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HEALTH AND SAFETY PLAN FOR REMEDIAL INVESTIGATION AT SITE 8 NETC NEWPORT
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6/1/2010
TETRA TECH

Health and Safety Plan

Remedial Investigation
for

Site 08 - Naval Undersea Systems Center
(NUSC) Disposal Area

Naval Station Newport
Newport, Rhode Island



Naval Facilities Engineering Command
Mid-Atlantic
Contract Number N62470-08-D-1001
Contract Task Order WE19

June 2010

**HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION**

FOR

**SITE 08 - NAVAL UNDERSEA SYSTEMS CENTER (NUSC) DISPOSAL AREA
NAVAL STATION NEWPORT
MIDDLETOWN, RHODE ISLAND**

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

**Submitted to:
Naval Facilities Engineering Command Mid-Atlantic
9742 Maryland Avenue
Norfolk, Virginia 23511-3095**

**Submitted by:
Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania 19406**

**Contract Number N62470-08-D-1001
Contract Task Order WE19**

June 2010

PREPARED UNDER THE SUPERVISION OF:

**JAMES FORRELLI, PE
PROJECT MANAGER
TETRA TECH NUS, INC.
WILMINGTON, MASSACHUSETTS**

APPROVED FOR SUBMITTAL BY:



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

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide safe work practices and procedures for Tetra Tech NUS, Inc. (Tetra Tech) and subcontractor personnel conducting site activities in support of the Remedial Investigation at the Naval Undersea System Center (NUSC), at the Naval Station (NAVSTA) Newport, Newport, Rhode Island (Figure 1-1). This HASP is to be used in conjunction with the Tetra Tech Health and Safety Guidance Manual, which provides supporting information pertaining to procedures detailed in the HASP as well as Tetra Tech Standard Operating Procedures (SOPs). The HASP and the Tetra Tech Health and Safety Guidance Manual were developed to comply with the requirements established by Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations and sections of 29 CFR 1926, Safety and Health Regulations for Construction.

This HASP was developed using historical site background information regarding known or suspected chemical contaminants, previous site visits, and potential physical hazards that may be associated with the proposed work at the site. This HASP will be modified, as necessary, if new information becomes available, and changes will be made with the approval of the Tetra Tech Site Safety Officer (SSO) and the Comprehensive Long-term Environmental Action – Navy (CLEAN) Health and Safety Manager (HSM). Requests for modifications to the HASP should be directed to the SSO. The SSO will notify the HSM, who will then notify affected personnel of the changes.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

All personnel assigned to participate in the field work have the primary responsibility for performing all of their work tasks in a manner that is consistent with the Tetra Tech Health and Safety Policy, the health and safety training that they have received, the contents of this HASP, and in an overall manner that protects their personal safety and health and that of their co-workers. Additionally, the rights and responsibilities as specified in the OSHA Poster apply to all personnel working on this project. The FOL and the SSO are to assure that the Poster is properly displayed at the work site.

The following persons have the primary responsibility for observing and implementing this HASP and for overall on-site health and safety on this project.

- The Tetra Tech PM is responsible for the overall direction and implementation of health and safety for this work. This includes the responsibility for ensuring that:
 - Work is appropriately planned and executed in accordance with contractual, regulatory, and internal requirements

- Adequate resources (including personnel, equipment, and supplies) are assembled, and made available to the Field Operations Leader (FOL) and the Site Safety Officer (SSO) to safely and effectively accomplish the work
- The Tetra Tech Field Operations Leader (FOL) is responsible for implementation of this HASP. The FOL manages field activities, executes the Work Plan, and enforces safety procedures as applicable to the Work Plan. Specifically, the FOL:
 - Serves as the primary point of contact with the PM on field progress and activities
 - Has authority to direct personnel and their activities on site
 - Verifies training and medical status of on-site personnel in relation to site activities.
 - Assures that utility clearances are properly performed and documented
 - Assists and represents Tetra Tech with emergency services (if needed)
- The Tetra Tech Site Safety Officer (SSO) or his/her representative supports the FOL concerning the aspects of health and safety including, but not limited to:
 - Coordinating health and safety activities
 - Serving as the Excavation Competent Person and fulfilling the responsibilities of that position
 - Performing and documenting heavy equipment inspections
 - Selecting, applying, inspecting, and maintaining personal protective equipment
 - Establishing work zones and control points
 - Implementing air monitoring procedures
 - Implementing hazard communication, hearing conservation, and other relevant safety and health programs onsite
 - Coordinating emergency services
 - Conducting and documenting initial and periodic (i.e., daily tail gate) site-specific and task-specific training briefings

1.2 STOP WORK PROCEDURES

All employees are empowered, authorized, and responsible to stop work at any time when an imminent and uncontrolled safety or health hazard is perceived. In a Stop Work event (immediately after the involved task has been shut down and the work area has been secured in a safe manner) the employee shall contact the Project Manager and the Corporate Health and Safety Manager. Through observations and communication, all parties involved shall then develop, communicate, and implement corrective actions necessary and appropriate to modify the task and to resume work.

1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Undersea Systems Center (NUSC) Disposal Area
Client Contact: Cornelia Mueller **Phone Number:** (401) 841-7561
Address: Taylor Drive
Naval Station Newport
Newport, Rhode Island 02841
Effective Date: June 10, 2010

Purpose of Site Work:

Project Team:

<u>Tetra Tech Personnel</u>	<u>Discipline/Tasks Assigned</u>	<u>Phone Number</u>
<u>James Forrelli, PE</u>	<u>Project Manager (PM)</u>	<u>(978) 474-8412</u>
<u>Michael Alroy</u>	<u>Field Operations Leader (FOL)</u>	<u>(978) 474-8450</u>
<u>Clyde Snyder</u>	<u>Project Health and Safety Officer (PHSO)</u>	<u>(412) 921-8904</u>
<u>Matthew M. Soltis, CIH, CSP</u>	<u>Health and Safety Manager (HSM)</u>	<u>(412) 921-8912</u>
<u>Thomas Campbell</u>	<u>Site Safety Officer (SSO)</u>	<u>(978) 474-8404</u>

<u>Non-Tetra Tech Personnel</u>	<u>Affiliation/Discipline/Tasks Assigned</u>	<u>Phone Number</u>
<u>TBD</u>	<u>Laboratory</u>	<u>TBD</u>
<u>TBD</u>	<u>IDW Transportation and Disposal</u>	<u>TBD</u>
<u>TBD</u>	<u>Soil Boring / Pile Driver</u>	<u>TBD</u>

Hazard Assessments (for purposes of 29 CFR 1910.132) and HASP preparation have been conducted by:
Clyde Snyder

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

In the event of an emergency during onsite work, the primary response action by onsite personnel will be to safely evacuate and assemble at an area unaffected by the emergency and notify the client and site contact, Cornelia Mueller, and with local and base fire protection and emergency services prior to commencement. Tetra Tech personnel are not authorized to participate in any emergency response activities. 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. The Navy RPM (James Colter) will be notified if outside response agencies are contacted.

Tetra Tech personnel may participate in minor event response and emergency prevention activities such as:

- Initial (e.g., non-structural) fire-fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support

2.2 EMERGENCY PLANNING

Based on the nature of the planned activities, emergencies resulting from primarily from physical hazards (contact with moving machinery, etc.) could be encountered. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following (which are the responsibility of the SSO and/or the FOL):

- Assuring that only authorized individuals operate excavation machinery and all others are restricted from the immediate surrounding area.
- Maintaining and operating heavy equipment in a safe condition and manner
- Coordinating with the local Emergency Response personnel to ensure that Tetra Tech 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:
- Creating and maintaining documents onsite that can be important in the event of an emergency situation, including:
 - An accurate Chemical Inventory of hazardous chemicals onsite, with corresponding Material Safety Data Sheets.
 - Completed Medical Data Sheets for onsite personnel.
 - A log book identifying personnel onsite each day.
 - Hospital route maps with directions.
 - Emergency Notification - phone numbers.

In the event of an onsite emergency, the Tetra Tech FOL will be responsible for the following tasks:

- Determining that an emergency situation exists, initiating a site evacuation, accounting for onsite personnel at the assembly area, and determining if/when return to work conditions resume
- With assistance from the SSO, educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention.
- With assistance from the SSO, periodically performing practice drills to ensure site workers are familiar with incidental response measures.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. Emergencies involving physical hazards are generally readily apparent visually. Visual observation will also play a role in detecting potential exposure events to chemical hazards. To adequately recognize chemical exposures, site personnel must have an awareness of signs and symptoms of exposure associated with the principle site contaminant of concern. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in this HASP. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The FOL and/or the SSO will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Survey findings are documented by the FOL and/or the SSO in the Site Health and Safety logbook. All site personnel are responsible for reporting perceived hazardous situations.

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

2.3.2 Prevention

Onsite personnel will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. Daily site surveys of work areas, prior to the commencement of that day's activities, by the FOL and/or the SSO will also assist in prevention of illness/injuries when hazards are recognized early and control measures initiated.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

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

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

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate

evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

2.5 EMERGENCY CONTACTS

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

As soon as possible, Navy contact Cornelia Mueller will be informed of any incident or accident that requires medical attention.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite (See Attachment I).

**TABLE 2-1
EMERGENCY CONTACTS
HEALTH AND SAFETY PLAN
NAVAL STATION NEWPORT
NEWPORT, RHODE ISLAND**

CONTACT	PHONE NUMBER
Naval Station Newport EMERGENCY (Fire and Rescue) OR Police Emergency Number	(401) 841-3333 (Fire Department) (401) 841-3241 (Police Department)
Newport Hospital 11 Friendship Street Newport, Rhode Island	(401) 845-1120 (Emergency)
Chemtrec National Response Center	(800) 424-9300 (800) 424-8802
Naval Station Newport Site Contact: Cornelia Mueller	(401) 841-7561
Project Manager: James Forrelli	(978) 658-7899 (978) 474-8412
CLEAN Health and Safety Manager: Matt Soltis	(412) 921-8912
Tetra Tech Wilmington Office Health and Safety Manager: Thomas Campbell	(978) 658-7899 (978) 474-8404
Project Health and Safety Officer Clyde Snyder	(412) 921-8904

**FIGURE 2-1
ROUTE TO HOSPITAL**



<ol style="list-style-type: none"> 1: Start out going southeast on Chases Lane toward Read St. 0.5 mile 2: Turn right onto W Main Rd / RI-114. Continue to follow W Main Rd. 1.4 miles 3: Stay straight to go onto Broadway. 0.6 mile 4: Turn left onto Friendship St. <0.1 mile 5: End at 11 Friendship St. 	<p>Directions to the Hospital: Newport Hospital 11 Friendship Street Newport, RI 02840 Telephone: (401) 253-4063 (general number) (401) 845-1120 (emergency)</p>
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2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Tetra Tech personnel will be working in close proximity to each other during planned site activities. As a result, hand signals, voice commands, and line of site communication will be sufficient to alert site personnel of an emergency.

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

- Initiate the evacuation via hand signals, voice commands, or line of site communication
- Report to the designated refuge point where the FOL will account for all personnel
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the FOL (FOL will serve as the Incident Coordinator) pertinent incident details.

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

Dial 911 and call other pertinent emergency contacts listed in Table 2-1 and report the incident. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

2.7 PPE AND EMERGENCY EQUIPMENT

A first-aid kit, eye wash units (or bottles of disposable eyewash solution) and fire extinguishers (strategically placed) will be maintained onsite and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office as well as in each site vehicle.

2.8 DECONTAMINATION PROCEDURES / EMERGENCY MEDICAL TREATMENT

Based on the nature of the planned activities and on the nature and extent of contamination that may be encountered during these activities, the need for any specific personal decontamination activities in an emergency medical situation is highly unlikely. In the unlikely instance that such efforts become necessary, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of the involved personnel. Decontamination will not be performed if the incident warrants immediate evacuation.

Tetra Tech personnel will perform rescue operations from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid" level support, and only within the limits

of training obtained by site personnel. Basic First-Aid is considered treatment that can be rendered by a trained first aid provider at the injury location and not requiring follow-up treatment or examination by a physician (for example; minor cuts, bruises, stings, scrapes, and burns). Medical attention above First-Aid level support will require assistance from the designated emergency response agencies.

2.9 INJURY/ILLNESS REPORTING

Attachment II provides the documentation that is to be used when reporting an injury/illness, and the form to be used for this purpose.

3.0 SITE BACKGROUND

This section presents background information for the marine portions of former NUSC Disposal Area, including a site description, site history, and a brief summary of previous investigations.

3.1 SITE HISTORY AND DESCRIPTION

The Disposal Area is located on the northwestern boundary of the Naval Undersea Systems Center (NUSC), northeast of Building 1170 and Cunningham Street. NUWC is part of NAVSTA Newport, located on the western slope of Aquidneck Island in the Narragansett Basin.

The site consists of approximately 8 acres of land adjacent to two streams, associated wetlands, and a small pond. The upland portions were used as disposal and storage areas since the Navy began developing there in the early 1950s. Currently, the site consists of a secured storage area and open storage area (both paved – approximately 2.3 acres combined) as well as open fields (1.6 acres) and brush-covered sloped and wetland areas (4.2 acres). Grasses and thick vegetation cover approximately 70 percent of the site.

The Wanumetonomy Golf Course, Inc. borders the site to the northeast. Building No. 185, consisting of a series of four open-sided, covered sheds, with 1- to 2-foot concrete berms is considered the southeastern extent of the site. These sheds are used for the storage of drummed oils and torpedo propellants. All the sheds are enclosed with chain link fencing, fitted with fixed roofs, and concrete berms approximately one to two feet in height. It is unclear what materials were stored in these areas; however, one locked steel box located between two of the sheds is labeled “Flammable”, and a second steel box is labeled “Otto fuel”. Precaution should be taken when in this area. However, no records were found of disposal or releases of Otto fuel in this area.

A small stream, Deerfield Creek, and the surrounding wetlands make up the southwestern edge of the disposal and storage areas. The Disposal Area extends west-northwest to the small pond known as “Deerfield Pond” or “NUWC Pond” (called NUWC Pond in this report). Cunningham Street, west of the pond and Deerfield Creek, forms the western boundary of the site. The dam at the northern terminus of the pond is the northern site boundary.

The site can be physically characterized as an elevated stream embankment area bordering Deerfield Creek to the southwest. The steep valley formed by Deerfield Creek is vegetated with shrubs, thickets, and trees. A second small unnamed stream flows through the northern portion of the site to Deerfield Creek in a northeast-southwest direction. This stream originates from the Wanumetonomy Golf Course,

Inc. northeast of the site, flows into Deerfield Creek on the western side of the site and into NUWC Pond northwest of the storage areas of the site. Dense shrubs and small trees vegetate the swale containing the unnamed stream and a fill area immediately south of that stream. The pond discharges through a culvert at the northern end, which in turn discharges to Narragansett Bay at a point south of McAllister Point Landfill. North of the unnamed stream is a flat, grass-covered, plateau-like area, referred to for this work plan as the North Meadow. The North Meadow consists of an open field with invasive woody plants encroaching from the slopes that surround it. East of Deerfield Creek and northwest of Building No. 185 is another elevated flat area, termed for this work plan the South Meadow. The South Meadow is also largely an open field, with invasive woody plants encroaching from the north and west. There are two paved materials storage areas located adjacent to one another. The western paved section is partially fenced and open to access on the southern edge, near the Building 185 complex. The eastern section is gated to restrict access to the stored materials. The storage areas are used by NUWC personnel for the temporary storage of large equipment such as steel buoys, empty torpedo casings, cable reels, molds, jigs, and other large miscellaneous equipment.

3.1.1 Building 179

Building 179 itself is located approximately 420 feet south of the Building 185 Complex, the southern portion of the NUSC Disposal Area, and east of Cunningham Street, near the northeastern boundary of the NUWC. Surface topography in the immediate vicinity of Building 179 is relatively flat. The land slopes gradually downward to the east to a wetland area and Deerfield Creek, which flows to the north. The maximum total relief between the area immediately west of Building 179 and Deerfield Creek to the east is approximately 10 feet.

The original Building 179 was constructed in 1961 and was used to test torpedo propulsion systems as part of the Propulsion Test Facility (PTF) at NUWC. The associated concrete underground storage tank (CUST), which was closed in place in December 1998, is located approximately 20 feet north of the northeast corner of Building 179. The Building 179 CUST Area consists of approximately 2 acres of land, including a heavily vegetated wetland adjacent to a small stream, Deerfield Creek, in the eastern portion of the property, and a heavily developed area in the western portion, much of which is paved, with a number of above- and below-ground process structures to support PTF functions. Plans of Building 179 and environs from 1999 also indicate: a “6,000 gallon steel hazardous waste above ground storage tank” located west of the CUST; a 1,500-gallon double-wall containment fuel-water separator (underground Tank B) northwest of the CUST; a “500-gallon oil-water separator (Tank B-1)” north-northwest of the CUST; as well as another underground fuel-water separator and oil-water separator (Tanks A and A-1, respectively), east of Building 178, further north of Building 179.

Site topography is highly variable, with topographic relief of approximately 33 feet from the northern to the southern portions of the site. Elevations range from approximately 58 feet above mean sea level at the southeastern corner of the study area to 25 feet above mean sea level, which was the measured elevation for the pond water at the northern end of the site.

Prior to the 1961 construction of Building 179, the area appeared to be undeveloped farmland (TRC, 1999). In 1961, Building 179 and the associated 2,000 gallon CUST were constructed to support the Navy through the testing of torpedo propulsion systems. The CUST was constructed as two separate compartments separated by a concrete wall and covered with a steel plate. The CUST compartments were historically referred to as concrete "pits" and were used to collect byproducts generated from propulsion system testing. The materials temporarily held in the concrete pits included water mixed with engine oil, small amounts of cleaning fluids (mineral spirits and other solvent-based cleaners, including 1,1,1-trichloroethane [1,1,1-TCA]); Otto Fuel; and combustion byproduct mixtures composed mostly of carbon with trace amounts of hydrogen cyanide (HCN) and cadmium. The HCN is a combustion product of Otto Fuel, while the cadmium was generated from engine component wear and tear during testing. Building floor drains collected waste materials such as those listed above and conveyed them to the smaller, 500-gallon-capacity compartment within the CUST. The larger 1,500-gallon-capacity compartment was used as a quench tank for water-soluble exhaust gases resulting from the torpedo test emissions. The contents from this compartment were pumped into a 6,000-gallon above-ground hazardous waste storage tank at the conclusion of each test. Based on information from tank and piping removal activities conducted immediately north of the CUST, an underground "Interceptor Tank" (now removed) connected to the CUST and had a discharge pipe extending approximately 50 feet east toward the wetland/Deerfield Creek (TECG, 1995; TRC, 1999).

4.0 SCOPE OF WORK

The following tasks will be performed under this task order at all of Site 8:

- Mobilization/demobilization
- Brush clearing
- Soil boring and monitoring well installation
- Utility clearance activities
- Excavation of soils and excavation backfilling operations
- Decontamination of select equipment
- Multi-media sampling
 - Groundwater
 - Soil
 - Sediment
 - Surface water
 - Benthic macroinvertebrae
 - Fish tissue
 - Electrofishing
 - Gill nets
 - Trap nets
 - Trot lines
- Geophysical and land survey
- Decontamination of sampling and heavy equipment tooling (e.g., excavator bucket)
- Wetlands delineation
- Investigation-derived waste (IDW) management

The following tasks only will be performed at Building 179 on Site 8:

- Soil boring and monitoring well installation
- Soil and groundwater sampling

If it becomes apparent that additional or modified tasks must be performed beyond those listed above, the work is not to proceed until the FOL or SSO notifies the PM and the HSM, so that any appropriate modifications to this HASP can first be developed and communicated to the intended task participants. Minor modifications to this HASP may be made by the SSO with the approval of the FOL and the PM.

5.0 IDENTIFYING AND COMMUNICATING TASK-SPECIFIC HAZARDS AND GENERAL SAFE WORK PRACTICES

The purpose of this section is to identify the anticipated hazards and appropriate hazard prevention/hazard control measures that are to be observed for each planned task or operation. These topics have been summarized for each planned task through the use of task-specific Safe Work Permits (SWPs), which are to be reviewed in the field by the SSO with all task participants prior to initiating any task. Additionally, potential hazard and hazard control matters that are relevant but are not necessarily task-specific are addressed in the following portions of this section.

Section 6.0 presents additional information on hazard anticipation, recognition, and control relevant to the planned field activities.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices and restrictions identified in the SWPs attached to this HASP, the following general safe work practices are to be followed when conducting work on-site.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists is prohibited.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. If a source of potable water is not available at the work site that can be used for hands-washing, the use of waterless hands cleaning products will be used, followed by actual hands-washing as soon as practicable upon exiting the site.
- Avoid contact with potentially contaminated substances including puddles, pools, mud, or other such areas. Avoid, kneeling on the ground or leaning or sitting on equipment. Keep monitoring equipment away from potentially contaminated surfaces.
- Plan and mark entrance, exit, and emergency evacuation routes.
- Rehearse unfamiliar operations prior to implementation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.

- Establish appropriate safety zones including support, contamination reduction, and exclusion zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone). Non-essential vehicles and equipment should remain within the support zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the SSO.
- Observe co-workers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 EXCAVATION SAFE WORK PRACTICES

Soil excavation activities will be performed through the use of a track or wheel mounted excavator that is outfitted with a boom and excavator bucket that is adequate to complete the entire excavation task **in a manner that will not involve or require any entry into the open excavation by any person or by any part of the excavator except for the boom/bucket.** The process for performing the excavation will involve the following:

1. First, any surface encumbrances within the intended work area of the excavation will be removed or supported, as necessary, in accordance with OSHA 1926.651(a).
2. The FOL will assure that the intended excavation area is cleared of any utility installations that may be reasonably be expected to be encountered during excavation work (in accordance with the Tetra Tech Utility Locating SOP in Attachment III and with OSHA 1926.651 [b])
3. Prior to being put into service at the site, the excavator will be inspected by the SSO, and this inspection will be documented using the applicable portions of Attachment IV.
4. The excavator will be positioned and operated so that it never approaches closer than 4 feet from the edge of an open excavation (other than the boom and bucket portion of the excavator).
5. At no time during the active operation of the excavator will any person (other than the operator) be permitted to approach the vehicle closer than a distance of the length of the excavator boom and bucket (fully-extended) plus 5 feet, but not less than 25 feet, whichever is greater.
6. Up to 10 test pits will be completed to confirm geophysical survey anomalies in unpaved areas. It is suspected that some anomalies may represent buried drums. The total depth of the excavations is

not expected to exceed 8 to 12 feet bgs. If any drum is encountered, excavation activities will cease and the drum will be documented and covered with soil.

7. Soil will be stockpiled onto a polyurethane (PE) sheet to be used later as backfill into that excavation.
8. In order to take PID readings, the FOL will perform general area air screening during the excavation activities, never approaching within the above specified distance of the excavator, or within 4 feet of the edge of the excavation.
9. If the FOL observes PID readings above daily-established background levels, or observes visibly-stained soils, he may elect to take PID readings in the air phase directly above the excavated soils from the bucket. In this instance, the excavator will swing the bucket onto a stable and relatively flat area, the bucket will be lowered and placed on the ground and the operator will disengage the controls.
10. At that time the operator will signal the FOL that it is safe to approach. The FOL will then obtain PID readings to assure that an adequate depth has been reached. As specified in the Work Plan, no soil sampling collection will be performed as part of this work activity. The FOL will then retreat from the bucket to a minimum "No Approach" distance (as specified in item #4).
11. The excavator operator will then re-engage the excavator and place the excavated soils onto the PE sheet.
12. Upon completion of the backfilling operation, the exactor operator may use the underside or face of the bucket to "tamp" the backfilled soil in preparation for sod placement and surface restoration.

Hazards associated with these activities may include:

- Being struck by the excavator or being trapped between an immovable object and the excavator.
- Being struck by truck traffic being loaded out.
- Slips, trips, and falls associated with movement over uneven terrain or over the sidewall of the excavation
- Contact with contaminants of concern.

Control measures will include:

- The Excavator Operator will serve as the Excavation Competent Person (as defined in OSHA 1926.651 [b], as *"one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them"*).

- Assuring that all personnel remain clear of the operating excavator at all times during its operation (a minimum "no approach" zone of 25 feet from the excavator or the length of the fully extended excavator boom/bucket length plus 5 feet, whichever is greater).
- **All work tasks will be performed in a manner that does not require any entry into an open excavation.** In fact all persons are to be restricted from approaching within 4 feet of the edge of any open excavation.
- The excavator operator will place the bucket on the ground and shut the excavator down (e.g., OFF), and **only then** will the Tetra Tech FOL approach the bucket to obtain PID readings. By disengaging the controls the operator will ensure that there is no accidental movement once the bucket is placed on the ground. The operator will not engage the controls until the FOL is beyond the "No Approach" zone, as specified previously.
- The FOL and the Excavator Operator will establish and maintain clear communications at all times. Also, the FOL is responsible for assuring that all persons are aware that it is their responsibility to remain outside of the "No Approach" Zone and out of the operator's blind spots.
- Hard hat, hearing protection and a high visibility vest will be required by all persons working near the excavation work area. Also, all personnel will be required to wear steel toe safety footwear, preferably with sole designs that include an aggressive lug to enhance traction
- All onsite personnel will remain out of truck traffic patterns.
- Personnel will be made aware that they are to never place him/herself between the excavator and an immovable object.
- The assignment of an Excavation Competent Person is also an important part of hazard recognition, evaluation, and control to protect personnel during excavation activities.

It is intended that no excavation will be left open beyond the day that it is created (i.e., backfilled the same day that it is created). If because of inclement weather or other reasons this cannot be accomplished, then the open excavation will be marked and protected.

Excavation Competent Person (ECP)

The ECP is responsible for addressing responsibilities as defined in OSHA 29 CFR 1926 Subpart P. For this project, the ECP will also be the SSO and the excavator operator. Specific ECP responsibilities include the following:

- Assuring that surface encumbrances are avoided, removed, or supported in accordance with (IAW) OSHA 1926.651 (a)
- Assuring that the FOL has accomplished the utility locating/avoidance processes prior to beginning any excavation (IAW 1926.651 [b])
- Assuring that no load (e.g., excavator boom or bucket) passes over the head of any person (IAW 1926.651[e])
- Assuring that adjacent structures, sidewalks, etc. are not undermined by excavation activities.
- Assuring that stockpiled material is placed in a location, height, and manner that do not represent the hazard of employees being struck by loose or falling materials.
- Because it is intended that excavations will be backfilled to grade the same day that they are created, the need to perform visual inspections (such as daily and after rain events, as specified in OSHA 1926.651[k][1]) should not be necessary. However, if such a need is encountered due to inclement weather or other reason, the ECP will be responsible for performing and documenting these excavation inspections. The inspection checklists in Attachment V are provided for this purpose.
- Assuring that stockpiled material will be placed no closer than 4 feet from the edge of an open excavation.

5.3 DPT/HSA/DRILLING SAFE WORK PRACTICES

The following safe work practices are to be followed when working in or around drill rig/DPT/HSA operations.

- Identify underground utilities and buried structures before drilling. Use the Utility Locating and Excavation Clearance SOP provided in Attachment III.

- Drill/DPT/HSA rigs will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment.
- Any repairs or deficiencies identified during the inspection will be corrected prior to use.
- The inspection will be documented using the Equipment Inspection Checklist provided in Attachment IV.
- Equipment Inspections will be conducted once each shift (either 5 or 10 day) or following repairs.
- Equipment and staging lay down areas will be established keep the work area clear of clutter and slips, trips, and fall hazards.
- The drill operator shall verbally alert employees and visually ensure employees are clear from dangerous parts of equipment before starting or engaging equipment.
- One person shall be responsible for emergency shut-off switch operation during drilling operation, such that the machinery can be shutdown quickly if another person is in danger. The identity of this person will be made known to personnel in the drilling area.
- Secure frayed or loose clothing, hair, and jewelry when working with operating equipment.
- Minimize contact to the extent possible with contaminated tooling and environmental media.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the drill/DPT/HSA rig of the height of the mast plus five feet to remove these activities from within physical hazard boundaries.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill/DPT/HSA rig.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted.
- Equipment that comes into direct contact with potentially contaminated media will undergo a complete decontamination prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- Whenever possible, motorized equipment will be fueled prior to the commencement of the day's activities.
- During fueling operations on site, equipment will be shutdown and bonded to the fuel provider to prevent the potential accumulation of static charges.
- When not in use drill/DPT/HSA rigs will be shutdown, emergency brakes set, and wheels chocked where hilly terrain is present.

Areas subjected to subsurface investigative methods will be restored to equal or better condition than original to the extent practical to remove contamination brought to the surface and to remove physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

6.0 HAZARD ASSESSMENT AND CONTROLS

This section provides information regarding the chemical, physical, and natural hazards associated with work at the NUSC Disposal Area Site 8 and Building 179.

6.1 SITE 8

A wide range of chemicals was identified in previous sampling at all of Site 8, including the following:

- Various Metals including antimony (Sb), chromium (Cr), lead (Pb) and thallium (Tl).
- Volatile organic compounds (VOCs) including 1,2,4-trimethylbenzene.
- Polynuclear aromatic hydrocarbons (PAHs) including acenaphthene, benzo(g,h,i)perylene, and fluorine.

Previous investigations indicate that these chemical contaminants are in relatively low concentrations. Although these concentrations may threaten marine ecosystems, exposure of site personnel via inhalation is considered negligible to non-existent. This assumption is based on the concentrations as well as the fact that the samples will be collected in a wet condition, and it is not anticipated that any airborne particulates will be generated during these activities.

Ingestion and dermal contact are still viable routes of exposure.

6.2 BUILDING 179

At Building 179 only the following contaminants have been identified during sampling activities: 1,1-Dichloroethene in soil. In water 1,1-Dichloroethane, Tetrachloroethylene, Trichlorobenzene and 1,1,1-Trichloroethane have been identified as contaminants of concern. A comparison and discussion of all the site contaminants is described below:

TABLE 6-1
BUILDING 179
COMPARISON OF COPCs, AVAILABLE WORST-CASE AIR CONCENTRATIONS,
AND CURRENT OCCUPATIONAL EXPOSURE LIMITS

Contaminant of Concern (volatiles in soil)	Maximum Concentrations	Worst-Case Air Concentration That Could Be Encountered	Current OSHA PEL or ACGIH TLV
1,1-Dichloroethene	10 mg/kg in soil	2,434.02 ppm	None
Contaminant of Concern (Volatile Compounds in Water)			Current OSHA PEL and/or ACGIH TLV
1,1-Dichloroethane	780 ug/l in water	44.3 ppm	OSHA: 100 ppm TWA ₈ ACGIH: 100 ppm TWA ₈
Tetrachloroethylene	9 ug/l in water	.96 ppm	OSHA: 100 ppm TWA ₈ ACGIH: 25 ppm TWA ₈ 100 ppm STEL
Trichlorobenzene	2 ug/l in water		None
1,1,1-Trichloroethane	3600 ug/l in water	464.13 ppm	OSHA: 100 ppm TWA ₈ ACGIH: 50 ppm TWA ₈
General PAHs	Not Available		OSHA limit: 0.2 mg/m ³

Table Notes:

TWA₈: Average air concentration over an 8-hour work period that is not to be exceeded

OSHA Ceiling: Concentration in air that is not to be exceeded

As indicated in the Table 6-1, from a worst-case scenario, COC concentrations immediately above a captured air phase above contaminated groundwater (such as in the head space of a monitoring well) could potentially reach concentrations that exceed the OELs. However, in regarding the results of this data evaluation, it is important to recognize the following:

- The planned work area at Building 179 is inside during drilling operations in an enclosed space may cause the levels to increase more than in an area with ample natural ventilation that would reduce airborne VOCs through dilution and dispersion
- The groundwater value used in this evaluation was the *highest* concentration detected during the most recent groundwater monitoring events

As a result of these factors, workers participating in this activity could encounter airborne concentrations of COCs that could represent an occupational exposure concern. To monitor this route, real-time direct reading monitoring instruments will be used (as described in section 7.0) during the intrusive tasks at Building 179, as these tasks are the most likely to involve encountering/releasing any VOCs into the airphase.

- No hand-to-mouth activities on site (eating, drinking, smoking, etc.)
- Washing hands upon leaving the work area and prior to performing any hand to mouth activities
- Wearing surgeon's-style gloves whenever handling potentially-contaminated media, including groundwater and any potential free product, sampling equipment, and sample containers.

6.3 VOLATILE ORGANIC COMPOUNDS (VOCs)

The majority of VOCs are often related to chlorinated solvents and associated degradation products, paint thinners, dry cleaning solvents, constituents of petroleum fuels (e.g. gasoline and natural gas), and crude oil tanking. Symptoms of exposure to VOCs can include abdominal pain, irritation of the skin, eyes, nose, and throat, dizziness, tremors, vomiting, GI bleeding, enlarged liver, pallor of the extremities, and frostbite like-symptoms.

Short-term exposure to VOCs, can cause irritation of the nose and throat and central nervous system (CNS) depression, with symptoms such as drowsiness, dizziness, giddiness, headache, loss of coordination. High concentrations have caused numbness and facial pain, reduced eyesight, unconsciousness, irregular heartbeat and death. Very high concentrations have produced death due to CNS effects, and, in rare cases, irregular heart beat. Permanent nervous system damage and/or liver injury have resulted from severe overexposure.

6.4 METALS

The physical effects of poisoning from the heavy metals tend to be a very slow process and occur over a long period of continued exposure to the source of the toxic metal. The physical symptoms which are typically induced by the presence of toxic metals in the body tend to be very vague and can include symptoms such as persistent fatigue, the appearance of splitting and blinding headaches, the presence of an upset stomach, disorders such as colic and even anemia in some cases. The central nervous system is the main part of the human body likely to be affected by the presence of toxic metals. Symptoms of a disrupted central nervous system include the appearance of muscular tremors, the development of spells of dizziness, the presence of insomnia, the poor concentration abilities in the person and a sudden lack of muscular coordination in the body.

6.5 PETROLEUM/OIL/GREASE PRODUCTS

Prolonged or repeated contact to these products may result in contact dermatitis which is characterized by dryness, chapping, and reddening of the skin. Prolonged or repeated contact may also result in oil acne which is characterized by blackheads with possible secondary infection. On rare occasions exposure to oil mists pose a risk of pulmonary disease such as chronic lung inflammation. Shortness of breath and cough are the most common symptoms of exposure to these products. These products also have laxative properties and may result in abdominal cramps and diarrhea, if ingested. Exposure to a large single dose, or repeated smaller doses, may lead to lung aspiration, which can lead to lipid pneumonia or chronic lung inflammation. These are low-grade, chronic localized tissue reactions.

6.6 POLYCHLORINATED BIPHENYLS (PCBS)

PCBs are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

6.7 POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. PAHs have the potential to cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure.

6.8 EXHAUST GASES/FUMES CREATED DURING INDOOR ACTIVITIES

Short-term (acute) effects of workers exposed to high concentrations of exhaust gases/fumes may include irritation of the eyes, nose, and throat; lightheadedness; heartburn; headache; weakness, numbness and tingling in the extremities; chest tightness; wheezing; and vomiting. Some studies have suggested that workers exposed to diesel/gasoline exhaust are more likely to have chronic respiratory symptoms such as persistent cough and mucous, bronchitis, and reduced lung capacity than unexposed workers. Of particular concern is the potential for exposure to carbon monoxide which is present in diesel and more predominately, in gasoline engine exhaust. Upon entering the bloodstream, carbon monoxide combines with hemoglobin over 200 times more tightly than oxygen. Hemoglobin, then, is unable to carry oxygen in the blood. Carbon monoxide may also combine with myoglobin which may cause muscle metabolism disturbances, especially in the heart. The degree of toxicity depends primarily on carbon monoxide concentrations, exposure time, individual susceptibility, and exertion level.

To prevent or minimize potential exposures to carbon monoxide and other exhaust gas constituents, safe work practices identified in section 5.4 and air monitoring measures listed Section 7.1.2 will be used.

6.9 OTTO FUEL

In Buildings 179 & 185, Otto fuel is stored. Records indicate that there have never been any releases of Otto fuel in this area. However, precaution should be taken when in this area.

Otto Fuel II is a distinct-smelling, reddish-orange, oily liquid that the U.S. Navy uses as a fuel for torpedoes and other weapon systems. It is a mixture of three synthetic substances: propylene glycol dinitrate (the major component), 2-nitrodiphenylamine, and dibutyl sebacate. Propylene glycol dinitrate, a colorless liquid with an unpleasant odor, is explosive. 2-Nitrodiphenylamine is an orange solid used to control the explosion of propylene glycol dinitrate. Dibutyl sebacate is a clear liquid used for making plastics, many of which are used for food packaging.

Exposure to Otto Fuel II occurs in areas where Otto Fuel II is used as a torpedo fuel or where it is made. Headaches are the most common effects from overexposure. Other effects include loss of balance, poor eye-hand coordination, eye irritation, nasal congestion, nausea, dizziness, and difficulty breathing. The chemical makeup is such that it can burn freely in a no-oxygen environment.

6.10 PHYSICAL HAZARDS

The most remarkable physical hazards associated with the planned scope of work are associated with the excavation tasks, which have been addressed previously in section 5.2. The following is a list of additional physical hazards that may be encountered at the site or may be present during the performance of site activities.

- Injury due to overexertion during manual material handling tasks (e.g., lifting, carrying, depositing heavy, bulky or awkward items such as, but not limited to, sections of sod for the site restoration activities,
- Slip, trips, and falls
- Contact with underground (electric lines, gas lines, water lines, etc.)
- Pinch/compression points
- Natural hazards (snakes, ticks, poisonous plants, etc.)
- Vehicular and equipment traffic
- Inclement weather
- Boating Hazards
- Noise

These hazards are discussed further below, and are presented relative to each task in the task-specific Safe Work Permits.

6.10.1 Injury Due to Manual Material Handling

During execution of planned activities there is some potential for strains, sprains, and/or muscle pulls due to the physical demands and nature of this site work, predominantly those that will involve manual material handling activities such as lifting, carrying, and depositing heavy and/or bulky loads. To avoid injury during these tasks personnel are to lift and deposit loads in the following manner:

- First, inspect the area where the load will be lifted, the path that it will be carried, and the area where it will be deposited. Remove any obstructions that could present tripping hazards, or select an alternate route/approach.
- Do a "test lift" by slightly moving the object to gauge its weight and your ability to safely lift, carry, and deposit it. The actual weight of an object may be deceptively heavier than its perceived or assumed weight (such a section of sod which may have significant moisture content). If after the "test lift" you are not very confident that you can move the object safely and without injury, STOP! Get help, a mechanical aid (such as a dolly or wheel barrow, etc.), or both.

- Approach the load and position your body as close to the load as possible
- Bend at the knees, not the back, and ensure that you can obtain and maintain firm handholds on the load
- Lift the load using your legs, not your back muscles
- DO NOT turn or twist while lifting, carrying, or depositing the load
- Place/deposit the load by bending at the legs, again avoiding turning, twisting, or bending at the back.
- When lifting or handling heavy material or equipment use an appropriate number of personnel. Keep the work area free from ground clutter to avoid unnecessary twisting or sudden movements while handling loads.

6.10.2 Slips, Trips, and Falls

During various site activities there is a potential for slip, trip, and fall hazards associated with wet, steep, or unstable work surfaces. To minimize hazards of this nature, personnel required to work in and along areas prone to these types of hazards will be required to exercise caution, and use appropriate precautions (restrict access, guardrails, life lines and/or safety harnesses) and other means suitable for the task at hand. Site activities will be performed using the buddy system.

6.10.3 Contact with Underground Utilities

Subsurface activities will proceed in accordance with the Tetra Tech SOP entitled "Utility Locating and Excavation Clearance (see Attachment V). Utility clearances shall be obtained through DIGSAFE and the public works department at Naval Station Newport prior to subsurface activities. The locations of underground utilities will be identified and marked prior to subsurface investigations. Overhead utilities must also be identified and avoided during equipment mobilization/demobilization.

6.10.4 Pinch/Compression Points

Handling of tools, machinery, and other equipment on site may expose personnel to pinch/compression point hazards during normal work activities. Where applicable, equipment will have intact and functional guarding to prevent personnel contact with hazards. Personnel will exercise caution when working

around pinch/compression points, using additional tools or devices (e.g., pinch bars) to assist in completing activities.

6.10.5 Natural Hazards

Natural hazards such as poisonous plants, bites from poisonous or disease carrying animals or insects (e.g., snakes, ticks, mosquitoes) are often prevalent at sites that are being investigated as part of hazardous waste site operations. To minimize the potential for site personnel to encounter these hazards, nesting areas in and about work areas will be avoided to the greatest extent possible. Work areas will be inspected by the FOL and the SSO to look for any evidence that dangerous animals may be present in the planned work areas.

During warm months (spring through early fall), tick-borne Lyme Disease may pose a potential health hazard. The longer a disease carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots and taped) will prevent initial tick attachment, while performing frequent body checks will help prevent long term attachment. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures and symptoms of exposure, consult Section 4.0 of the Health and Safety Guidance Manual.

Contact with poisonous plants and bites or stings from poisonous insects are other potential natural hazards. Long sleeved shirts and long pants (tucked into boots), and avoiding potential nesting areas, will minimize the potential for exposure. Additionally, insect repellents may be used by site personnel. Personnel who are allergic to stinging insects (such as bees, wasps and hornets) must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet (see Attachment I of this HASP), and the FOL or SSO notified.

6.10.6 Vehicular and Equipment Traffic

Hazards associated with vehicular and equipment traffic are likely to exist during various site activities. Site personnel will be instructed to maintain awareness of traffic and moving equipment when performing site activities. When working near roadways, site personnel will wear high visibility vests.

6.10.7 Inclement Weather

The project tasks under this scope of work will be performed outdoors. As a result, inclement weather (electrical storms, tornadoes, hurricanes, etc.) may be encountered. In the event that adverse weather

conditions arise, the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist. In the event of severe weather conditions, report to a safe location with suitable shelter (preferably in a facility building recognized as a safe haven or shelter) for the weather conditions that result in termination of site activities. In the event of an electrical storm, immediate stop site activities and report to a safe location such as a building. If moving to a safe location is not feasible, stay in site vehicles.

Temperature extremes are considered inclement weather. Steps should be taken to the extent possible to protect site personnel from the effects of heat stress and the sun. Control measures include the following:

- Watch for signs of heat stress/exhaustion
- Provide fluid replacement
- Provide adequate number of breaks within a cooler environment

Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma, the following measures should be employed:

Protection from the Sun

- Wear a hat that shades the face, neck, and ears.
- Apply sunscreen with a sun protection factor (SPF) of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every 2 hours, more if you are sweating significantly.
- Plan/provide suitable equipment to offer shade to avoid the midday sun because the sun's ultraviolet rays are most intense between 10 A. and 4 PM and can damage your skin even on hazy days. Portable canopies over the sample station are an example of this type of equipment.
- Wear wrap-around sunglasses to protect the eyes and delicate skin around them.

6.11 WATER HAZARDS

6.11.1 USCG Flotation Device Types

Use the following information to determine the proper type of USCG PFD.

Device	Type	Description
Off Shore Life Jacket	Type I 22 lbs buoyancy	Best in rough or open waters. Floats best especially in long time rescue. Will turn unconscious upright. Bulky but highly visible.
Near Shore Buoyant Vest	Type II, 15.5 lbs buoyancy	Good in calmer waters. Will turn most unconscious face up. Less bulky. Not for long time rescue.
Flotation Aid	Type III 15.5 lbs buoyancy	Most comfortable device offering more freedom of movement. Not intended for rough water. Unconscious may end up face down
Throwable Devices	Type IV	Throwable devices for calm waters with heavy boat traffic where help is always close. Not for unconscious, non-swimmers, or long hours. Good backups for the other devices.

Site personnel shall wear Type III personal flotation devices in the event that someone falls overboard or if the boat sinks or capsizes. Type IIIs were selected because they offer the most flexibility for working while still meeting minimum requirements for buoyancy. In situations where personal flotation devices cannot be worn due to the task to be conducted, the flotation devices shall be immediately available/accessible. It is recommended that PFDs be continually worn during colder months due to the potential for hypothermia to restrict muscle movement and therefore self rescue and maintaining buoyancy. In addition, a single Type IV Throwable Flotation Device shall be maintained on board the boat with at least 90 feet of 3/8 polypropylene line.

7.0 AIR MONITORING

Direct-reading instruments will be used at this site to detect and evaluate the presence of site contaminants and other potentially hazardous conditions and to screen sample media. Specific air monitoring measures and requirements are established in Section 7.1 pertaining to the hazards and tasks of an identified operation. Additionally Section 1.0, the Health and Safety Guidance Manual contains detailed information regarding direct-reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENT AND USE

The PID with a lamp energy of 10.6 electron volts (eV) or higher will be used to evaluate the presence of potential VOCs of concern. It will be used to monitor source points and worker breathing zone areas during intrusive site work activities. The SSO/FOL shall obtain and document the daily background (BG) reading at an upwind, unaffected area and observe for readings above that BG level. The SSO/FOL shall monitor source areas (e.g., excavation areas) for the presence of any readings above the daily-established BG level. If elevated readings are observed, the SSO shall monitor the workers breathing zone (BZ) areas. If the appropriate instrument Action Level is exceeded, the following process will be followed:

1. The SSO shall order all personnel to stop work and retreat upwind to a safe, unaffected area, where they will remain until further directed by the SSO.
2. The SSO shall allow at least 5 minutes to pass so that the work area can ventilate, and will then re-approach the work area while continuously monitoring the BZ areas.
3. Only when BG levels are regained in BZ areas will work be permitted to resume.

7.1.1 Four Gas LEL/O₂/CO Meter

As a precaution during drilling in the shed adjacent to Building 179 a four gas Meter will be used to measure levels of flammable gases, carbon monoxide and oxygen levels in air. The purpose is to determine if we are approaching flammable gas to air mixture and Carbon monoxide levels do not enter the dangerous area. To confirm this is, the four gas meter will be used during casing cutting with a torch to measure possible levels of methane gas. In the past sampling data has not indicated the presence of methane the LEL/O₂ is being used as a precaution since an open flame torch is being used. The following action levels will be used:

Action levels:

Record airborne concentrations in the following manner:

- Oxygen readings – First
 - 19.5 to 23.5% normal
 - <19.5% oxygen deficient
 - >23.5 oxygen enriched – Fire potential – Stop work
 - <10% Burning will not occur without difficulty
- LEL Readings – Second
 - 0-10% of the LEL - Continue to work, continue to monitor utilizing the proper respiratory protection.
 - 10-25% - Increase frequency of monitoring remove potential ignition sources.
 - >25% of LEL - Stop work - contact PM/PHSO for additional instruction.
 -
 - Carbon Monoxide –Third
 - 0 – 49 ppm continue work
 - 50 ppm shut down machinery exit atmosphere till background levels return

Monitoring should be conducted from the breathing zone to the ground surface and down to the base of the excavation.

7.1.2 Hazard Monitoring Procedure and Frequency

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

The PID/FID will be used to initially screen source areas at each sample. Any elevated readings at a source area will require that worker breathing zones in the work area be monitored to determine if any VOCs are present that may create an inhalation exposure hazard. Readings obtained in worker breathing zones will be compared to the established action level. Based on the unlikely presence of detectable concentrations of VOCs, an action level of 1 part per million (ppm) has been established. Any readings greater than 1 ppm in a worker's breathing zone will be considered an unanticipated condition

that will require personnel to leave the area and report to an unaffected area until readings subside to background levels.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the equipment provider. Operational checks and field calibration will be performed on site instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations. The SSO is responsible for assuring that the manufacturer's Operating Manual is present onsite, and for assuring that the instrument is used, calibrated, maintained, and stored according to the manufacturer's direction. Field calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

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

7.3 DOCUMENTING INSTRUMENT READINGS

The SHSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SHSO is also responsible for ensuring that all instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. **This includes the requirement for documenting instrument readings that indicate no elevated readings above not ed daily background levels (i.e., no -exposure readings).** At a minimum, the SHSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SHSO (such as weather conditions, possible instrument interferences, etc.)

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 personnel participating in on site activities. All personnel intending to participate in intrusive, onsite activities must first present proof of completing 40 hours of introductory hazardous waste site training to the SSO. Personnel working onsite who have had introductory training more than 12 months ago must also present proof of completion of an 8 hour HAZWOPER annual refresher training course. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel.

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

8.2 SITE-SPECIFIC TRAINING

Tetra Tech SSO will provide site-specific training to employees who will perform work on this project. Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation will be employed to identify personnel who through record review and attendance of the site-specific training are cleared for participation in site activities. This document shall be maintained at the site to identify and maintain an active list of trained and cleared site personnel.

The Tetra Tech SSO will also conduct a pre-activities training session prior to initiating site work. This will consist of a brief meeting at the beginning of each day to discuss operations planned for that day, and a review of the appropriate Safe Work Permits with the planned task participants. A short meeting may also be held at the end of the day to discuss the operations completed and any problems encountered.

8.3 MEDICAL SURVEILLANCE

Tetra Tech personnel participating in project field activities will have had a physical examination meeting the requirements of Tetra Tech's medical surveillance program. Documentation for medical clearances will be maintained in the Tetra Tech Pittsburgh office and made available, as necessary, and will be documented using Figure 8-1 for every employee participating in onsite work activities at this site.

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

8.4 SITE VISITORS

All site visitors to the site must be 100% escorted at all times and restricted from approaching any work areas where they could be exposed to hazards from Tetra Tech operations. If a visitor has authorization from the client and from the Tetra Tech Project Manager to approach our work areas, the FOL must assure that the visitor first provides documentation indicating that he/she/they have successfully completed the necessary OSHA introductory training, receive site-specific training from the SSO, and that they have been physically cleared to work on hazardous waste sites.

9.0 SITE CONTROL

This section outlines the means by which Tetra Tech 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 approach will be comprised of an exclusion zone, a contamination reduction zone, and a support zone. It is also anticipated that this approach will control access to site work areas, restricting access by the general public, minimizing the potential for the spread of contaminants, and protecting individuals who are not cleared to enter work areas.

9.1 EXCLUSION ZONE

The exclusion zone will be considered the areas of the site of known or suspected contamination. It is anticipated that the areas around the exhaust vents will have the potential for contaminants brought to the surface. These areas will be marked and personnel will maintain safe distances. 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 performed, plus a designated area of at least 15 feet surrounding these work areas. Exclusion zones will be delineated as deemed appropriate by the FOL, through means such as erecting visibility fencing, barrier tape, cones, and/or postings to inform and direct personnel.

9.1.1 Exclusion Zone Clearance

Subsurface activities will proceed only when utility clearance has been obtained. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Section 2.0, Table 2-1, will be notified.

9.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting exclusion zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel.

Based on the nature of the work that will be performed, only limited decontamination activities are anticipated to be necessary. This will involve positioning the excavator so that the bucket is extended out over the edge of the excavation, where it will be rinsed of with a garden hose.

9.3 SUPPORT ZONE

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established at areas of the site where away from potential exposure to site contaminants during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits (SWPs) to guide and direct field crews on a task by task basis. An example of the SWP to be used is provided in Figure 9-1. Partially completed SWPs for the work to be performed are provided in Attachment VI of this HASP. These permits were completed to the extent possible as part of the development of this HASP. It is the SSO's responsibility to finalize and complete all blank portions of the SWPs based on current, existing conditions the day the task is to be performed, and then review that completed permit with all task participants as part of a pre-task tail gate briefing session. This will ensure that site-specific considerations and changing conditions are appropriately incorporated into the SWP, provide the SSO with a structured format for conducting the tail gate sessions, as well will also give personnel an opportunity to ask questions and make suggestions. All SWPs require the signature of the FOL or SSO.

9.5 SITE VISITORS

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

- Personnel invited to observe or participate in operations by Tetra Tech.
- Regulatory personnel (i.e., Department of Defense [DoD], Rhode Island Department of Environmental Management [RIDEM], United States Environmental Protection Agency [EPA], OSHA, etc.).
- Navy personnel/NAVSTA Newport personnel.
- Other authorized visitors.

Non-DoD personnel working on this project are required to gain initial access to the base by coordinating with the Tetra Tech PM or designee and following established base access procedures.

After access to the base is obtained, personnel who require access to Tetra Tech work sites (i.e., areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon

gaining access to the work site, site visitors wishing to observe operations in progress will be required to meet the following minimum requirements:

- 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 organization they represent, and the purpose for the visit. The FOL is responsible for ensuring that site visitors are always escorted while on site.
- Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Navy personnel) and medical surveillance as stipulated in Section 8.3 of this document. In addition, to enter the site operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

After the site visitors have completed the above items, they will be permitted to enter the site and applicable operational areas. Visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. Any visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

9.6 SITE SECURITY

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

Security at the work areas will be accomplished using field personnel. Tetra Tech personnel will retain complete control over active operational zones.

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

9.7 SITE MAP

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

9.8 BUDDY SYSTEM

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

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

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

9.10 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary.

External communication will be accomplished by using the telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities at the former NUSC Disposal Area, the FOL will determine and arrange for telephone communications.

FIGURE 9-1
SAFE WORK PERMIT

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

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

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

III. Field Crew: _____

IV. On-site Inspection conducted [] Yes [] No Initials of Inspector _____ Tetra Tech
Equipment Inspection required [] Yes [] No Initials of Inspector _____ Tetra Tech

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

VI. Chemicals of Concern Hazard Monitoring Action Level(s) Response Measures
Primary Route(s) of Exposure/Hazard: _____

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

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

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

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

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

This program applies to the single or aggregate accumulation of decontamination fluid generated during the decontamination process of non-dedicated sample equipment. It is not anticipated that significant decontamination fluids will be generated (less than 55 gallons). Because the classification of these materials (IDW) is unknown, these materials will be treated as hazardous pending laboratory certification to the contrary. The types of materials for which this program will apply are as follows:

- IDW – decontamination fluids
- Resource Storage – limited fuel and lubricant storage

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

10.2 POTENTIAL SPILL AREAS

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

- Resource deployment – fuel supply on the boat
- IDW waste generation point
- Central staging

10.3 CONTAINMENT AREAS

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

10.3.1 IDW

The following represent general staging conditions and requirements and are not anticipated to reflect site specific conditions. As stated above, the accumulation of greater than 55gallons of IDW is not anticipated; however, whether one drum or 10 drums are stored, elements of the following information will apply:

- 55-Gallon Drums (United Nations [U.N.] 1A2 configurations) – maximum 4 drums to a pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; minimum 4 feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management.
- Storage Tank – polyethylene construction – tank shall be placed into a bermed enclosure of sufficient size to accommodate 110 percent of anticipated volume (largest container plus 10 percent for rainwater and container displacement).

Regardless of container types selected, the staging area will be identified as a Satellite Storage Area with proper signage, points of contact in the event of an emergency, alternate contacts, and identification of stored material.

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

10.3.2 Flammable/POL Storage

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

- The fuels will be stored and dispensed from portable containers (safety cans).
- Portable hand-held storage containers will be labeled per Hazard Communication requirements.
- Portable flammable liquid storage tanks will be properly grounded and will have bonding capabilities for the loading and off-loading of its contents.
- Dispensing locations will be supported by a fire extinguisher positioned no closer than 50 feet from the storage tank, properly mounted, and identified.
- The dispensing location will be well marked with proper signage and protective bumper poles and will have straight through access/egress for boats.

10.4 MATERIALS HANDLING

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

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

- Decontamination fluids will be transported to the drum storage location via portable containers (5-gallon buckets).
- Other means of material handling will be evaluated by the SSO based on their ability to minimize or eliminate material handling hazards.

10.5 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, personnel transporting and dispensing decontamination fluids will visually determine that transport containers and storage vessels are not leaking. If a leak is detected, the FOL will be notified and the Spill Containment/Control Response Plan as specified in Section 9.8 will be engaged. Inspections will be documented in the project logbook.

10.6 PERSONNEL TRAINING AND SPILL PREVENTION

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

10.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

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

- Bag of sand, vermiculite, or other non combustible absorbent (Oil-dry).
- At least one extra drums (55-gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Shovel and broom.
- Container labels.
- PPE
 - Nitrile outer gloves
 - Splash shield
 - Impermeable over-boots
 - Rain suit

10.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

The following describes the procedures that Tetra Tech field personnel will employ upon the detection of a spill or leak:

- Notify the SSO or FOL immediately upon detection of a leak or spill.
- Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.
- Transfer the material to a new vessel, and collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.
- Re-containerize spills, including 2 inches of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options.

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

11.0 CONFINED SPACE ENTRY

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, an open excavation).
- Is not designed for continuous employee occupancy.

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

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

The creation of the open excavation will constitute a type of confined space. **However, no personnel under the provisions of this HASP will be authorized or permitted, under any circumstances, to enter an open excavation or any other confined space.**

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.

12.0 MATERIALS AND DOCUMENTATION

The Tetra Tech Field Operations Leader (FOL) shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailer)
- Training/Medical Surveillance Documentation Form (Blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)
- Directions to the Hospital

12.1 MATERIALS TO BE POSTED AT THE SITE

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

- **Chemical Inventory Listing (posted)** - This list represents all chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc. This list should be posted in a central area.
- **MSDSs (maintained)** - The MSDSs should also be in a central area accessible to 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 (posted)** - This poster should be conspicuously posted in places where notices to employees are normally posted, as directed by 29 CFR 1903.2 (a)(1). Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. The law also states that reproductions or facsimiles of the poster shall be at least 8 1/2 by 14 inches with 10 point type.

- **Site Clearance (maintained)** - This list is found within the training section of the HASP (Figure 8-1). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The 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) (posted)** - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.
- **Medical Data Sheets/Cards (maintained)** - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to all personnel to be carried on their person.
- **Personnel Monitoring (maintained)** - All results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.
- **Placards and Labels (maintained)** - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable [Hazard Communication 29 CFR 1910.1200(f)] labels.

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

13.0 ACRONYMS / ABBREVIATIONS

CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-Term Environmental Action Navy
CSP	Certified Safety Professional
DRI	Direct Reading Instrument
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IAW	In Accordance With
N/A	Not Available
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PPE	Personal Protective Equipment
SSO	Site Safety Officer
PM	Project Manager
Tetra Tech	Tetra Tech NUS, Inc.
VOCs	Volatile Organic Compounds

ATTACHMENT I

MEDICAL DATA SHEET

MEDICAL DATA SHEET

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

Project _____

Name _____

Home Telephone: _____ Work#: _____ Cell#: _____

Address _____

Age: _____ Height: _____ Weight: _____

Occupation/Trade: _____

Person to notify in the event of an emergency: Name: _____

Home Telephone: _____ Work#: _____ Cell#: _____

Drug or other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

What medications are you presently using? _____

Existing medical conditions that could be aggravated: _____

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

Note: Health Insurance Portability and Accountability Act (HIPAA) Requirements

HIPAA took effect in 1996 and was amended in April 14, 2003. Loosely interpreted, HIPAA regulates the disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on this Medical Data Sheet), provision of health care, or other information. HIPAA also requires Tetra Tech to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form will not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that the can accompany an injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

Name (Print clearly)

Signature

Date

ATTACHMENT II

INJURY/ILLNESS REPORTING

Report Date	Report Prepared By	Incident Report Number
INSTRUCTIONS:		
All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.		
Complete any additional parts to this form as indicated below for the type of incident selected.		
TYPE OF INCIDENT (Check all that apply)	Additional Form(s) Required for this type of incident	
Near Miss (No losses, but could have resulted in injury, illness, or damage)	<input type="checkbox"/> Complete IR Form Only	
Injury or Illness	<input type="checkbox"/> Complete Form IR-A; Injury or Illness	
Property or Equipment Damage, Fire, Spill or Release	<input type="checkbox"/> Complete Form IR-B; Damage, Fire, Spill or Release	
Motor Vehicle	<input type="checkbox"/> Complete Form IR-C; Motor Vehicle	
INFORMATION ABOUT THE INCIDENT		
Description of Incident		
<hr/> <hr/> <hr/>		
Date of Incident	Time of Incident	
	_____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/>	
Weather conditions at the time of the incident	Was there adequate lighting?	
	_____ Yes <input type="checkbox"/> No <input type="checkbox"/>	
Location of Incident		
_____ Was location of incident within the employer's work environment? Yes <input type="checkbox"/> No <input type="checkbox"/>		
Street Address	City, State, Zip Code and Country	
Project Name	Client:	
Tt Supervisor or Project Manager	Was supervisor on the scene?	
	Yes <input type="checkbox"/> No <input type="checkbox"/>	
WITNESS INFORMATION (attach additional sheets if necessary)		
Name	Company	
Street Address	City, State and Zip Code	
Telephone Number(s)		

CORRECTIVE ACTIONS				
Corrective action(s) immediately taken by unit reporting the incident:				
<hr/> <hr/> <hr/>				
Corrective action(s) still to be taken (by whom and when):				
<hr/> <hr/> <hr/>				
ROOT CAUSE ANALYSIS LEVEL REQUIRED				
Root Cause Analysis Level Required: Level - 1 <input type="checkbox"/> Level - 2 <input type="checkbox"/> None <input type="checkbox"/>				
Root Cause Analysis Level Definitions				
Level - 1	<p>Definition: A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office.</p> <p>The following events may trigger a Level 1 RCA:</p> <ul style="list-style-type: none"> ▪ Work related fatality ▪ Hospitalization of one or more employee where injuries result in total or partial permanent disability ▪ Property damage in excess of \$75,000 ▪ When requested by senior management 			
Level - 2	<p>Definition: A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided.</p> <p>The following events will require a Level 2 RCA:</p> <ul style="list-style-type: none"> ▪ OSHA recordable lost time incident ▪ Near miss incident that could have triggered a Level 1 RCA ▪ When requested by senior management 			
Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause identified within each area of inquiry.				
NOTIFICATIONS				
Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other: _____				

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

INSTRUCTIONS:

Complete all sections below for incidents involving injury or illness.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)		
EMPLOYEE INFORMATION		
Company Affiliation		
Tetra Tech Employee? <input type="checkbox"/> TetraTech subcontractor employee (directly supervised by Tt personnel)? <input type="checkbox"/>		
Full Name		Company (if not Tt employee)
Street Address, City, State and Zip Code		Address Type
_____		Home address (for Tt employees) <input type="checkbox"/>
_____		Business address (for subcontractors) <input type="checkbox"/>
Telephone Numbers		
Work: _____	Home: _____	Cell: _____
Occupation (regular job title)		Department
Was the individual performing regular job duties?		Time individual began work
Yes <input type="checkbox"/> No <input type="checkbox"/>		_____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/>
Safety equipment		
Provided? Yes <input type="checkbox"/> No <input type="checkbox"/>	Type(s) provided:	<input type="checkbox"/> Hard hat <input type="checkbox"/> Protective clothing
Used? Yes <input type="checkbox"/> No <input type="checkbox"/> If no, explain why		<input type="checkbox"/> Gloves <input type="checkbox"/> High visibility vest
_____		<input type="checkbox"/> Eye protection <input type="checkbox"/> Fall protection
_____		<input type="checkbox"/> Safety shoes <input type="checkbox"/> Machine guarding
_____		<input type="checkbox"/> Respirator <input type="checkbox"/> Other (list)

NOTIFICATIONS		
Name of Tt e employee to whom the i njury or i llness was fi rst reported	Was H&S notified within one hour of injury or illness?	
	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Date of report	H&S Personnel Notified	
Time of report	Time of Report	
If subcontractor injury, did subcontractor's firm perform their own incident investigation?		
Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, request a copy of their completed investigation form/report and attach it to this report.		

INJURY / ILLNESS DETAILS

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

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

Describe the object or substance that directly harmed the individual: Examples: "Concrete floor"; "Chlorine"; "Radial Arm Saw". If this question does not apply to the incident, write "Not Applicable".

MEDICAL CARE PROVIDED

Was first aid provided at the site: Yes No If yes, describe the type of first aid administered and by whom?

Was treatment provided away from the site: Yes No If yes, provide the information below.

Name of physician or health care professional

Facility Name

Street Address, City State and Zip Code

Type of Care?

Was individual treated in emergency room? Yes No

Was individual hospitalized overnight as an in-patient? Yes No

Telephone Number

Did the individual die? Yes No If yes, date: _____

Will a worker's compensation claim be filed? Yes No

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

SIGNATURES

I have reviewed this report and agree that all the supplied information is accurate

Affected individual (print)

Affected individual (signature)

Telephone Number

Date

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

INSTRUCTIONS:

Complete all sections below for incidents involving property/equipment damage, fire, spill or release.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)

TYPE OF INCIDENT (Check all that apply)

Property Damage Equipment Damage Fire or Explosion Spill or Release

INCIDENT DETAILS

Results of Incident: Fully describe damages, losses, etc.

Response Actions Taken:

Responding Agency(s) (i.e. police, fire department, etc.)

Agency(s) Contact Name(s)

DAMAGED ITEMS (List all damaged items, extent of damage and estimated repair cost)

Item:	Extent of damage:	Estimated repair cost

SPILLS / RELEASES (Provide information for spilled/released materials)

Substance	Estimated quantity and duration	Specify Reportable Quantity (RQ)
		_____ Exceeded? Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>

FIRES / EXPLOSIONS (Provide information related to fires/explosions)

Fire fighting equipment used? Yes No If yes, type of equipment: _____

NOTIFICATIONS

Required notifications	Name of person notified	By whom	Date / Time
Client: _____ Yes <input type="checkbox"/> No <input type="checkbox"/>			
Agency: _____ Yes <input type="checkbox"/> No <input type="checkbox"/>			
Other: _____ Yes <input type="checkbox"/> No <input type="checkbox"/>			

Who is responsible for reporting incident to outside agency(s)? To Client Other Name: _____

Was an additional written report on this incident generated? Yes No If yes, place in project file.

INSTRUCTIONS:

Complete all sections below for incidents involving motor vehicle accidents. Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)							
INCIDENT DETAILS							
Name of road, street, highway or location where accident occurred				Name of intersecting road, street or highway if applicable			
County			City			State	
Did police respond to the accident?				Did ambulance respond to the accident?			
Yes <input type="checkbox"/> No <input type="checkbox"/>				Yes <input type="checkbox"/> No <input type="checkbox"/>			
Name and location of responding police department				Ambulance company name and location			
Officer's name/badge #							
Did police complete an incident report? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, police report number: _____							
Request a copy of completed investigation report and attach to this form.							
VEHICLE INFORMATION							
How many vehicles were involved in the accident? _____ (Attach additional sheets as applicable for accidents involving more than 2 vehicles.)							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
Vehicle Owner / Contact Information				Vehicle Owner / Contact Information			
Color				Color			
Make				Make			
Model				Model			
Year				Year			
License Plate #				License Plate #			
Identification #				Identification #			
Describe damage to vehicle number 1				Describe damage to vehicle number 2			
Insurance Company Name and Address				Insurance Company Name and Address			
Agent Name				Agent Name			
Agent Phone No.				Agent Phone No.			
Policy Number				Policy Number			

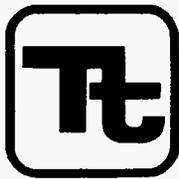
DRIVER INFORMATION							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
Driver's Name				Driver's Name			
Driver's Address				Driver's Address			
Phone Number				Phone Number			
Date of Birth				Date of Birth			
Driver's License #				Driver's License #			
Licensing State				Licensing State			
Gender		Male <input type="checkbox"/> Female <input type="checkbox"/>		Gender		Male <input type="checkbox"/> Female <input type="checkbox"/>	
Was traffic citation issued to Tetra Tech driver? Yes <input type="checkbox"/> No <input type="checkbox"/>				Was traffic citation issued to driver of other vehicle? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Citation #				Citation #			
Citation Description				Citation Description			
PASSENGERS IN VEHICLES (NON-INJURED)							
List all non-injured passengers (excluding driver) in each vehicle. Driver information is captured in the preceding section. Information related to persons injured in the accident (non-Tt employees) is captured in the section below on this form. Injured Tt employee information is captured on FORM IR-A							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
How many passengers (excluding driver) in the vehicle? ____				How many passengers (excluding driver) in the vehicle? ____			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
INJURIES TO NON-TETRATECH EMPLOYEES							
Name of injured person 1				Address of injured person 1			
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male <input type="checkbox"/> Female <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Injured <input type="checkbox"/> Died <input type="checkbox"/>	
Name of injured person 2				Address of injured person 2			
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male <input type="checkbox"/> Female <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Injured <input type="checkbox"/> Died <input type="checkbox"/>	
OTHER PROPERTY DAMAGE							
Describe damage to property other than motor vehicles							
Property Owner's Name				Property Owner's Address			

COMPLETE AND SUBMIT DIAGRAM DEPICTING WHAT HAPPENED

A large, empty rectangular box with a black border, intended for drawing a diagram. The box is currently blank, providing space for the student to complete the task.

ATTACHMENT III

UTILITY LOCATING AND EXCAVATION CLEARANCE



TETRA TECH NUS, INC.

STANDARD OPERATING PROCEDURES

Number	HS-1.0	Page	1 of 15
Effective Date	12/03	Revision	2
Applicability	Tetra Tech NUS, Inc.		
Prepared	Health & Safety		
Approved	D. Senovich <i>[Signature]</i>		

Subject
UTILITY LOCATING AND EXCAVATION CLEARANCE

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1.0 PURPOSE

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

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

2.0 SCOPE

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

3.0 GLOSSARY

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

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

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

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

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

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

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4.0 RESPONSIBILITIES

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

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

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

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

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

5.0 PROCEDURES

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

5.1 Buried Utilities

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

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

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.
- 2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scars and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

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

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.
4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.
5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain
6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.
7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.
8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

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5.2 Overhead Power Lines

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

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

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

6.0 UNDERGROUND LOCATING TECHNIQUES

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

6.1 Geophysical Methods

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

Electromagnetic Induction

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

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

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

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Magnetics

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

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

Ground Penetrating Radar

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

6.2 Passive Detection Surveys

Acoustic Surveys

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

Thermal Imaging

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

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

6.3 Intrusive Detection Surveys

Vacuum Excavation

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

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

Hand Excavation

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

Tile Probe Surveys

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

7.0 INTRUSIVE ACTIVITIES SUMMARY

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

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.
2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

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

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.
4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

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

8.0 REFERENCES

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

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**ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES**



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

**ONE-CALL SYSTEMS INTERNATIONAL
CONDENSED DIRECTORY**

Alabama Alabama One-Call 1-800-292-8525	Iowa Iowa One-Call 1-800-292-8989	New Jersey New Jersey One Call 1-800-272-1000
Alaska Locate Call Center of Alaska, Inc. 1-800-478-3121	Kansas Kansas One-Call System, Inc. 1-800-344-7233	New Mexico New Mexico One Call System, Inc. 1-800-321-2537 Las Cruces- Dona Ana Blue Stakes 1-888-526-0400
Arizona Arizona Blue Stake 1-800-782-5348	Kentucky Kentucky Underground Protection Inc. 1-800-752-6007	New York Dig Safely New York 1-800-862-7962 New York City- Long Island One Call Center 1-800-272-4480
Arkansas Arkansas One Call System, Inc. 1-800-482-8998	Louisiana Louisiana One Call System, Inc. 1-800-272-3020	North Carolina The North Carolina One-Call Center, Inc. 1-800-632-4949
California Underground Service Alert North 1-800-227-2600 Underground Service Alert of Southern California 1-800-227-2600	Maine Dig Safe System, Inc. 1-888-344-7233	North Dakota North Dakota One-Call 1-800-795-0555
Colorado Utility Notification Center of Colorado 1-800-922-1987	Maryland Miss Utility 1-800-257-7777 Miss Utility of Delmarva 1-800-282-8555	Ohio Ohio Utilities Protection Service 1-800-362-2764 Oil & Gas Producers Underground Protect'n Svc 1-800-925-0988
Connecticut Call Before You Dig 1-800-922-4455	Massachusetts Dig Safe System, Inc. 1-888-344-7233	Oklahoma Call Okie 1-800-522-6543
Delaware Miss Utility of Delmarva 1-800-282-8555	Michigan Miss Dig System, Inc. 1-800-482-7171	Oregon Oregon Utility Notification Center/One Call Concepts 1-800-332-2344
Florida Sunshine State One-Call of Florida, Inc. 1-800-432-4770	Minnesota Gopher State One Call 1-800-252-1168	Pennsylvania Pennsylvania One Call System, Inc. 1-800-242-1776
Georgia Underground Protection Center, Inc. 1-800-282-7411	Mississippi Mississippi One-Call System, Inc. 1-800-227-6477	Rhode Island Dig Safe System, Inc. 1-888-344-7233
Hawaii Underground Service Alert North 1-800-227-2600	Missouri Missouri One-Call System, Inc. 1-800-344-7483	South Carolina Palmetto Utility Protection Service Inc. 1-888-721-7877
Idaho Dig Line Inc. 1-800-342-1585 Kootenai County One-Call 1-800-428-4950 Shoshone - Benewah One-Call 1-800-398-3285	Montana Utilities Underground Protection Center 1-800-424-5555 Montana One Call Center 1-800-551-8344	South Dakota South Dakota One Call 1-800-781-7474
Illinois JULIE, Inc. 1-800-892-0123 Digger (Chicago Utility Alert Network) 312-744-7000	Nebraska Diggers Hotline of Nebraska 1-800-331-5666	Tennessee Tennessee One-Call System, Inc. 1-800-351-1111
Indiana Indiana Underground Plant Protection Service 1-800-382-5544	Nevada Underground Service Alert North 1-800-227-2600	
	New Hampshire Dig Safe System, Inc. 1-888-344-7233	

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ATTACHMENT 1 (Continued)

Texas

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

Utah

Blue Stakes of Utah
1-800-662-4111

Vermont

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

Virginia

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

Washington

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

West Virginia

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

Wisconsin

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

Wyoming

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

District of Columbia

Miss Utility
1-800-257-7777

Alberta

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

British Columbia

BC One Call
1-800-474-6886

Ontario

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

Quebec

Info-Excavation
1-800-663-9228

Subject

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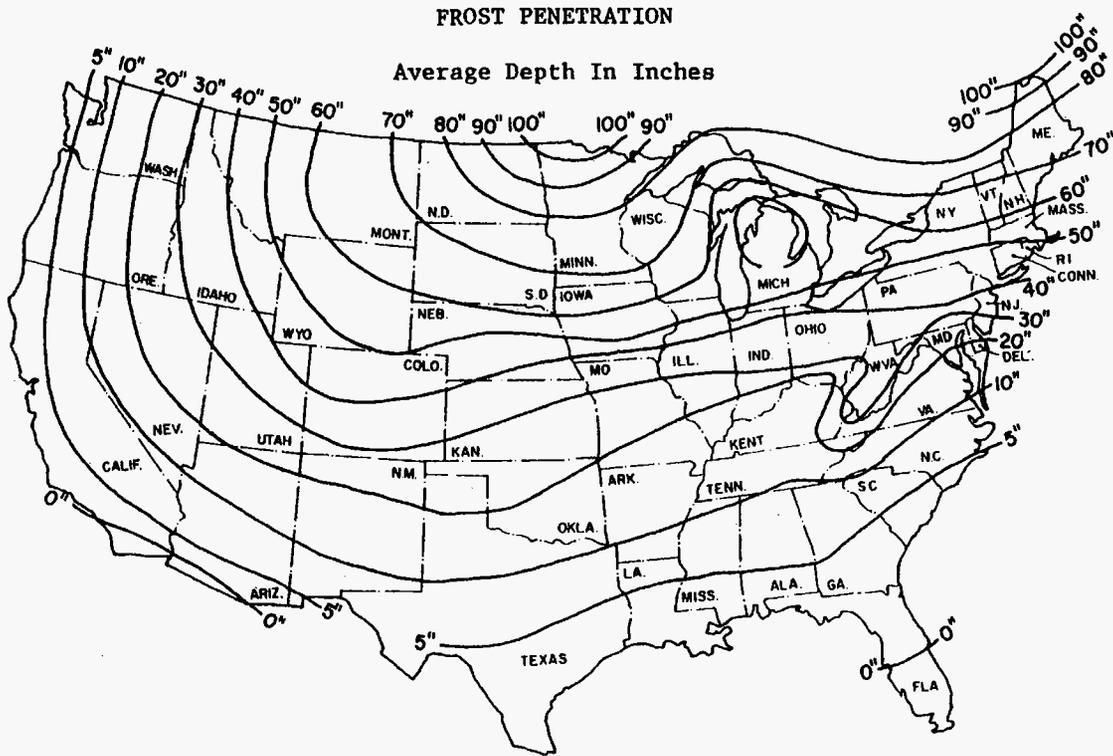
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ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

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**ATTACHMENT 3
UTILITY CLEARANCE FORM**

Client: _____ Project Name: _____
 Project No.: _____ Completed By: _____
 Location Name: _____ Work Date: _____
 Excavation Method/Overhead Equipment: _____

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

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

3. Notes:

Approval:

 Site Manager/Field Operations Leader Date

c: PM/Project File
 Program File

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**ATTACHMENT 4
OSHA LETTER OF INTERPRETATION**

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

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

Dear Mr. Caldwell:

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

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

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

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

Answer

Background

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

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

Paragraph (b)(3) provides:

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ATTACHMENT 4 (Continued)

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

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

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

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

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

Non-conductive hand tools are permitted

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

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

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Hydro-vacuum excavation

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

Other technologies

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

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

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

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

ATTACHMENT IV

**HEAVY EQUIPMENT INSPECTION
CHECKLIST**

Heavy Equipment Inspection Checklist

Company: _____

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Time: _____ :

Equipment Type: _____

(e.g., earthmoving equipment - tractors backhoes, bulldozers, etc.)

Project Name: _____

Project No#: _____

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Seat Belts <ul style="list-style-type: none"> • Are available for intended operator and passengers (where applicable) • Seat Belts are operational? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Roll-Over Protection (ROPS) <ul style="list-style-type: none"> • Roll-over protection structures (ROPS) are provided on vehicles and heavy equipment (including scrapers, tractors, loaders, bulldozers, carryalls, etc.) 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Brakes <ul style="list-style-type: none"> • Brake systems capable of stopping and holding fully loaded equipment • Parking Brake functions properly • Wheel Chocks available (where and as applicable) 	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Access <ul style="list-style-type: none"> • Non-slip steps • Grab Handles (3-Point Grab/Step Mounting Points) 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Audible Alarms <ul style="list-style-type: none"> • Audible alarms – All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. • Back up Alarms – All self propelled equipment with an obstructed view to the rear will be equipped with a reverse gear signal alarm distinguishable from the surrounding noise level. • Horn functioning properly 	

Heavy Equipment Inspection Checklist

Unit/Serial No#: _____
 Inspection Date: ____ / ____ / ____ Time: ____ : ____
 Equipment Type: _____
 Page 2

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Highway Use</p> <ul style="list-style-type: none"> • Fenders for equipment that can exceed 15mph • Fire Extinguisher • Are exhaust emissions directed away from the Operator? • Cab <ul style="list-style-type: none"> - Clean, free from debris, tools or equipment that can interfere with foot Control. - Free from storage of flammable material/solvents • Mirrors, • Safety glass <ul style="list-style-type: none"> - Equipped with defrosters - Windshield wipers • Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use? • Gauges functioning properly • Tires (Tread) or tracks • Steering (standard and emergency) • Are tools and material secured to prevent movement during transport? 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Fluid Levels:</p> <ul style="list-style-type: none"> • Engine oil • Transmission fluid • Brake fluid • Cooling system fluid • Hoses and belts • Hydraulic oil 	

Heavy Equipment Inspection Checklist

Unit/Serial No#: _____
 Inspection Date: ____ / ____ / ____ Time: ____ : ____
 Equipment Type: _____
 Page 3

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Fueling <ul style="list-style-type: none"> • Fueling of vehicles and heavy equipment is done with the engine off. • No smoking is permitted at or near the fuel storage or refueling area. A sign is posted stating: NO SMOKING WITHIN 50 FEET. • No sources of ignition are present near the fuel storage or refueling area. • A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area, no closer than 50-feet. • Safety cans available? 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Safety Guards – <ul style="list-style-type: none"> • All points of operations protected from accidental contact, such as rotating/reciprocating apparatus shielded or enclosed (belts, pulleys, sprockets, spindles, drums, flywheels, chains) • Hot pipes and surfaces are protected from accidental contact? • High pressure pneumatic lines have safety cable to prevent thrashing should it become disconnected? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attachments <ul style="list-style-type: none"> • Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Operator Qualifications <ul style="list-style-type: none"> • Does the operator have proper licensing where applicable, (e.g., CDL)? • Does the operator, understand the equipment's operating instructions? • Is the operator experienced with this equipment? • Is the operator 21 years of age or more? 	

Heavy Equipment Inspection Checklist

Unit/Serial No#: _____
 Inspection Date: ____ / ____ / ____ Time: ____ : ____
 Equipment Type: _____
 Page 4

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	PPE Required <ul style="list-style-type: none"> • Hardhat • Safety glasses • Work gloves • Chemical resistant gloves _____ • Steel toed Work Boots • Chemical resistant Boot Covers • Apron • Coveralls Tyvek, Saranex, cotton) _____ 	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Key(s)? Operating Manual?	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Other Hazards <ul style="list-style-type: none"> • Excessive Noise Levels _____ dBA • Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.) • MSDSs available? 	

Approved for Use Yes No See Comments

 Site Health and Safety Officer

 Date Inspection Performed

ATTACHMENT V

**EXCAVATION INSPECTION
CHECKLISTS**

Excavation Daily and Post-Rain Event Inspection Form

	ITEM DESCRIPTION	Y	N	NA	Comments
a.	Has pre-identification & location of utilities and/or underground obstructions been completed?				
b.	Protective systems in place and adequate?				
c.	Spoil >2' from edge?				
d.	Access/egress? If no entry, then so specify in Comments				
e.	Water accumulation?				
f.	Appropriate perimeter signs & barricades				
g.	Fall Protection necessary? If yes, Used Properly				
h.	Does Excavation qualify as Confined Space? If no entry, then so specify in Comments				
i.	Are employees in excavation (within danger area) while equipment is operating?				
j.	If trench box is used is tabulated data on site for system being used?				
k.	Other remarkable issues or items requiring correction before initiating or resuming work?				

Project Name and Location: _____

Competent Person Performing Inspection:

Name (Print Clearly)

Signature

Date

Excavation Inspection Checklist

This checklist is to be completed by the Excavation Competent Person for daily, periodic, and occurrence specific inspections and ***PRIOR TO ANY ENTRY INTO EACH EXCAVATION***

Reason for Inspection (Daily, rain event, weekly, etc.)

Excavation Identity (e.g. Number)

#	ASSESSMENT QUESTIONS	YES	NO	NA	COMMENTS
1	<p>Is the cut/cavity/depression greater than 4-feet?</p> <p>Does 29 CFR 1926. 650-652 apply?</p>				<p>What is the estimated size (l * w * h) of the excavation? ___ * ___ * ___</p> <p>Is the cut/cavity/depression an excavation or trench?</p>
Surface/Subsurface Encumbrances					
2	<p>Are surface encumbrances within the area of influence of the excavation?</p>				<p>Type:</p> <p>Estimated Surcharge Load:</p>
3	<p>Are subsurface encumbrances within the area of influence of the excavation?</p>				<p>Type:</p> <p>Supported:</p>
4	<p>Do structures (buildings, etc.) exist near the excavation?</p> <p>Will the excavation proceed under the footing/foundation?</p>				<p>Method of stabilization:</p>
5	<p>Is the excavation exposed to heavy equipment/vehicular traffic?</p> <p>Vehicles stops provided approaching the excavation boundary?</p> <p>Are vehicles/equipment equipped with movement warning systems?</p> <p>Spotters/Flagpersons controlling heavy equipment/vehicle traffic?</p>				<p>Type:</p> <p>Distance from the sidewalls?</p> <p>Types:</p> <p>Types:</p>

#	ASSESSMENT QUESTIONS	YES	NO	NA	COMMENTS
6	<p>Are personnel potentially exposed to falling loads/loose soils/materials?</p> <p>Tension Cracks/toppling evident?</p> <p>Have protective barriers/barricades been installed?</p>				<p>Due to:</p> <p>Spalling Material storage and transport</p> <p>Look for surface cracks 0.5-0.75 times the depth</p> <p>Type: Canopy Netting</p>
Water Accumulation					
7	<p>Is/has water accumulated within the excavation?</p> <p>Has primary/intermittent water drainage pathways been interrupted by the excavation?</p> <p>Are there indications of heaving/squeezing</p>				<p>Source:</p> <p>Surface Seeps Boiling</p> <p>Water drainage control methods employed:</p> <p>Diversion Ditches How close to the excavation</p> <p>Dikes/Pumping</p>
Access/Egress					
8	<p>Are fixed means of access/egress placed within 25-feet of lateral travel from the area work is being performed?</p> <p>Type/structure of access/egress</p>				<p>No. of Access/Egress Points:</p> <p>Earthen Ramps?</p> <p>Estimated angle of repose:</p> <p>Can persons walk up the ramp in an upright position?</p> <p>Structural Ramps?</p> <p>Cleats or other traction provided?</p> <p>Ladders?</p> <p>Do they extend at least 36-inches above the excavation sidewall?</p> <p>How are they secured?</p>

Hazardous Atmosphere Monitoring					
10	<p>Does the excavation/trench have the potential to generate a hazardous atmosphere?</p> <p>Oxygen levels measured?</p> <p>Flammable/combustible gases</p> <p>Toxic Atmosphere</p>				<p>Type:</p> <p>_____ (19.5-23.5% acceptable)</p> <p>_____ (0% LEL acceptable)</p> <p>(1-10% LEL employ engineering controls generation and accumulation)</p> <p>(>10% cease operations)</p> <p>_____ (<1 ppm sustained >10 minutes)</p>
Personal Protective Equipment					
11	<p>Is personal protection employed by persons entering the excavation?</p>				<p>Types:</p> <p>Hardhat safety glasses reflective vest airhorn lifeline and harness</p>
Emergency Rescue Equipment					
12	<p>Is there a potential for an emergency condition/situation?</p> <p>Has emergency equipment been selected and placed at the excavation for immediate access?</p>				<p>Types:</p> <p>Physical –</p> <p>Chemical –</p> <p>Types of Equipment:</p>

Excavation Suitable for Entry? _____ Yes _____ No

Competent Person:

Print Name

Date

Signature

ATTACHMENT VI
SAFE WORK PERMITS

**SAFE WORK PERMIT
MOBILIZATION
SITE 08 NUSC DISPOSAL AREA
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

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

II. Primary Hazards: Lifting; pinches and compressions; slips, trips, and falls; vehicular and foot traffic; ambient temperature extremes; animal and insect bites/poisonous plants; inclement weather

III. Field Crew: _____

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

V. Protective equipment required
 Level D Level B
 Level C Level A
 Modifications/Exceptions _____

Respiratory equipment required
 Yes Specify on the reverse
 No

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this Activity	none	none	none
Primary Route(s) of Exposure/Hazard: <u>none</u>			

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

VII. Additional Safety Equipment/Procedures

Hard-Hat.....	<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 checked="" type="checkbox"/> No
Chemical/Splash Goggles.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio/Cellular Phone.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Suit/Coveralls.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type – Nitrile).....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable Apron.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest Regimen.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel Toe Work Shoes/Boots.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High Visibility Vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape/Insect Repellent.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Modifications/Exceptions: <u>Various tasks require additional PPE. Tasks and site conditions will determine the additional PPE.</u>			

VIII. Site Preparation:	Yes	No	N/A
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

X. Special instructions, precautions: Use safe lifting and carrying techniques. Use additional PPE based on the task hazards. Use work gloves when cutting boxes or handling sharp tools and cutting devices. Safety glasses will be worn when hazards are present. Identify and remove or isolate physical hazards and mark areas where they cannot be Removed. Keep work area clutter free.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
SOIL BORING MONITORING WELL INSTALLATION
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

- I. Work limited to the following (description, area, equipment used):** Soil boring and installation of monitoring wells. Drilling in the shed adjacent to Building 179 is included. This task includes monitoring well development.
- II. Primary Hazards:** Contact and transfer site contamination; heavy equipment hazards; noise; contact with utilities; lifting; slip, trip, and fall; vehicular and foot traffic; temperature extremes; flying projectiles; In the shed next to Building 179 an oxygen deficient, explosive and carbon monoxide atmosphere may exist.
Insect/animal bites/poisonous plants; inclement weather
- III. Field Crew:** _____
- IV. On-site Inspection conducted:** Yes No Initials of Inspector _____ TtNUS
Equipment Inspection required Yes No Initials of Inspector _____ TtNUS

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

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
VOCs:	FID/PID	Elevated readings greater than 80PPM PID	Evacuate area until readings to background levels
SVOCs: PAHs	Visual observation of airborne dust in work areas	Use wetting methods on visible dust	or dust is controlled
Metals: Sb, Cr, Pb and TI			
LEL, O2, CO	Four Gas Meter Building 179 only	<19.5% O2, >25% LEL, 50 ppm CO	Evacuate area until Background levels return

Primary Route(s) of Exposure/Hazard: Inhalation of airborne dusts is possible. Incidental ingestion and contact with contaminants will be prevented through the use of PPE and safe work practices.

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

- VII. Additional Safety Equipment/Procedures**
- | | | | |
|------------------------------------|---|---------------------------------------|---|
| Hard-Hat..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs)..... | <input 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 type="checkbox"/> No |
| Chemical/Splash Goggles..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Radio/Cellular Phone..... | <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 |
| Tyvek Coveralls..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type – Nitrile)..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Impermeable Apron..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest Regimen..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel Toe Work Shoes or Boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical Resistant Boot Covers..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| High Visibility Vest..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Tape/Insect Repellent..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| First Aid Kit..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Fire Extinguisher..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Shower/Eyewash..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Other..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
- Modifications/Exceptions: Coveralls if the potential for soiling work clothes exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.). Hard hat and hearing protection when near operating equipment; life lines or when near water hazard.

- VIII. Site Preparation:**
- | | Yes | No | N/A |
|--|--------------------------|--------------------------|--------------------------|
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place.. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Identified and Isolated (Splash and containment barriers)..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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

- X. Special instructions, precautions:** Use safe lifting and carrying practices. Inspect equipment prior to use.
Ensure emergency stop devices are functional.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
GROUNDWATER, SOIL AND IDW SAMPLING
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

I. Work limited to the following (description, area, equipment used): Groundwater, Soil & IDW sampling.
Well development, purging, groundwater level measurements, pump tests, and other related activities

II. Primary Hazards: Contact and transfer site contamination; slip, trip, and fall; temperature extremes; vehicular and foot traffic; insect/animal bites/poisonous plants; inclement weather

III. Field Crew: _____

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

V. Protective equipment required
Level D Level B
Level C Level A
Modifications/Exceptions _____

Respiratory equipment required
Yes Specify on the reverse
No

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
VOCs: <u>1,2,4-trimethylbenzene</u>	FID/PID	Elevated readings greater than 80PPM PID	Evacuate area until readings to background levels
SVOCs: PAHs	Visual observation of airborne dust in work areas	Use wetting methods on visible dust	or dust is controlled
Metals: Sb, Cr, Pb and TI			

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

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

VII. Additional Safety Equipment/Procedures

Hard-Hat.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs).....	<input 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 type="checkbox"/> No
Chemical/Splash Goggles.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Radio/Cellular Phone.....	<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
Tyvek Coveralls.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type – Nitrile).....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable Apron.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest Regimen.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel Toe Work Shoes or Boots.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
High Visibility Vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape/Insect Repellent.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: PVC or PE coated Tyvek if potential to soil clothes. Hard hat when approaching pile driver rig

VIII. Site Preparation:

	Yes	No	N/A
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

X. Special instructions, precautions: Review and follow the instructions on the MSDS for the decontamination Fluids. Follow guidance in Table 5-1 for PPE for different decontamination tasks. Ensure emergency stop devices are functional.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
MULTIMEDIA SAMPLING
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

I. Work limited to the following (description, area, equipment used): Multi-media sampling including: sediment surface water, benthic macroinvertebrae, fish, and wetland delineation.

II. Primary Hazards: Contact and transfer site contamination; lifting; slip, trip, and fall; temperature extremes; water hazards/drowning; pinches and compressions; Insect/animal bites/poisonous plants; inclement weather

III. Field Crew: _____

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

V. Protective equipment required
 Level D Level B
 Level C Level A
 Modifications/Exceptions _____

Respiratory equipment required
 Yes Specify on the reverse
 No

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

Primary Route(s) of Exposure/Hazard: Incidental ingestion

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

VII. Additional Safety Equipment/Procedures

Hard-Hat.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs).....	<input 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 type="checkbox"/> No
Chemical/Splash Goggles.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Radio/Cellular Phone.....	<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
Tyvek Coveralls.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type – Nitrile).....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable Apron.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest Regimen.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel Toe Work Shoes or Boots.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
High Visibility Vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape/Insect Repellent.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: PVC or PE Coated Tyvek if potential to soil clothes. Hard hat when approaching pile driver rig. Wear proper PFD or use life lines when working on or near water.

VIII. Site Preparation:	Yes	No	N/A
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Physical Hazards Identified and Isolated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boat Safety Checklist completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
DECONTAMINATION
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

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

II. Primary Hazards: Contact with site contaminants and decontamination fluids; lifting; noise; flying projectiles; vehicular and foot traffic; temperature extremes; slip, trip, and fall; inclement weather

III. Field Crew: _____

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

V. Protective equipment required
 Level D Level B
 Level C Level A
 Modifications/Exceptions _____

Respiratory equipment required
 Yes Specify on the reverse
 No

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
VOCs: <u>1,2,4-trimethylbenzene</u>	FID/PID	<u>Elevated readings greater than background levels in worker breathing zone.</u>	<u>Evacuate area until readings to background levels</u>
SVOCs: PAHs	<u>Visual observation of airborne dust in work areas</u>	<u>Use wetting methods on visible dust</u>	<u>or dust is controlled</u>
Metals: Sb, Cr, Pb and Tl			
Primary Route(s) of Exposure/Hazard: <u>Contact with contaminants</u>			

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

VII. Additional Safety Equipment/Procedures

Hard-Hat.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hearing Protection (Plugs/Muffs).....	<input 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 type="checkbox"/> No
Chemical/Splash Goggles.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Radio/Cellular Phone.....	<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 – Nitrile).....	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Impermeable Apron.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Work/rest Regimen.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Steel Toe Work Shoes or Boots.....	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Chemical Resistant Boot Covers.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
High Visibility Vest.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tape/Insect Repellent.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety Shower/Eyewash.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Modifications/Exceptions: When deconing heavy equipment wear hearing protection; splash shield, PVC coated Tyvek if potential to soil clothes.

VIII. Site Preparation:

	Yes	No	N/A
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
IDW MANAGEMENT
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

I. Work limited to the following (description, area, equipment used): IDW management, moving and storage

II. Primary Hazards: Lifting; noise; pinches and compressions; slip, trip, and fall; vehicular and foot traffic; temperature extremes; animal and insect bites/poisonous plants; inclement weather

III. Field Crew: _____

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

V. Protective equipment required
 Level D Level B
 Level C Level A
 Modifications/Exceptions _____

Respiratory equipment required
 Yes Specify on the reverse
 No

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
VOCs: <u>1,2,4-trimethylbenzene</u>	FID/PID	Elevated readings greater than 80PPM PID s in worker breathing zone.	Evacuate area until readings to background levels
SVOCs: PAHs	Visual observation of airborne dust in work areas	Use wetting methods on visible dust	or dust is controlled
Metals: Sb, Cr, Pb and TI			

Primary Route(s) of Exposure/Hazard: Incidental ingestion, contact, inhalation of dust

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

VII. Additional Safety Equipment/Procedures

Hard-Hat.....	<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 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/Cellular Phone.....	<input type="checkbox"/> Yes <input 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 Suit/Coveralls.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type – Nitrile).....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable Apron.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Work/rest Regimen.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel Toe Work Shoes or Boots.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High Visibility Vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape/Insect Repellent.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Safety Shower/Eyewash.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: Various tasks require additional PPE. Tasks and site conditions will determine the additional PPE.

VIII. Site Preparation:

	Yes	No	N/A
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

X. Special instructions, precautions: Inspect containers used to store IDW prior to use. Cover containers to prevent unauthorized entry and infiltration of precipitation. Never over load containers. Disperse IDW evenly. Use proper lifting techniques and obtain assistance when handling heavy drums. Use equipment whenever possible to move heavy items.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SITE 08 NUSC DISPOSAL AREA
SURVEY
NAVAL UNDERSEA WARFARE CENTER
MIDDLETOWN, RHODE ISLAND**

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

- I. Work limited to the following (description, area, equipment used):** Geographical land survey
- II. Primary Hazards:** Slip, trip, and fall; vehicular and foot traffic; temperature extremes; animal and insect bites and poisonous plants; inclement weather
- III. Field Crew:** _____
- IV. On-site Inspection conducted:** Yes No Initials of Inspector _____ TtNUS
Equipment Inspection required Yes No Initials of Inspector _____ TtNUS

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

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this task	none	none	none
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Primary Route(s) of Exposure/Hazard: absorption

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

- VII. Additional Safety Equipment/Procedures**
- | | | | |
|------------------------------------|---|---------------------------------------|---|
| Hard-Hat..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs)..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses..... | <input 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/Cellular Phone..... | <input type="checkbox"/> Yes <input 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 Suit/Coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type – Nitrile)..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Impermeable Apron..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Work/rest Regimen..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel Toe Work Shoes or Boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical Resistant Boot Covers..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| High Visibility Vest..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Tape/Insect Repellent..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| First Aid Kit..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Fire Extinguisher..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Shower/Eyewash..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Other..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
- Modifications/Exceptions: Various tasks require additional PPE. Tasks and site conditions will determine the additional PPE.

- VIII. Site Preparation:**
- | | Yes | No | N/A |
|--|--------------------------|--------------------------|--------------------------|
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place.. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Identified and Isolated (Splash and containment barriers)..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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

- X. Special instructions, precautions:** Use safe lifting and carrying techniques. Use additional PPE based on the task hazards. Use work gloves when cutting boxes or handling sharp tools and cutting devices. Safety glasses will be worn when hazards are present. Identify and remove or isolate physical hazards and mark areas where they cannot be removed. Keep work area clutter free.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT VII

OSHA POSTER

Job Safety and Health

It's the law!

OSHA

Occupational Safety
and Health Administration
U.S. Department of Labor

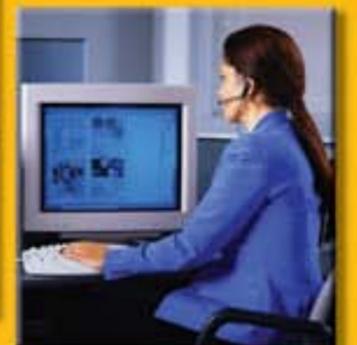
EMPLOYEES:

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

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health



Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 3185-12-06R