezing Pt: Not available Solubility: Insoluble in water; soluble hot aniline, phenol, and nitric acid Specific Gravity: 1.2 Vapor Pressure: Not available Flash Pt: Heat (explosion in 5 seconds) 500°F; 260°C LEL: Not available UEL: Not available Incompatibles: Strong oxidizers, combustible materials, mercury fulminate, and heat Appearance and odor: Colorless to white crystalline powder, odorless	Routes of exposure: Inhalation, ingestion, skin and eye contact. Sign and symptoms of overexposure may include: headaches, dizziness, nausea, hyperactivity, convulsions, seizures, fatigue, irritability. These effects may be experienced quickly or several hours later. Topically irritating to skin and eyes.
Cyclotetramethylene tetranitramine Octagen, (HMX)	2691-41-0	No information found.	Air sampling use particulate filter; gravimetric detection. Sampling and analytical procedures shall be in accordance with NIOSH Method #0500 (Nuisance Dust, Total).	OSHA/NIOSH: 15 mg/m ³ total dust; 5 mg/m ³ respirable fraction. ACGIH: 10 mg/m ³ for total dust.	Respiratory Protection: Can use air purifying respirator with an organic vapor cartridge for concentrations up to 75 mg/m ³ . Airborne concentrations above this level use an airline respirator or SCBA. Recommended Gloves: Impermeable gloves suitable to prevent skin contact. Nitrile gloves have been selected for most other applications.	Boiling Pt: Not available Melting Pt: 530°F; 276.7°C Freezing Pt: Not available Solubility: Not available Specific Gravity: Not available Vapor Pressure: Not available Flash Pt: Not available LEL: Not available UEL: Not available Incompatibles: Not available Appearance: White powder	Routes of exposure: Inhalation, ingestion, and skin and eye contact. Signs and symptoms of overexposure will be similar to those specified for RDX.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Nitrocellulose (NC) Synonyms: Pyroxylin Plastics Cellulose Nitrate Cellulose Tetranitrate	9004-70-0	Particulate form - unable to be detected by the PID or FID.	None found	None established	Extremely flammable Burns rapidly with extreme heat Deteriorates rapidly in the presence of moisture. Recommended gloves: Impermeable work gloves (Note: Nitrile has been selected as the predominant glove of choice for the other tasks.)	Boiling Pt: Not available Melting Pt: Not available Detonation Pt: 446°F; 230°C Solubility: Insoluble Specific Gravity: Not available TDP: Toxic fumes of Nox Vapor Density: Negligible Vapor Pressure: Negligible Flash Pt: 55°F; 13°C LEL: Not available UEL: Not available Incompatibles: Not available Appearance and odor: White fibers	Excessive airborne concentrations may react similar to that of nuisance dust. This would include difficulty in breathing, coughing, sneezing, tightness in the chest, increased sputum production. No chronic effects known.
Nitroglycerine (NG) Synonyms: Blasting gelatin; Glyceryl Trinitrate, solution up to 10% in alcohol Nitroglycerin liquid; Desensitized; Nitroglycerin, Liquid Not desensitized	55-63-0	No information found	Tenax GC tubes; ethanol desorption; GC/ECD detection. Sampling and analytical protocol in accordance with NIOSH Method #2507.	OSHA: 0.1 mg/m ³ (skin) ACGIH: 0.46 mg/m ³ (skin) NIOSH: 0.1 mg/m ³ (ceiling); (skin) IDLH: 75 mg/m ³	Air purifying respirators are recommended for escape purposes only. Recommended Gloves: Gloves suitable to prevent skin contact. Natural rubber or Nitrile rubber recommended for incidental contact.	Boiling Pt: 498.8°F; 256°C (decomposes 122°F-140°F; 50-60°C) Melting Pt: 44.8°F; 7°C Freezing Pt: 56°F; 13°C Detonation Pt: 424.4°F; 218°C Solubility: 0.1% Specific Gravity: 1.60 Vapor Density: 7.84 Vapor Pressure: 0.0003 mm Flash Pt: Explodes at 500°F; 256°C LEL: Unknown UEL: Unknown Incompatibles: Heat, ozone, shock, UV radiation, and acids Appearance: Colorless to pale yellow viscous liquid or solid with a sweet taste	Routes of exposure: Inhalation, ingestion, absorption, and contact. The following symptoms may be experienced resulting from exposure to nitroglycerine or its intermediates. The severity of the effect will depend on the concentrations, duration, and frequency of exposure. Severe headaches, nausea, vomiting, abdominal cramps, confusion, delirium, altered heart rhythm, dyspnea (potentially respiratory paralysis), methemoglobinemia, and cyanosis may result from overexposure to this material. This material will also cause skin irritation and possibly a rash. Chronic Toxicity: Severe headaches, hallucinations, and skin rashes. NOTE: Alcohol may aggravate and intensify the symptoms.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Nitroguanidine (NQ) Synonyms: Nitroguanidine, containing less than 20% water; Nitroguanidine dry; Pictrite	556-88-7	No information found	None established	None established	This material will be in the form of a particulate under ambient temperatures. As there is no suitable way to determine its presence through warning properties or monitoring instruments, a general approach will be to control all particulate emissions and hence control potential exposures to this compound. Not very sensitive to shock or impact. Recommended Gloves: Gloves suitable to prevent skin contact. Natural rubber or Nitrile rubber recommended for incidental contact.	Boiling Pt: Decomposes at 437°F; 225 °C Melting Pt: 450°F; 232°C Solubility: Yes, in hot water Specific Gravity: Not available Vapor Density: 3.6 Vapor Pressure: Negligible Flash Pt: Not available LEL: Not available UEL: Not available Incompatibles: oxidizers Appearance and Odor: White, fiber-like crystals	Routes of exposure: inhalation, absorption, and ingestion. The following symptoms may be experienced resulting from exposure to Nitroguanidine or its intermediates. The severity of the effect will depend on the concentrations, duration, and frequency of exposure. Acute Toxicity: CNS depression Chronic Toxicity: Chronic exposure may cause poison by intraperitoneal route, mutagenic effects, anemia, moderate cyanosis, dizziness, headache, and insomnia. *-based on general amine exposure
1,3,5-Trinitrobenzene (TNB) Synonyms: Trinitrobenzene (dry)	99-35-4	No information found	Air sample using a Tenax GC Tube; Acetone desorption; GC/TEA detection. Sample and analytical protocol in accordance with OSHA Method #44.	None established	Highly flammable insensitive to friction, light green-yellow crystals very stable. Use air purifying respirator with combination organic vapor/HEPA filters. Recommended gloves: Nitrile	Boiling Pt: Not available Melting Pt: 600°F; 350°C Freezing Pt: Not available Solubility: 3% Density: 1.76 Specific Gravity: Not available Vapor Pressure: Not available Flash Pt: Not available LEL: Not available UEL: Not available Incompatibles: Reducing materials Appearance and Odor: Green-yellow crystals	*Routes of exposure: inhalation and absorption. The following symptoms may be experienced resulting from exposure: CNS depression, oxygen deprivation of the blood. *Chronic effects: Poisoning, anemia, cyanosis, fatigue, liver and kidney damage *-based on general nitro compounds, no other information found.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
VOLATILE ORGANIC COMPOUNDS							
Benzene	71-43-2	PID: I.P. 9.24 eV, 100% response with PID and 10.2 eV lamp. FID: 150% relative response ratio with FID.	Air sample using 2 mil Tedlar sample bags or charcoal tube with carbon disulfide desorption. Sampling and analytical protocol in accordance with NIOSH Method # 3700 or #1500 and OSHA 07.	OSHA: 1 ppm 5 ppm (STEL) <i>See 29 CFR 1910.1028</i> ACGIH: 10 ppm NIOSH: 0.1 ppm IDLH: 500 ppm	Inadequate - Odor threshold 1.4-120 ppm. The use of half-face air-purifying respirators with organic vapor cartridge up to 10 ppm is acceptable despite the inadequate warning properties, providing cartridges are changed at the beginning of each shift. Recommended gloves: Butyl/neoprene blend - >8.00 hrs; Silver shield as a liner - >8.00 hrs; Viton - >8.00 hrs	Boiling Pt: 176°F; 80°C Melting Pt: 42°F; 5.5°C Solubility: 0.07% Flash Pt: 12°F; -11°C LEL/LFL: 1.2% UEL/UFL: 7.8% Vapor Density: 2.77 Vapor Pressure: 75 mmHg Specific Gravity: 0.88 Incompatibilities: Strong oxidizers, fluorides, perchlorates, and acids Appearance and Odor: Colorless to a light yellow liquid with an aromatic odor	Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. CNS effects include giddiness, lightheadedness, headaches, staggered gait, fatigue, and lassitude and depression. Additional effects may include nausea, difficulty breathing, and intoxicification. Long duration exposures may result in respiratory collapse. May cause damage to the blood forming organs and may cause a form of cancer called leukemia. The ACGIH, IARC, and OSHA list benzene as a carcinogen.
Chloroform	67-66-3	PID: I.P. 11.42 eV, relative response ratio unknown. FID: 100% response with FID.	Air sample using charcoal sorbent tube and carbon disulfide desorption with gas chromatography flame ionization detector; Sample and analytical protocol in accordance with NIOSH Method #1003.	OSHA: 50 ppm (ceiling) NIOSH: STEL 2 ppm ACGIH: 10 ppm IDLH: 500 ppm	Inadequate - Odor threshold 133 - 276 ppm. Chloroform has poor warning properties but will adhere to organic vapor cartridges. Supplied air respirators are recommended. Recommended glove: Polyvinyl Alcohol >8.00 hrs; Viton 9.50 hrs; Teflon >3.60 hrs	Boiling Pt: 143°F; 62°C Melting Pt: -81°F; -62°C Solubility: 0.5% Flash Pt: Not available LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 160 mmHg @ 68°F; 20°C Specific Gravity: 1.48 Incompatibilities: Strong caustics, chemically active metals such as aluminum or magnesium powder, sodium and potassium, strong oxidizers Appearance and Odor: Colorless liquid with a sweet pleasant odor.	Overexposure to this substance may cause dizziness, mental dullness, nausea, headache, fatigue, anaesthesia, and irritation of the skin and eyes. Chronic overexposure may result in damage to the liver, kidneys, heart, eyes and skin.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Nitrobenzene	98-95-3	PID: Ionization potential - 9.92 eV, relative response ratio unknown. FID: Detectable, however, relative response ratio unknown	Air sample using silica gel capture media; methanol desorption; GC/FID detection; Sampling and analytical protocol in accordance with NIOSH Method #2005.	NIOSH/OSHA/ACGIH: 1 ppm (skin) IDLH: 200 ppm	Adequate - Odor threshold 0.37 ppm. The use of air-purifying respirators with organic vapor cartridge/HEPA filter up to 10 ppm (Half-face); 100 ppm (full-face), providing cartridges are changed at the beginning of each shift. Recommended gloves: Butyl - >8.00 - >23.00 hrs; PV Alcohol >6.00 - >16.00 hrs; Silver shield >8.00 hrs; Nitrile 0.48 hrs	Boiling Pt: 411°F; 211°C Melting Pt: 43°F; 6°C Solubility: 0.2% in water Flash Pt: 190°F; 88°C LEL/LFL: 1.8% @ 200°F; 93°C UEL/UFL: Not available Density: 1.20 Vapor Density: 4.25 Vapor Pressure: 0.3 mmHg Specific Gravity: 1.20 Incompatibilities: Nitric acid, nitrogen tetroxide, strong alkalis, phosphorus pentachloride, and chemically active metals (i.e., tin, zinc, etc.) Appearance and Odor: Yellow oily liquid with a pungent odor like paste shoe polish	Typically this material is a skin and eye irritant. Systemically, overexposure can result in anoxia, anemia, methemoglobinemia with possible manifestations resulting in liver, kidney, and testicular effects. Repeated or prolonged exposure to the skin may result in dermatitis.
1,2-Dichloroethane see also Ethylene Dichloride	107-06-2	PID: I.P. 11.05 eV, 140% relative response ratio. FID: 80% response with FID.	Air sample using charcoal sorbent tube and carbon disulfide desorption with gas chromatography-flame ionization detector; Sample and analytical protocol in accordance with NIOSH Method #1003	OSHA: 50 ppm, 100 ppm (Ceiling) ACGIH: 10 ppm NIOSH: 1 ppm IDLH: 50 ppm	Inadequate - This compound has poor warning properties (odor threshold 26 ppm) OSHA allows the use of organic vapor cartridges in certain circumstances. Recommended glove: Polyvinyl alcohol >8.00 hrs; Viton 6.90 hrs; Teflon >24.00 hrs; Silver Shield >6.00 hrs	Boiling Pt: 182°F; 83°C Melting Pt: -31°F; -35°C Solubility: 0.9% Flash Pt: 56°F; 13°C LEL/LFL: 6.2% UEL/UFL: 16% Vapor Density: Not available Vapor Pressure: 64 mmHg @ 68°F; 20 °C Specific Gravity: 1.24 Incompatibilities: Strong oxidizers and caustics, chemically active metals such as aluminum or magnesium powder, sodium and potassium. Appearance and Odor: Colorless liquid with a pleasant, chloroform-like odor.	Exposure to this substance may cause CNS depression, nausea, vomiting, dermatitis, and irritation of the eyes. Chronic overexposure may result in damage to the kidneys, liver, eyes (cornea opacity), skin and CNS.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Ethylbenzene	100-41-4	PID: I.P. 8.76, High response with PID and 10.2 eV lamp. FID: 100% response with FID.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with OSHA Method #07 or NIOSH Method #1501 Aromatic Hydrocarbon.	ACGIH; NIOSH: 100 ppm; 125 ppm STEL OSHA: 100 ppm IDLH: 800 ppm	Adequate - Can use air-purifying respirator with organic vapor cartridge up to 800 ppm. Recommended gloves: Neoprene or nitrile w/ silver shield when potential for saturation; Teflon >3.00 hrs	Boiling Pt: 277°F; 136°C Melting Pt: -139°F; -95°C Solubility: 0.01% Flash Pt: 55°F; 13°C LEL/LFL: 1.0% UEL/UFL: 6.7% Vapor Density: 3.66 Vapor Pressure: 10 mmHg @ 79°F; 26 °C Specific Gravity: 0.87 Incompatibilities: Strong oxidizers Appearance and odor: Colorless liquid with an aromatic odor. Odor Threshold of 0.092-0.60.	Regulated primarily because of its potential to irritate the eyes and respiratory system. In addition, effects of overexposure may include headaches, narcotic effects, CNS changes (i.e., coordination impairment, impaired reflexes, tremoring) difficulty in breathing, possible chemical pneumonia, and potentially respiratory failure or coma.
Acetone	67-64-1	PID: I.P. 9.69 eV, high response with PID and 10.2 eV lamp. FID: 60 % relative response ratio with FID.	Air sample using a charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol shall proceed in accordance with OSHA Method #69, 07 or NIOSH Method #1300.	OSHA: 1000 ppm ACGIH: 750 ppm, 1000 ppm STEL NIOSH: 250 ppm IDLH: 2500 ppm	Adequate - Can use air purifying respirator with organic vapor cartridge up to 2500 ppm. Recommended glove: Natural rubber	Boiling Pt: 133°F; 56°C Melting Pt: -139°F; -95°C Solubility: Miscible Flash Pt: 0°F; -18°C LEL/LFL: 2.5% UEL/UFL: 13% Vapor Density: Not available Vapor Pressure: 180 mmHg Specific Gravity: 0.79 Incompatibilities: Oxidizers, acids Appearance and odor: Colorless liquid with a fragrant mint-like odor.	Exposure to this chemical may result in irritation to the eyes, nose, throat. Overexposure may cause headache, dizziness. Contact with the skin may cause dermatitis. Target organs are listed as the respiratory system (lungs) and skin.
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.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
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.
Trichloroethylene	79-01-6	PID: I.P. 9.45 eV, High response with PID and 10.2 eV lamp. FID: 70% 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 #1022 or #1003.	OSHA: 50 ppm; 200 ppm (Ceiling) ACGIH: 50 ppm; 100 ppm STEL NIOSH: 25 ppm IDLH: 1000 ppm	Inadequate - Odor threshold 82 ppm. APRs with organic vapor/acid gas cartridges may be used for escape purposes. Exceedances over the exposure limits require the use of positive pressure-demand supplied air respirator. Recommended gloves: PV Alcohol unsupported >16.00 hrs; Silver shield >6.00 hrs; Teflon >24.00 hrs; or Viton >24.00 hrs; Nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection)	Boiling Pt: 188°F; 86.7°C Melting Pt: -99°F; -73°C Solubility: 0.1% @ 77°F; 25°C Flash Pt: 90°F; 32°C LEL/LFL: 8% @ 77°F; 25°C UEL/UFL: 10.5 @ 77°F; 25°C Vapor Density: 4.53 Vapor Pressure: 100 mmHg @ 90°F; 32°C Specific Gravity: 1.46 Incompatibilities: Strong caustics and alkalis, chemically active metals (barium, lithium, sodium, magnesium, titanium, and beryllium) Appearance and Odor: Colorless liquid with a chloroform type odor. Combustible liquid, however, burns with difficulty.	Central nervous system effects, including euphoria, analgesia, anesthesia, paresthesia, headaches, tremors, vertigo, and somnolence. Damage to the liver, kidneys, heart, lungs, and skin have also been reported. Contact may result in irritation to the eyes, skin, and mucous membranes. Ingestion may result in GI disturbances including nausea, and vomiting NIOSH lists this substance a potential human carcinogen.
Xylene All isomers o-,m-, p-	1330-20-7	PID: I.P. 8.56 eV, High response with PID and 10.2 eV lamp. FID: 110% response with FID.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol shall proceed in accordance with OSHA 07, or NIOSH Method 1500.	ACGIH, & NIOSH: 100 ppm, 150 ppm STEL OSHA: 100 ppm IDLH: 900 ppm	Adequate - Odor thresholds for the following isomers: 0.6 m-; 5.4 p-; 20 o- ppm. Can use air-purifying respirator with organic vapor cartridge up to 900 ppm concentrations. Recommended gloves: PV Alcohol >12.67 hrs; Viton >8.00 hrs; CPE >1.00 hr; Butyl 0.87 hrs; Nitrile is acceptable for limited operations and contact (>0.20 hrs)	Boiling Pt: 269-281°F; 132-138°C Melting Pt: -130/-54m/56p°F; -25o/-48m/13p °C Solubility: 0.02 % Flash Pt: 81-90°F;27-32°C LEL/LFL: 0.9% UEL/UFL: 7.0% Vapor Density: 3.66 Vapor Pressure: 7-9 mmHg @ 70°F; 21°C Specific Gravity: 0.86-0.88 Incompatibilities: Strong oxidizers and strong acids Appearance and odor: Colorless liquid with an aromatic odor.	Effects may of overexposure include irritation at all points of contact, CNS changes (i.e. dizziness, excitement, drowsiness, incoherent, staggering gait), difficulty in breathing, pulmonary edema, and possibly respiratory failure. Chronic effects may include dermatitis and cornea vacuolization.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS							
Aluminum	7429-90-5	Particulate form - unable to be detected by PID/FID.	Air sample using a cellulose ester membrane filter (particulate filter); atomic absorption (Method #7013) or ICP (Method #7300). Sampling and analytical protocol shall proceed in accordance with NIOSH Methods #7013 and #7300 as applicable.	OSHA: 15 mg/m ³ Total dust, 5 mg/m ³ Respirable fraction NIOSH: 10 mg/m ³ Total dust, 5 mg/m ³ Respirable fraction ACGIH: 10 mg/m ³	Particulate form - No identifiable warning properties to indicate presence and thereby detection. Employ air purifying respiratory protection suitable for dust and fume. Organic vapor acid gases with HEPA filter. 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: 4452F; 2450°C Melting Pt: 1220°F; 660°C Solubility: Insoluble Flash Pt: Nonflammable LEL/LFL: Nonflammable UEL/UFL: Nonflammable It should be noted that finely divided powders or dust when airborne becomes moderately flammable/explosive when exposed to heat, flame, or powerful oxidizers Vapor Density: Not available Vapor Pressure: 1 mmHg @ 2343°F; 1284°C Specific Gravity: 2.702 @ 77°F; 25°C Incompatibles: Acids, alkalis, oxidizers, halogens and halocarbons, alcohols Appearance and odor: silvery gray ductile, lustrous metal	Inhalation of finely divided powders or dusts may result in difficulty in breathing, coughing, and has been reported to cause pulmonary fibrosis. This malady known as "Shavers disease" is a form of benign pneumoconiosis.
Cadmium	7440-43-9	Particulate Form - Unable to be easily detected by PID or FID.	Air sample using a mixed cellulose-ester filter / acid desorption and analysis by atomic absorption-flame. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300 or #7048.	OSHA: 2 µg/m ³ (0.002 mg/m ³) ACGIH: 0.01 mg/m ³ (total particulate); 0.002 mg/m ³ (respirable particulate) IDLH: 9 mg/m ³ (as cd)	The use of an air purifying, full face-piece respirator with a high efficiency particulate air filter for concentrations up to 0.25 mg/m ³ . Recommended Gloves: This is in particulate form. Therefore any glove suitable to prevent skin contact.	Boiling Pt: 1412°F; 767°C Melting Pt: 610°F; 321°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: 1 mmHg @ 741°F; 394°C Specific Gravity: 8.65 @ 90°F; 32°C Incompatibilities: Strong oxidizers, elemental sulfur, selenium, tellurium, zinc, nitric acid, and hydrazoic acid Appearance and Odor: Metal: Silver-white, blue-tinged lustrous, odorless solid. Fume: yellow-brown, finely divided particulate dispersed in air.	Overexposure to this substance may result in irritation to the respiratory tract, dyspnea, tightness in the chest, coughing, possibly pulmonary edema. Overexposure to fumes causes symptoms characteristic of the flu (headaches, chills, muscle aches, nausea, vomiting, diarrhea). Chronic exposure may result in damage to the lungs, kidneys and liver. This substance has been identified as a confirmed animal; potential human carcinogen by IARC and NTP.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Chromium Compounds	7440-47-3 (Element)	Not detectable by PID. Not detectable by FID.	Air sample using mixed cellulose-ester filter; acid desorption and analysis by atomic absorption. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7024.	OSHA & NIOSH: (Chromium II, III) 0.5 mg/m ³ (Chromium VI) 0.1 mg/m ³ (Ceiling) ACGIH: 0.5 mg/m ³ (Chromium II, III compounds), 0.05 mg/m ³ (Chromium VI compounds) IDLH: 30 mg/m ³ (Chromium VI compounds)	The use of a air purifying, full face-piece respirator with a high efficiency particulate filter for concentrations up to 0.1 mg/m ³ . Recommended Gloves: This is in particulate form. Therefore any glove suitable to prevent skin contact.	Boiling Pt: 4788°F; 2642°C Melting Pt: 3452°F; 1900°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: 7.14 Incompatibilities: Strong oxidizers, peroxides, and alkalis Appearance and Odor: Appearance and odor vary depending upon the specific compound.	Health hazards are characterized normally through chronic exposure manifesting as histologic fibrosis of the lungs and ulceration of the nasal septum and skin. IARC, NTP and ACGIH list various chromium compounds as possessing carcinogenic properties.
Copper	7440-50-8 (Cu) 1317-38-0 (CuO)	Substance is not volatile. Unable to be detected by PID or FID.	Air sample using a mixed cellulose ester filter; inductively coupled plasma/atomic emission spectroscopy. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300.	NIOSH; OSHA: 0.10 mg/m ³ ACGIH: 0.2 mg/m ³	The use of an air-purifying full-face respirator with a high efficiency particulate air filter. 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: 4215°F; 2324°C Melting Pt: 1981°F; 1083°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: 1 mmHg @ 2962°F; 1628°C Specific Gravity: 8.94 Incompatibilities: Oxidizers, alkalis, sodium azide, acetylene, bromates, chlorates, iodates, and acids. Appearance and Odor: Metal: Reddish, lustrous malleable, odorless solid. Fume: Finely divided black particulate dispersed in air.	Irritation to the nose, throat, and respiratory tract. Metallic taste Discoloration of skin (potential dermatitis) and hair. Chronic exposure may result in dermatitis and damage to the liver and kidneys. Overexposure to fumes causes symptoms characteristic of the flu (headaches, chills, muscle aches, nausea, vomiting, diarrhea). Ingestion may cause burning in the mouth, throat, and stomach. Metallic taste with colicky abdominal pain. Individuals with Wilson's disease are at greater risk of chronic exposure as a result of the bodies tendency to absorb and retain copper.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO ₃ or H ₂ O ₂ desorption; or Atomic absorption detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m ³ ACGIH: 0.15 mg/m ³ NIOSH: 0.10 mg/m ³ IDLH: 100 mg/m ³ as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m ³ . 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.
Manganese	7439-96-5 as Mn	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using particulate filter, acid desorption, ICP detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300.	OSHA: Ceiling 5 mg/m ³ as a fume 1 mg/m ³ NIOSH: 1 mg/m ³ for dust and fume; 3 mg/m ³ as a STEL ACGIH: 5 mg/m ³ for dust; 1 mg/m ³ for fume IDLH: 500 mg/m ³	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. 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: 3452°F; 1900°C Melting Pt: 2300°F; 1260°C Solubility: Insoluble Flash Pt: Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals. This substance is considered a combustible solid.) LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 1 mmHg @ 2358°F; 1292°C Specific Gravity: 7.20 Incompatibilities: Strong oxidizers, halogens, and nitrates. Will react with water to produce hydrogen gas. Appearance and odor: Silvery solid or reddish-gray, odorless	Overexposure to this product may result in Central Nervous System and pulmonary effects by inhalation. Symptoms may include disturbances in gait and speech, sleepiness, mental confusion, stolid, masklike face, muscular twitching varying from tremors to coarse rhythmical movements of the extremities accompanied by cramps. Symptoms are described as postencephalitic Parkinsonism. Additionally dry throat, tightness in the chest, dyspnea, rales, flu-like symptoms low back pain, and vomiting.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Nickel	7440-02-0	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using particulate filter; acid desorption; ICP detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300.	OSHA: as Ni metal and insoluble compounds 1 mg/m ³ NIOSH: 0.015 mg/m ³ ACGIH: 0.05 mg/m ³ IDLH: 10 mg/m ³	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. Recommended gloves: This material 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: 4946°F; 2730°C Melting Pt: 2651°F; 1455°C Solubility: Insoluble acid Flash Pt: Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 1 mmHg @ 3290°F; 1810°C Specific Gravity: 8.90 Incompatibilities: Strong acids, halogens, sulfur, wood and other combustibles, nickel nitrate, and oxidizers Appearance and odor: Silvery white, hard, malleable ductile metal, odorless	Symptoms of overexposure to this product may include headaches, vertigo, delirium, extreme weakness, GI disturbance and pain including nausea vomiting and diarrhea, coughing, hyperpnea, cyanosis, weakness, allergic dermatitis, nickel itch, pulmonary asthma, chest pains tightness, dyspnea, dry cough, and conjunctivitis. This substances has been identified as a Human carcinogen by NTP and IARC.
Silver	7440-22-4	Particulate form - Unable to be detected by PID or FID.	Air sample using a mixed cellulose ester filter; acid desorption; Atomic absorption or plasma emission spectroscopy detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #5(s182), or OSHA Method #ID121.	NIOSH; OSHA; ACGIH: 0.01 mg/m ³	No identifiable warning properties to indicate presence and thereby detection. The use of a air purifying, full-face respirator with a high efficiency particulate air filter. 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: 4014°F; 2212°C Melting Pt: 1764°F; 962°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: 10.49 Incompatibilities: Acetylene, acetylene compounds, ammonia, peroxides, bromoazide, chlorine, trifluoride, ethylene imine, oxalic acid, nitric acid, and tartaric acid Appearance and Odor: Metal: white lustrous solid.	Overexposure to this substance may result in gastrointestinal, upper respiratory, and skin irritation. Discoloration of the eyes, skin and hair.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
PETROLEUM COMPOUNDS							
Waste Oils All information is based on mineral oil	N.E. 8012-95-1 for mineral oil	Varies between fractions however waste oils tend to be less volatile. The FID tends to handle the longer chained aliphatic hydrocarbons more efficiently than its PID counterpart and would be selected as the instrument of choice.	Sampling and analytical protocol shall be in accordance with NIOSH Method #5026 is the recommended method for mineral oil mist.	ACGIH; NIOSH: 5 mg/m ³ (Oil mists); 10 mg/m ³ STEL OSHA: 5 mg/m ³ (Oil mists)	Non-volatile substance, therefore no respiratory protection is required. In an aerosol form dust and mist respirator would be considered acceptable for up to 500 mg/m ³ . Recommended gloves: Any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances, and will be acceptable).	Boiling Pt: 680°F; 360°C Melting Pt: Not available Solubility: Insoluble Flash Pt: 275-500°F; 135-260°C depends on the distillation fraction LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: <0.5 mmHg Specific Gravity: 0.90 Incompatibilities: None reported Appearance and odor: Colorless, oily, with an odor of burned lubricating oil.	Minor irritation to the eyes, skin, and respiratory system.
Diesel Fuel No.2-D	Mixture	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID.	Air sample using charcoal tube as a collection media; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with NIOSH Method #1550.	OSHA; NIOSH; ACGIH: 5 mg/m ³ as mineral oil mist. In addition NIOSH and ACGIH establish 10 mg/m ³ as a STEL.	Kerosene odor Recommended Air Purifying cartridges: Organic vapor Recommended gloves: Nitrile	Boiling Pt: <170-400°F; 77-204°C Melting Pt: Not available Solubility: Negligible Flash Pt: 125°F; 52°C LEL/LFL: 0.6% UEL/UFL: 7.5% Vapor Density: >5 Vapor Pressure: <1 mmHg @ 70°F; 21 °C Specific Gravity: 0.86 Incompatibilities: strong oxidizers, halogens, and hypochlorites Appearance and odor: Colorless to amber with a kerosene 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.
Gasoline	8006-61-9	Relative response ratios for the components of gasoline range from 100 - 200% for PID and FID detection.	See components for measurement considerations.	ACGIH & OSHA: 300 ppm 500 ppm STEL NIOSH: Reduce to lowest feasible concentration.	Respiratory Protection: Odor threshold 0.7 ppm, adequate air purifying respirator with organic vapor cartridges up to 100 ppm. Recommended Gloves: Nitrile >6.00 hrs; PV alcohol >6.00 hrs; Viton/neoprene >8.00 hrs	Boiling Pt: 102°F; 39°C Melting Pt: Not available Solubility: Negligible Flash Pt: -50°F; -45°C LEL/LFL: 1.4% UEL/UFL: 7.6% Vapor Density: ~5 Vapor Pressure: 38-300 mmHg (varies seasonally) Specific Gravity: 0.74 @ 20/20°C Incompatibilities: Strong oxidizers, peroxides, strong acids, and perchlorates Appearance and Odor: Colorless liquid with gasoline odor.	Overexposure to this substance may result in irritation to the eyes, skin, and mucous membranes. Systemically, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, possible convulsion, and chemical pneumonia (aspiration). Prolonged or chronic exposures may result in possible liver or kidney damage. Components of this substance have been determined to be confirmed human carcinogens.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NSWC, WHITE OAK, SILVER SPRING, MD (CTO 0273)**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
BATTERY ACID							
Sulfuric Acid	7664-93-9	This substance is unable to be detected by PID/FID.	Sampling and analytical protocol shall be in accordance with NIOSH Method #7903.	OSHA; NIOSH: 1 mg/m ³ ACGIH: 1 mg/m ³ , 3 mg/m ³ (Ceiling) NIOSH: 1 mg/m ³ IDLH: 15 mg/m ³	Adequate - Irritating, tingling sensation. Odor threshold 0.15 ppm. Suitable for acid gases and dusts and mists for concentrations less than 15 mg/m ³ . Recommended gloves: Nitrile 6.00 hrs has been the one most widely used for the other substances and is acceptable for this substance. Other options include butyl rubber >8.00 hrs; silver shield 6.00 hrs; neoprene 1-3 hrs; and Viton >8.00 hrs.	Boiling Pt: 554°F; 290°C Melting Pt: 51°F; 10°C Solubility: Miscible Flash Pt: Not available LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 1 mmHg @ 295°F; 146°C Specific Gravity: 1.84 Incompatibilities: Organic materials, chlorates, carbides, fulminates, water, and powdered metals. Liberates excessive heat when mixed with water. Appearance and odor: Colorless, oily liquid, odorless	This substance is corrosive at all points of contact. Severe exposure may result in burns, chemical pneumonitis, conjunctivitis, stomatitis, and erosion of the teeth. Depending on the severity, shock and collapse may result.

6.2 PHYSICAL HAZARDS

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

- Moving machinery (contact/entanglement with rotating equipment or machinery).
- Slips, trips, and falls.
- Energized systems (contact with underground or overhead utilities).
- Lifting (muscle strains and pulls).
- Pinches and compressions.
- Noise (in excess of 85 decibels).
- Inclement weather.
- Contact with UXO (primarily at the Former Building 355 – Magazine Explosion Area).
- Excavation collapse.
- Vehicular and foot traffic
- Water hazards.

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

6.3 NATURAL HAZARDS

During field activities site personnel may also encounter various natural hazards including:

- Insect bites and stings
- Vector (Ticks, mosquitoes, etc.) transmitted illnesses and diseases
- Snakes and other wild animal encounters
- Poisonous plants

6.3.1 Insect Bites and Stings

Insect bites and stings are difficult to control given the climate and environmental setting of NSWC White Oak. However, in an effort to minimize this hazard the following control measures will be initiated where possible.

- Loose fitting clothing with long sleeves, where possible (given heat stress considerations) should be employed to provide a barrier between the field person and the insects. Commercially available bug sprays and repellents can be used if necessary. Products such as DEET should not be applied directly to the skin due to potential irritation. This product should be applied over clothing articles. For mosquito infested areas mosquito nets may also be used.
- The FOL and/or the SSO will preview all 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 communicated to all site personnel.

Note: It is important that any allergies be reported on the Medical Data Sheets and to the SSO. Additionally, any specific procedure for administering treatment as directed by your physician, must also be communicated to ensure the quickest and most efficient response possible.

6.3.2 Vector (Ticks, Mosquitoes, etc.) Transmitted Illnesses and Diseases

Ticks and mosquitoes, in this case, are the primary vectors of concern. These insects have been identified in the transmission of various diseases, including Lyme disease and malaria. Warm months (spring through early fall) are the predominant time for this hazard to impact personnel. However, due to the climate and environmental setting of NSWC White Oak, this hazard may occur year-round.

Information concerning vector transmitted Lyme's Disease including recognition, evaluation, tick removal, and control is provided in Attachment I of this HASP, and in Section 4.0 of the Health and Safety Guidance Manual.

6.3.3 Snakes And Other Wild Animals

Indigenous animals, including snakes (poisonous and non-poisonous), raccoons, and other animals native to the region may be encountered as part of field operations. Some of the work locations may encroach on nesting areas or territories claimed by these animals.

To avoid the obvious hazards conveyed as part of a direct encounter, the following actions will be taken to minimize impact on field crews and/or site operations.

- The FOL and/or SSO will preview access routes and work locations for nesting areas or signs of animal activities (tracks, foraging areas, etc.). All identified suspect areas will be communicated to the field crews. Where avoidance of these areas, or the animals that inhabit them, is not possible, the relocation of animals and nests will be coordinated with the Maryland Fish and Wildlife Commission.

6.3.3.1 Snake Bites

As stated above, all initial efforts will be directed to avoid, where possible, nesting and territorial areas claimed by these reptiles. However, should field personnel 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 aid to provide prompt and correct antidotes as necessary.
- Immobilize the bite victim to the greatest extent possible. Physical exertion will mobilize the toxins (in 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.

6.3.4 Poisonous Plants

Various plants that can cause an allergic reaction may be encountered during field work. These include, but are not limited to, poison ivy, poison oak, and poison sumac. Contact may occur when clearing vegetation to gain access to work areas.

Protective measures to control and minimize the effects of poisonous plants include the following:

- Identify plants for field personnel.
 - Poison Ivy plants are characterized climbing shrubbery, three leaf configuration ovate to elliptical in shape, greenish flowers, and white berries that produce irritating oils.
 - Poison Sumac plants characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with axillary clusters of white fruit producing irritating oils.

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

- Use of disposable garments such as Tyvek when clearing brush. After use remove and properly dispose of disposable PPE, do not reuse.

- Practice personal hygiene. The oils from the plants will only cause an allergic response when the person's protective skin layer is penetrated. This can be accomplished through pores open when perspiring, or through cuts, nicks, scratches, etc. This can also be accomplished when using excessively hot water for cleaning the skin, which also causes pores to open. Prior to break time wash potentially exposed skin with cool water and soap to remove as much of the oils as possible. In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to prevent the oils from accessing and penetrating the dermal layer.

7.0 HAZARD MONITORING

This section presents requirements for the use of real-time air monitoring instruments during site activities. It establishes the types of instruments to be used. Information on specific instruments, the frequency at which they are to be used, techniques for their use, and the action levels for upgrading/downgrading levels of protection are addressed in Table 5-1 of this document.

7.1 INSTRUMENTS AND USE

Real time monitoring instruments will be used to monitor source areas (sample locations, wells, etc.) and worker breathing zones. Action levels are discussed in Table 5-1 as they may apply to a specific task or location. This approach (coupled with the use of personal protective equipment and the observance of the other control requirements presented in this HASP) has been selected to minimize potential for personnel exposures to hazardous concentrations of airborne contaminants. These instruments will be utilized as screening tools to detect the presence of some of the site contaminants identified within Table 6-1.

7.1.1 Photoionization Detector

A photoionization detector (PID) with a lamp energy of 10.6 eV will be used to evaluate airborne concentrations of chemicals which may present an exposure potential to site personnel. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during the Geoprobe operations, sample collection, test pitting, and other subsurface or intrusive procedures. The PID has been selected because it is capable of detecting organic gases and vapors and some inorganic gases and vapors. In some cases the contaminants of concern will not be detected by the PID, so emphasis will be placed on engineering controls and PPE to control potential exposures.

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), location, and the other information specified in the field operations logbook or preferably on the activities sheet (i.e., Boring log, sample log sheet, etc.).

7.1.2 Hazard Monitoring Frequency

Table 5-1 presents the frequency that hazard monitoring may apply to the tasks to be conducted. However, based on instrument responses and site observations, the SSO may decide to increase these

frequencies. Reduction in monitoring frequencies will not be permitted without obtaining the prior consent of the PHSO and the CLEAN 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 all instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site for reference). All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field Health and Safety Logbook, provided that all of 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

Methods for instrument maintenance and calibration can be found in Section 1.0 of the Health and Safety Guidance Manual.

7.3 PARTICULATES

It is not anticipated that significant concentrations of dusts will be generated as a result of site activities. If dusts are generated during site operations, exposure to these dusts will be minimized by the use of area wetting methods and/or avoidance of the dusts (moving upwind of source, evacuation, etc.). Monitoring for particulates, therefore, is not anticipated for this project.

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

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

8.1.1 Requirements for TtNUS Personnel

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

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

TtNUS will also conduct a brief meeting daily to discuss operations planned for that day and to issue SWPs for those operations. At the end of the workday, a short meeting will be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a SWP System (See Section 10.10).

8.1.2 Requirements for Subcontractors

All TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120(e)(8) prior to performing field work at the NSWC White Oak. All subcontractor personnel serving as supervisors must also provide documentation of supervisory training as per 29 CFR 1910.120(e)(4). TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided as in Figure 8-1 and by providing copies of certificates for all subcontractor personnel participating in site activities.

FIGURE 8-1

TRAINING LETTER

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

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

Month, day, year

Mr. Scott Nesbit, P.E.
Project Manager
Tetra Tech NUS
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Training for NSWC White Oak, Silver Spring, Maryland

Dear Mr. Nesbit:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with all applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 126.

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

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

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

Sincerely,

(Name and Title of Company Officer)

Enclosed: Copies of Training Certificates

8.2 SITE-SPECIFIC TRAINING

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

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

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

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS Personnel

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

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

8.3.2 Medical Surveillance Requirements for Subcontractors

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

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

8.3.3 Requirements for All Field Personnel

Each field team member (including subcontractors) and visitors entering the exclusion zone(s) shall be required to complete and submit a copy of Medical Data Sheet presented in Section 7 of the Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

Subcontractors who will not enter the exclusion zone during operation, and whose activities involve no potential for exposure to site contaminants, may not be required to meet the requirements for training/medical surveillance other than site-specific training as stipulated in Section 8.2. This exception can only be granted under the sole authority of the CLEAN HSM.

**FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM**

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f), and was found to be medically -
 qualified to perform work at the NSWC White Oak work site
 not qualified to perform work at the NSWC White Oak work site

and,
2. Undergone a physical examination in accordance with OSHA 29 CFR 1910.134(b)(10) and was found to be medically -
 qualified to wear respiratory protection
 not qualified to wear respiratory protection

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

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

Part B

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

and have determined the following information:

**FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO**

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

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

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

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

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NSWG White Oak work site, this participant

- may
 may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

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

Address

FIGURE 8-4

MEDICAL SURVEILLANCE LETTER

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

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

Month, day, year

Mr. Scott Nesbit, P.E.
Project Manager
Tetra Tech NUS
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: Medical Surveillance for NSWC White Oak, Silver Spring, Maryland

Dear Mr. Nesbit:

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

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

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

Sincerely,

(Name and Title of Company Officer)

9.0 SPILL CONTAINMENT PROGRAM

9.1 SCOPE AND APPLICATION

It is not anticipated that quantities of bulk potentially hazardous materials (greater than 55-gallons) will be handled during some of the site activities conducted as part of the scope of work. Significant quantities of waste water (decontamination, purge and development) and Investigative-Derived Wastes (IDW) may be generated as part of site activities. It is not anticipated, however, that spillage of these materials would constitute a significant danger to human health or the environment. Further, it is possible that as the job progresses disposable PPE and other non-reusable items may be generated. As needed, 55 -gallon drums will be used to contain waste waters, IDW, and other unwanted items generated during investigatory activities. These drums will be labeled with the site name (SWMU, AOC, or IRP Site and location), drum number, the type of contents (purge waters), volume, the date, point of contact with telephone number. An updated Inventory Log will be provided to the Base Contact (Mr. Bob Ridgway) and to the PM at the termination of every 10-day shift. This will be done to keep a running tab of containers retained within an established marshaling area.

Samples will be collected and analyzed to characterize the material and determine appropriate disposal measures. Once characterized they can be removed from the staging area and disposed of in accordance with Federal, State and local regulations.

9.2 POTENTIAL SPILL AREAS

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

- Areas used for central staging of resources
- Areas used for central staging of IDW materials
- Decontamination area

Additionally, areas designated for handling, loading, and unloading of potentially contaminated soils, waters, and debris present limited potential for leaks or spills. Monitoring of these areas will be done at least weekly.

9.2.1 Site Drums/Containers

All drums/containers used for containing soils and liquids will be sealed, labeled, and staged within a centralized area awaiting shipment or disposal. Drums used for the storage and transportation of IDW will meet the packaging requirements for steel drums category U.N. 1A2, removable head as specified in paragraph 9.6.1, United Nations Transport of Dangerous Goods.

9.2.1.1 Staging Area Configuration

The staging or marshaling area as referred to before will be configured to support this spill prevention and control program. The area will be configured as follows:

- Where possible secondary containment should be provided. This would include a bermed area sufficient in size to hold 10% of the total volume or the volume of largest container, whichever is greater. This calculation of secondary containment should also consider any displacement by containers or pallets. This bermed area should be lined (plastic liner or other impermeable surface) to prevent any spillage inside the containment from saturating the ground.
- Drums will be organized no more than four to a pallet. The drums label and the head bolt arranged as such to permit reading/review or removal of the head without requiring the drum to be moved on the pallet. Drums will be segregated to site and media. A minimum of two feet shall be maintained between each row of pallets to permit access for spill response measures.

9.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic (once a week) walk around by the SSO will be conducted during working hours to visually determine that containers are not leaking. If a leak is detected, the first approach will be to transfer the container contents using a hand pump into a new container. Other provisions for the transfer of container contents will be made and appropriate emergency contacts will be notified, if necessary. In most instances, leaks will be collected and contained using absorbents such as Oil-dry, vermiculite, or sand, which will be stored at the staging area in a conspicuously marked drum. This material too, will be containerized for disposal pending analyses. All inspections will be documented in the Project Logbook.

9.4 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed on the procedures for 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 Coordinator for this operation should the need arise.

9.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment which will be maintained at the staging area at all times for the purpose of supporting this Spill Prevention/Containment Program.

Spill Response Equipment:

- Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry);
- Drums (55-gallon U.N 1A2)
- Portable storage tanks or additional drums
- Shovels, rakes, and brooms
- Labels

PPE stored at the staging area:

- Rubber boot covers, nitrile outer gloves, PVC rain-suit or other form of impermeable splash protection, should it be required.

9.6 SPILL CONTROL PLAN

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

- 1) Notify the SSO or FOL immediately upon the detection of a leak or spill.
- 2) Employ the personnel protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the drum or raising the leak to the highest point. Spread the absorbent material in the area of the spill covering completely.
- 3) Transfer the material to a new container, collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment or disposal options.

- 4) All spills occurring on soils, grassy areas, gravel lots will be re-containerized including 2-inches of top cover on which the spill occurred, and await test results for treatment or disposal options.

It is not anticipated that a spill will occur in which the field crews cannot handle. Should this occur notification of appropriate emergency response agencies will be carried out by the FOL or SSO.

10.0 SITE CONTROL

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

10.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of the site of known or suspected contamination. It is not anticipated that significant amounts of surface contamination are present in the proposed work areas of this site. It is anticipated that this will remain so until/unless contaminants are brought to the surface by intrusive activities, such as soil boring or sampling operations. Furthermore, once intrusive activities have been completed and surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the contamination reduction zone. Therefore, the exclusion zones for this project will be limited to those areas of the site where active work is being performed plus a designated area surrounding the point of operation (see Table 5-1 for specific operation). The exclusion zone for this activity will be fragmented to represent the areas where the soil is disturbed through, direct push, test pit operations, or sampling activities. When possible, exclusion zones will be delineated using barrier tape, cones and/or drive poles, and postings to inform personnel other than the field crew.

10.1.1 Exclusion Zone Clearance

Prior to the initiation of site activities, utility locations will be identified by commercial utility location companies and drawings made available through the NSWC White Oak Contact (Mr. Robert Ridgway). The positions of identified utilities will be field located and staked, to minimize the potential for damage during intrusive activities. Sample locations can be located to avoid buried utilities. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Section 2.9 and Table 2-1 will be notified.

Access to work areas will be controlled by TtNUS personnel. No persons will be permitted to enter site exclusion zones without site-specific training. Site visitors will be provided site-specific training and will be escorted by TtNUS personnel at all times (see Section 10.4).

10.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. The personnel and equipment decontamination will not take place in this area, but will take place at a central location established for this project. This area instead will serve as a focal point in supporting exclusion zone activities. When applicable, this area will be delineated using barrier tape, cones and/or drive poles, and postings to inform and direct facility personnel.

10.3 SUPPORT ZONE

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

10.4 SITE VISITORS

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

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (EPA, OSHA, etc.)
- NSWC White Oak or DOD Personnel
- Other authorized visitors

All personnel working on this project are required to gain initial access to the NSWC White Oak by coordinating with the TtNUS FOL or designee and following established NSWC White Oak access procedures.

Once access to NSWC White Oak is obtained, all personnel who require site access into areas of ongoing operations will be required to obtain permission from the FOL and SSO. The prerequisites for all site visitors wishing to observe operations in progress in the exclusion zone are discussed below:

- All 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 individual's name (proper identification required), the entity which they represent, and the purpose of the visit.

- All site visitors will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training (40-hours of HAZWOPER training) and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, all 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 operational zone. All visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. Any and all visitors not meeting the requirements stipulated in this plan will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause the termination of all on-site activities until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from the Base Contact and GSA Physical Security. All site visitors granted access to the exclusion zones during ongoing operations will be escorted by a TtNUS representative (arranged for by the FOL) at all times while the visitor remains in the exclusion zone.

10.5 SITE SECURITY

TtNUS will retain control over active operational areas. The FOL will serve as a focal point for site personnel, and will serve as the final line of security for the work areas. As stated above all work will cease in the event of unauthorized personnel entering the exclusion zone. Work will remain temporarily suspended until the unauthorized visitor can be removed. The Base Contact will serve as the primary enforcement contact for removing unauthorized visitors.

10.6 SITE MAP

Once the areas of contamination, access routes, utilities, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. These maps will show utility locations, potential points of contact with the public, roadways, and other significant characteristics that may impact site operations and safety. Site maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

10.7 BUDDY SYSTEM

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

10.8**MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS**

TtNUS and subcontractor personnel will provide MSDSs for all chemicals brought on-site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of these substances on site. A chemical inventory of all chemicals used on site will be developed using Tab 5 of the Health and Safety Guidance Manual. A copy of the Chemical Inventory List will be provided to the Fire Department, as they would serve as primary responders to the work/storage trailer should the need arise. The MSDSs will then be maintained in a central location and will be available for anyone to review upon request.

10.9**COMMUNICATION**

As personnel may not always be working in proximity to one another during field activities, a supported means of communication between field crews will be used as necessary. As a result, two-way radio communication devices will be used by field personnel while at the site. All two-way radio communications intended for use at NSWC White Oak, will have GSA approval prior to being brought on-site for use.

External communication will be accomplished by using provided telephones at the site. External communication will primarily be used for the purpose of resource and emergency resource communications.

10.10**SAFE WORK PERMITS**

All exclusion zone work conducted in support of this project will be performed using SWPs to guide and direct field crews on a task by task basis. An example of the SWP to be used is illustrated in Figure 10-1. Attachment IV contains partially completed SWP for tasks that are to be performed as part of the investigation. Information such as field crew performing the task, date, time, procedure reviews, and equipment preparation information need to be completed by the FOL or SSO prior to the initiation of site activities. SWPs will be further supported by the daily safety meetings. This effort will ensure all site specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signature of the FOL and/or SSO. All personnel engaged in on-site activities will be aware of the elements indicating levels of protection and precautionary measures to be used.

Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The SWP will take precedence over the HASP when more conservative measures are required based on specific site conditions.

Upon completion of work specified on the SWP, the person accepting the permit will return it to the SSO.

Any problems encountered regarding control measures taken will be annotated on the permit or a separate sheet of paper and returned to the SSO for review and evaluation.

FIGURE 10-1 SAFE WORK PERMIT

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

SECTION I: General Job Scope (To be filled in by person performing work)

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

 Equipment used: _____
 II. Names: _____

 III. On-site inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | |
|---|---|
| <p>IV. Protective equipment required</p> <p>Level D <input type="checkbox"/> Level B <input type="checkbox"/>
 Level C <input type="checkbox"/> Level A <input type="checkbox"/>
 Detailed on Reverse</p> | <p>Respiratory equipment required</p> <p>Full face APR <input type="checkbox"/> Escape Pack <input type="checkbox"/>
 Half face APR <input type="checkbox"/> SCBA <input type="checkbox"/>
 SKA-PAC SAR <input type="checkbox"/> Bottle Trailer <input type="checkbox"/>
 Skid Rig <input type="checkbox"/> None <input type="checkbox"/></p> |
|---|---|
- Modifications/Exceptions: _____

V. Chemicals of Concern	Action Level(s)	Response Measures
_____	_____	_____
_____	_____	_____
_____	_____	_____

- VI. Additional Safety Equipment/Procedures
- | | | | | | |
|-------------------------------|------------------------------|-----------------------------|----------------------------------|------------------------------|-----------------------------|
| Hard-hat | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Safety Glasses | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Radio | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Barricades | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Splash suits/coveralls | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Gloves (Type) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
- Modifications/Exceptions: _____

- | | | | | | |
|--|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | | Yes | NA |
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.) Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

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 one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, 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 this HASP modified accordingly.

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 all chemicals brought on site, including decon solutions, fuels, sample preservatives, calibration gases, etc.
- Follow-up Reports
- A full-size OSHA Job Safety and Health Poster (posted in the site trailers)
- Training/Medical Surveillance Documentation Form (Blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED AT THE SITE

The following documentation is to be posted at the site for quick reference purposes. In situations where posting of these documents is not feasible (such as no office trailer), these documents should be separated and immediately accessible.

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

Material Safety Data Sheets (MSDSs) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances employed on site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster - 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 Posting - This list is found within the training section of the HASP (See Figure 8-1). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. This list 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) - This list of numbers and the directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards - Medical Data Sheets will be filled out by all 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 all personnel to be carried on their person.

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

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

Placards and Labels - 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.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirators
AOC	Area of Concern
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
DOD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
eV	electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
LEL/O ₂	Lower Explosive Limit/Oxygen
N/A	Not Available
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photo Ionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
SAP	Sampling and Analysis Plan
SCBA	Self Contained Breathing Apparatus
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SWMU	Solid Waste Management Unit
TOM	Task Order Manager
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
UV	Ultra Violet
WP	Work Plan

ATTACHMENT I

**TICK CONTROL
AND
LYME DISEASE**

TICK CONTROL AND LYME DISEASE

The occurrence of Lyme disease has become a worldwide problem since its identification in 1976. This disease is characteristically recognized as being transmitted by ticks, which may be encountered by field personnel while working at this site. As a result, this discussion has been included with this Health and Safety Plan to provide for adequate recognition, evaluation, and control efforts to minimize the occurrence and effects of this potential hazard.

The discovery of Lyme disease is credited to Dr. Allen Steere of Yale University Medical School, and is named after the community where it was (reportedly) first encountered, Lyme, Connecticut. This disease can be transmitted to man through the bite of ticks that are infected with a cork screw-shaped microbe (spirochete). The spread of this disease has been so rapid that in 1984 it surpassed Rocky Mountain Spotted fever as the most common tick-borne disease in the United States. In this country, most of the incidents of this disease have been recorded in the Northeast, and the tick species most commonly attributed with its spread is the deer tick.

Recognition

This hazard potential exists primarily in the spring and summer months, as these are the seasons that tick populations and activity flourish. In fact, 90 percent of the reported cases have occurred from early June through September. Also, this concern exists primarily in heavily vegetated areas. Therefore, recognition of these factors can aid in the awareness and control of this threat.

To aid in the recognition and identification of these insects, an example illustration of the tick species common to the region where this site is located has been included with this discussion. This species (the American Dog tick) is common in the eastern half of the United States, and typically exists in areas covered with grass or underbrush. These insects will attach themselves to animals (including man) that pass through the area and rub against them. After finding a host, the tick inserts its mouthparts and sucks blood until it is fully engorged. This requires a time period of three to twelve days, then the tick will drop off. In addition to Lyme disease concerns, this tick has also been identified as a transmitter of Rocky Mountain Spotted Fever, and the organisms of tularemia and possibly relapsing fever. The wounds left by tick bites can be painful, and can also have a paralyzing effect commonly referred to as tick paralysis.

The earliest symptom of the onset of this disease is the occurrence of an unusual red skin rash. This is commonly the first indication since it has been evidenced that many persons who have contracted this disease were, in fact, unaware that they had been bitten. This rash can appear at the site of the bite anywhere from several days to a few weeks after the bite. It typically starts as a small red spot, and then expands as the spirochetes expand from the bite location. Rash sizes can vary, but have been most commonly associated in a 2 to 3 inch diameter size range. This rash will fade (with or without treatment) after a few weeks. Close inspection is necessary to detect this symptom as the rashes are easy to miss because they're often very faint. Body sites where rashes frequently occur include the thigh areas, groin, and armpits. Also, it is not uncommon for a rash to develop in more than one place.

Other early symptoms include profound fatigue, a stiff neck, and flu-like symptoms such as headache, chills, fever, and muscle aches. Recognition of the onset of any of these symptoms is important since tick bites do not always produce a rash. If left untreated, the disease will progress to its second stage within weeks or months after the infection. This stage involves affects to the heart and nervous system. A common second stage symptom is a paralysis on one or both sides of the face. Others include severe headache, encephalitis, or meningitis. The third and final stage involves the development of chronic inflammatory arthritis, which can occur up to a year or more after the bite.

Evaluation

Evaluation of this hazard potential principally involves field personnel performing close self-inspections for the presence of ticks each time they leave the site. This should involve careful examination, especially of the individuals' heads. Personnel should be aware that when a tick attaches itself to its host, it inserts its entire head under the surface of the skin.

Control

Control of this threat involves several components. First, field personnel must be aware of the climate and area conditions which are commonly associated with being conducive to tick infestation. Second, when working in or walking through potential infested areas, personnel must ensure that they do not have exposed body parts (i.e. at least long sleeved shirts and long pants, particularly when protective coveralls are not worn). In heavily vegetated areas where infestation is likely, Tyvek coveralls will be required to minimize this hazard potential. Also, several commercial products have been demonstrated as being effective in repelling ticks. Examples include Permanone, Off!, and Cutter. These types of repellents will be used at the direction and discretion of the Brown & Root Environmental Health and Safety Officer, and only in accordance and observation of manufacturer's recommendations. In most instances, however, such repellents are typically applied to the outside surfaces of clothing (and not directly onto the skin), and should be applied also to shoe tops, socks, pants cuffs, and other areas most susceptible to ticks.

Tick Removal

In the event that a tick is discovered to be attached to a member of the field team, timely removal of the insect is critical to reducing the potential for contracting the disease. According to available information and research, there is apparently a grace period of at least a few hours from the time of the bite before the tick transmits the microbe (the spirochetes are not present in the mouth parts of the tick). However, the incident of a tick bite is frequently unnoticed, and the discovery of the tick may not occur until after this suspected grace period has already elapsed. Therefore, timely removal is very important. The preferred method of tick removal is to pull it out using tweezers or small forceps. In this method, the tick should be grasped as close to the mouth as possible, and then pulled steadily upward. Care must be exercised so as not to pull in a jerking motion as this can result in the head becoming detached. After the tick has been removed, disinfect the bite with rubbing alcohol or povidone iodine (Betadine). The tick must not be handled as the microbes can enter the body through any breaks in intact skin. The bite should be checked occasionally for at least a two-week period to see if a rash forms. If it does, medical attention must be promptly sought.

In order to provide for proper and timely response to the occurrence of a tick bite, the SSO will ensure that the site First Aid kit is properly equipped with medical forceps and rubbing alcohol, in addition to the standard kit contents. Also, an adequate supply of commercial insect (tick) repellents will be maintained on-site, and all personnel will be trained in its proper application and will be required to use it, at the direction of FOL.

ATTACHMENT II

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

Safety Guards:

Yes No

- Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____
- Hot pipes and surfaces exposed to accidental contact? _____
- All emergency shut offs have been identified and communicated to the field crew? _____
- Have emergency shutoffs been field tested? _____
- Results? _____
- Are any structural members bent, rusted, or otherwise show signs of damage? _____

EQUIPMENT INSPECTION (Continued)

- Are fueling cans used with this equipment approved type safety cans? _____
- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? _____

Portable Power Tools:

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

Cleanliness:

- Overall condition (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 all 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? | <input type="checkbox"/> | <input type="checkbox"/> |
| - If so, has an 8-hour noise dosimetry test been performed? | <input type="checkbox"/> | <input type="checkbox"/> |
| - 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 III

OSHA FORM 101

Bureau of Labor Statistics
Supplementary Record of
Occupational Injuries and Illnesses

U.S. Department of Labor

This form is required by Public Law 91-596 and must be kept in the establishment of 5 years.
Failure to maintain can result in the issuance of citations and assessment of penalties.

Case or File No.

Form Approved
O.M.B. No. 1220-0029

Employer

1. Name

2. Mail address (No. and street, city or town, State, and zip code)

3. Location, if different from mail address

Injured or Ill Employee

4. Name (First, middle, and last)

Social Security No.

5. Home address (No. and street, city or town, State, and zip code)

6. Age

7. Sex (check one)

Male

Female

8. Occupation (Enter regular job title, not the specific activity he was performing at the time of injury)

9. Department (Enter name of department, or division in which injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)

The Accident or Exposure to Occupational Illness

If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.

10. Place of accident or exposure (No. and street, city or town, State, and zip code)

11. Was place of accident or exposure on employer's premises?

Yes

No

12. What was the employee doing when injured? (Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them).

13. How did the accident occur? (Describe fully the events which resulted in the injury or occupational illness. Tell what and how it happened.

Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident Use separate sheet for additional space.)

Occupational Injury or Occupational Illness

14. Describe the injury or illness in detail and indicate the part of body affected. (E.g., amputation of right index finger at second joint, fracture of ribs; lead poisoning; dermatitis of the left hand, etc.)

15. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him;

the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)

16. Date of injury or initial diagnosis of occupational illness.

17. Did employee die? (Check one)

Yes

No

Other

18. Name and address of physician

19. If hospitalized, name and address of hospital

Date of Report

Prepared by

Official position

ATTACHMENT IV
SAFE WORK PERMITS

**SAFE WORK PERMIT FOR
SURVEYING ACTIVITIES AT VARIOUS SITES**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surveying (geographical and geophysical) activities at various sites.

II. Required Monitoring Instruments: None

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants and safety footwear. Safety glasses, hard hats, and hearing protection will be worn when working near operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated given the nature of surveying activities and limited contact w/ media.</u>	_____	_____
	_____	_____

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Safety Glasses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall to protect against natural hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake caps to protect against bites.

VII. Procedure review with permit acceptors	Yes	NA	Emergency alarms.....	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>			

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
MOBILIZATION AND DEMOBILIZATION ACTIVITIES
AT VARIOUS SITES**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): **Mobilization and demobilization activities at various sites.**

II. Required Monitoring Instruments: None

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirements include sleeved shirt and long pants, safety glasses and safety footwear. Hard hats and hearing protection will be worn when working near operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated given the nature of surveying activities and limited contact w/ media.</u>	_____	_____
	_____	_____

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall to protect against natural hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake chaps to protect against bites.

VII. Procedure review with permit acceptors	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls; natural hazards; etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. The Former Bldg. 355 will be screened for UXO prior to field crews performing activities at this site.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
DEMOLITION ACTIVITIES AT
EBS AOC 304-3**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Demolition of the shed associated with EBS AOC 30403. At the time that this Safe Work Permit was developed it was unknown how demolition would be performed or who would be performing demolition activities.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	Escape Pack	<input type="checkbox"/>
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	SCBA	<input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	Bottle Trailer	<input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	None	<input checked="" type="checkbox"/>
	Skid Rig <input type="checkbox"/>		

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, leather gloves with surgical style inner gloves, safety glasses, hard hats, and hearing protection.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Unknown chemicals</u>	<u>Any sustained readings</u>	<u>Suspend site activities and</u>
<u>(See Section X below)</u>	<u>above background levels</u>	<u>report to an unaffected area.</u>
	<u>in worker breathing zones.</u>	

VI. Additional Safety Equipment/Procedures				
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash suits/coveralls	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - leather w/ nitrile)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths or contacting potentially contaminated media (soils, shed debris, etc.). PVC or PE coated Tyvek if saturation or work cloths may occur.

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: It has been reported that the floor of the shed (5 X 6 feet) is stained and that it emitted a strong chemical odor. Information regarding the type of chemicals stored in this area was not available. As a result, field crews will perform continuous air monitoring. Any suspicious substance will be avoided. If possible, entry into the shed should be prevented. If any electrical lines or other utilities are present in the shed, they must be disconnected and de-energized prior to demolition activities. Minimize the generation of dusts or airborne particulates during demolition as they may pose an inhalation and ingestion exposure hazard.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
DEMOLITION ACTIVITIES AT
EBS AOC 304-3**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Demolition of the shed associated with EBS AOC 30403. At the time that this Safe Work Permit was developed it was unknown how demolition would be performed or who would be performing demolition activities.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, leather gloves with surgical style inner gloves, safety glasses, hard hats, and hearing protection.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Unknown chemicals</u>	<u>Any sustained readings</u>	<u>Suspend site activities and</u>
<u>(See Section X below)</u>	<u>above background levels</u>	<u>report to an unaffected area.</u>
	<u>in worker breathing zones.</u>	

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - <u>leather w/ nitrile</u>) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths or contacting potentially contaminated media (soils, shed debris, etc.). PVC or PE coated Tyvek if saturation or work cloths may occur.

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: It has been reported that the floor of the shed (5 X 6 feet) is stained and that it emitted a strong chemical odor. Information regarding the type of chemicals stored in this area was not available. As a result, field crews will perform continuous air monitoring. Any suspicious substance will be avoided. If possible, entry into the shed should be prevented. If any electrical lines or other utilities are present in the shed, they must be disconnected and de-energized prior to demolition activities. Minimize the generation of dusts or airborne particulates during demolition as they may pose an inhalation and ingestion exposure hazard.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING & GEOPROBE OPERATIONS AT
SWMUS 29, 34, 40, FORMER BLDG. 355 AND BLDG. 615**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling at SWMUs 29, 34, 40, Former Building 355 and Building 615. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils collected by hand via trowels.
- II. Required Monitoring Instruments: PID with 10.6 eV lamp source
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | |
|---|---|
| IV. Protective equipment required
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>
Detailed on Reverse | Respiratory equipment required
Full face APR <input type="checkbox"/> Escape Pack <input type="checkbox"/>
Half face APR <input type="checkbox"/> SCBA <input type="checkbox"/>
SKA-PAC SAR <input type="checkbox"/> Bottle Trailer <input type="checkbox"/>
Skid Rig <input type="checkbox"/> None <input checked="" type="checkbox"/> |
|---|---|

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

- | | | |
|---|---|---|
| V. Chemicals of Concern
<u>Explosive Compounds</u>
<u>incl. 2, 4, 6 - trinitrotoluene</u> | Action Level(s)
<u>Any sustained readings</u>
<u>above background levels</u>
<u>in worker breathing zones.</u> | Response Measures
<u>Suspend site activities and</u>
<u>report to an unaffected area.</u> |
|---|---|---|

- | | | | |
|--|---|----------------------------------|---|
| VI. Additional Safety Equipment/Procedures | | | |
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

- | | | | | | |
|---|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Emergency alarms..... | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | | | |

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
 If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Former Building 355 will have a surface sweep of the area prior to the start of sampling to ensure that no UXO is present. UXO at other site associated with this permit is not anticipated to be encountered. However, suspicious materials or items shall be avoided and reported to the site contact. Avoid visible dust plumes. If necessary employ area wetting methods.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SEDIMENT AND SURFACE WASTER SAMPLING AT
SWMU 41 AND AOC M, P, Q, AND R**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surface water and sediment sampling at SWMU 41, and AOC M, P, Q, and R. Sediment samples will be collected using trowels. Surface water samples from Paint Branch and outfalls.

II. Required Monitoring Instrument(s): PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats and hearing protection will be worn when working near operating equipment or when required by the facility.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Non-specific explosive compounds including 2, 4, 6-trinitrotoluene (TNT)</u>	<u>Any sustained readings above background levels in worker breathing zones.</u>	<u>Suspend site activities and report to an unaffected area.</u>

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Safety Glasses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths and PVC or PE coated Tyvek if saturation or work cloths may occur. U.S. Coast Guard approved life vest or lifelines if sampling on or near bodies where drowning hazards exist.

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Basins and storm drains may be considered confined space and shall not be entered by site personnel. Whenever possible surface water samples will be collected using remote sampling methods. Potential contaminants are not fully characterized. Suspicious materials or items shall be avoided and reported to the site contact.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING AND GEOPROBE OPERATIONS AT
EBS AOC 150, 151, AND 303**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling at EBS AOCs 150, 151, and 303. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils collected by hand via trowels.
- II. Required Monitoring Instruments: PID with 10.6 eV lamp source
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector: TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | | |
|--|--|--|
| IV. Protective equipment required | Respiratory equipment required | |
| Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

- | | | |
|---|--|--|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>Unknown chemicals assoc. with disposal of various items, debris, and ordnance casings.</u> | <u>Any sustained readings above background levels in worker breathing zones.</u> | <u>Suspend site activities and report to an unaffected area.</u> |

- | | | |
|--|---|--|
| VI. Additional Safety Equipment/Procedures | | |
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation of work cloths may occur

- | | | | | | |
|---|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Emergency alarms..... | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | | | |

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Potential contaminants associated with these sites are unknown. EBS AOC 150 was used to store various items including underwater mine casings. EBS AOC 151 contains rusted metallic ordnance items, concrete, and asbestos-like material. EBS AOC 303 contains old building foundations, misc. debris, metal and plastic items, and bomb casings. Anything suspected of being asbestos or UXO will be avoided and reported to the site contact. Avoid generating any airborne dusts.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL & GROUNDWATER SAMPLING & GEOPROBE OPERATIONS AT
SWMUS 36, 47, 56, AND 87**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surface and subsurface soil and groundwater sampling at SWMUs 36, 47, 56, and 87. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils collected by hand via trowels. Groundwater samples will be collected via hydropunch.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Unidentified contaminants associated w/ municipal waste disposal and WWTP</u>	<u>Any sustained readings above background levels in worker breathing zones.</u>	<u>Suspend site activities and report to an unaffected area.</u>

VI. Additional Safety Equipment/Procedures			
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Potential contaminants associated with these sites are unknown but are not anticipated to be significant based on past site activities. Municipal type wastes were incinerated at SWMU 36. SWMU 47 was a former wastewater treatment plant and SWMU 56 had an underground storage tank that was used to store wastewater from the cleaning of the explosive test chambers. SWMU 87 was a solid waste storage unit that reportedly contained wood, metal waste, and other debris.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING & GEOPROBE OPERATIONS AT
SWMUS 50, 51, AND 52**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling at SWMUs 50, 51, And 52. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils collected by hand via trowels.
- II. Required Monitoring Instruments: PID with 10.6 eV lamp source
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

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|--|--|--|
| IV. Protective equipment required | Respiratory equipment required | |
| Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

- | | | |
|--|--|--|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>Petroleum compounds and various metals associated w/ oil/water separators</u> | <u>Any sustained readings above background levels in worker breathing zones.</u> | <u>Suspend site activities and report to an unaffected area.</u> |

- | | | |
|--|---|--|
| VI. Additional Safety Equipment/Procedures | | |
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

- | | | | | | |
|---|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Emergency alarms..... | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | | | |

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- X. Special instructions, precautions: UXO is not anticipated to be encountered at these sites, however, suspicious materials or items shall be avoided and reported to the site contact. Avoid visible dust plumes. If necessary employ area wetting methods.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SEDIMENT AND SURFACE WATER SAMPLING AT
AOC N AND S**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surface water and sediment sampling at AOC N and S. Sediment samples will be collected using trowels. Surface water samples will be collected from outfalls.

II. Required Monitoring Instrument(s): PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats and hearing protection will be worn when working near operating equipment or when required by the facility.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Non-specific chemicals associated with corrosives, solvents, and explosive wastes</u>	<u>Any sustained readings above background levels in worker breathing zones.</u>	<u>Suspend site activities and report to an unaffected area.</u>

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Safety Glasses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths and PVC or PE coated Tyvek if saturation or work cloths may occur. U.S. Coast Guard approved life vest or lifelines if sampling on or near bodies where drowning hazards exist.

VII. Procedure review with permit acceptors	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Basins and storm drains may be considered confined space and shall not be entered by site personnel. Whenever possible surface water and sediment samples will be collected using remote sampling methods. Potential contaminants are not fully characterized. Suspicious materials or items shall be avoided and reported to the site contact.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING & GEOPROBE OPERATIONS AT
SWMU 8**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Subsurface soil sampling at SWMU 8.
Subsurface soil samples will be collected via Direct Push Technology (Geoprobe).
- II. Required Monitoring Instruments: PID with 10.6 eV lamp source
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | | |
|--|--|--|
| IV. Protective equipment required | Respiratory equipment required | |
| Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, nitrile gloves, safety glasses, hard hats, and hearing protection.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Misc. chemicals associated with a laboratory (see Section X below for discussion)</u>	<u>Any sustained readings above background levels in worker breathing zones.</u>	<u>Suspend site activities and report to an unaffected area.</u>

- VI. Additional Safety Equipment/Procedures
- | | | |
|-------------------------------|---|--|
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Laboratory wastes were reportedly disposed of in two ways (from 1950 to 1978): pouring wastes down a laboratory sink and poured directly onto soil. Some of the chemicals reportedly used in the laboratory include: phosgene, chlorine, hydrogen chloride, hydrogen sulfide, nitrogen oxides, nitrobenzene, benzene, chloroform, ammonia, carbon tetrachloride, ethylene dichloride, and halogenated hydrocarbons. However, airborne concentrations of these chemicals are not anticipated to be encountered given the physical characteristics of these chemicals and the significant amount of time that has passed since disposal. However, suspicious substances (observed or perceived) shall be avoided and reported to the site contact. Avoid visible dust plumes. If necessary employ area wetting methods.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL & GROUNDWATER SAMPLING & TEST PIT OPERATIONS AT
SWMU 20**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Subsurface soil and groundwater sampling at SWMU 20. Subsurface soil sample collected from test pits excavated at depths between 4 and 10 feet. Groundwater samples will be collected via hydropunch.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment (i.e., backhoe).

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Battery acids (sulfuric acid)</u>	<u>Any sustained readings</u>	<u>Suspend site activities and</u>
<u>and possibly lead associated</u>	<u>above background levels</u>	<u>report to an unaffected area.</u>
<u>w/ batteries</u>	<u>in worker breathing zones.</u>	

VI. Additional Safety Equipment/Procedures			
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur.

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Test pits will be excavated in accordance with 29 CFR 1926.650-.652. Site personnel will not be permitted to enter any excavation. Samples will be collected from the bucket of the backhoe or by using a remote sampling device. Equipment, personnel, and machinery will be kept away from the edges of open excavations (> 3 feet). Open excavations will be barricaded. If any intact containers or drums are uncovered as a result of excavation activities, site operations will be suspended and the site contact will be notified.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL AND GROUNDWATER SAMPLING & GEOPROBE OPERATIONS AT
SWMU 35**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling at SWMU 35. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils will be collected by hand via trowels. Groundwater samples will be collected through hydropunch methods.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Contaminants associated w/ sandblasting operations (silica, metals such as lead)</u>	<u>Any sustained readings above background levels in worker breathing zones.</u>	<u>Suspend site activities and report to an unaffected area.</u>

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation of work cloths may occur

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Site activities are not anticipated to generate any significant airborne dusts. If dusts are generated, use area wetting methods to minimize the potential for exposure to possible site contaminants that may be bound to particulates.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING & GEOPROBE OPERATIONS AT
EBS AOC 304-3**

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling at EBS ACO 304-3. Subsurface soil sample collected via Direct Push Technology (Geoprobe) and surface soils collected by hand via trowels.

II. Required Monitoring Instruments: PID with 10.6 eV lamp source

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required	
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/>	Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/>	SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/>	Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/>	None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Geoprobe or other operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Unknown chemicals</u>	<u>Any sustained readings</u>	<u>Suspend site activities and</u>
<u>(See Section X below)</u>	<u>above background levels</u>	<u>report to an unaffected area.</u>
	<u>in worker breathing zones.</u>	

VI. Additional Safety Equipment/Procedures		
Hard-hat	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressurized	<input type="checkbox"/>	<input type="checkbox"/>
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested.....	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place.....	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: It has been proposed that the shed that was used to store chemicals be demolished (see Safe Work Permit for Demolition activities) to gain access to potentially contaminated media. It has been reported that the floor of the shed (5 X 6 feet) is stained and that it emitted a strong chemical odor. Information regarding the type of chemicals stored in this area was not available. As a result, field crews will perform continuous air monitoring. Any suspicious substance will be avoided.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
SOIL SAMPLING AT
EBS AOC 334 AND 500B**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Surface soil sampling at EBS ACO 334 and 500B. Surface soils will be collected using hand via trowels.
- II. Required Monitoring Instruments: PID with 10.6 eV lamp source
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | | |
|--|--|--|
| IV. Protective equipment required | Respiratory equipment required | |
| Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of operating equipment or whenever these hazards exist.

- | | | |
|---|--|--|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>Battery acids, constituents of paint and metals (lead, copper, etc.)</u> | <u>Any sustained readings above background levels in worker breathing zones.</u> | <u>Suspend site activities and report to an unaffected area.</u> |

- | | | |
|--|---|--|
| VI. Additional Safety Equipment/Procedures | | |
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vest for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

- | | | | | | |
|---|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Emergency alarms..... | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | | | |

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: EBS AOC 334 was used as a storage area for batteries and paint cans. EBS AOC 500B was a pistol range. It was unknown if soils containing bullets had been removed from the site. There is no evidence of a release at this site and no bullets, shell casings, or other items consistent with the operation of a pistol range were observed during a site survey. It is not expected that UXO is present at either site. If any suspected UXO is encountered, site activities will be suspended and the site contact will be notified.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR DECONTAMINATION ACTIVITIES AT ALL SITES

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment and machinery (Geoprobe and backhoe). Brushes and spray bottles will be used to decon small sampling equipment. Pressure washers or steam cleaning units will be used to decon the Geoprobe and backhoe.

II. Required Monitoring Instrument(s): PID with 10.6 eV lamp source (used to screen equipment)

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector _____

TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required	Respiratory equipment required
Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/>	Full face APR <input type="checkbox"/> Escape Pack <input type="checkbox"/>
Level C <input type="checkbox"/> Level A <input type="checkbox"/>	Half face APR <input type="checkbox"/> SCBA <input type="checkbox"/>
Detailed on Reverse	SKA-PAC SAR <input type="checkbox"/> Bottle Trailer <input type="checkbox"/>
	Skid Rig <input type="checkbox"/> None <input checked="" type="checkbox"/>

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety glasses, safety footwear, and nitrile gloves. When using pressure washers, steam cleaners field crews will wear hearing protection, and face shields.

V. Chemicals of Concern	Action Level(s)	Response Measures
Potential site contaminants	Elevated readings are not	If airborne readings are
<u>vary depending on the site</u>	<u>anticipated to be</u>	<u>observed report to an</u>
<u>Decon solutions and chemicals encountered</u>		<u>unaffected area</u>

VI. Additional Safety Equipment/Procedures

Hard-hat	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Safety Glasses	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Chemical/splash goggles	Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash Shield	Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Splash suits/coveralls	Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Steel toe Work shoes or boots	Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Modifications/Exceptions: PVC rain suits or PE or PVC coated Tyvek for protection against splashes and overspray. Chemical resistant boot covers if excessive liquids are generated or to protected footwear.

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

VIII. Equipment Preparation

Equipment drained/depressurized	Yes	NA
Equipment purged/cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Isolation checklist completed	<input type="checkbox"/>	<input type="checkbox"/>
Electrical lockout required/field switch tested	<input type="checkbox"/>	<input type="checkbox"/>
Blinds/misalignments/blocks & bleeds in place	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous materials on walls/behind liners considered	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)

Yes No

If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Site contaminants vary depending on the site where the equipment was used. Other chemical hazards include decontamination fluids such as isopropyl alcohol, methanol, etc. To minimize the potential for exposure, site personnel will use PPE and prevent contact with potentially contaminated equipment. Refer to the manufacturer's MSDS regarding PPE, handling, storage, and first-aid measures related to decontamination fluids.

Permit Issued by: _____ Permit Accepted by: _____