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HEALTH AND SAFETY PLAN REVISION 1 FOR GROUNDWATER MONITORING AND  
WETLAND DELINEATION AT OPERABLE UNIT 5 (OU 5) SITE 15 NAS CECIL FIELD FL  
9/29/2003  
TETRA TECH NUS INC

**Health and Safety Plan**  
for  
**Groundwater Monitoring**  
and  
**Wetland Delineation**

**Operable Unit 5**

**Site 15**

**Naval Air Station Cecil Field**  
Jacksonville, Florida



**Southern Division**  
**Naval Facilities Engineering Command**  
Contract No. N62467-94-D-0888  
Contract Task Order 0039

September 2003

HEALTH AND SAFETY PLAN  
FOR  
GROUNDWATER MONITORING  
AND  
WETLAND DELINEATION  
AT  
OPERABLE UNIT 5, SITE 15

NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY CONTRACT

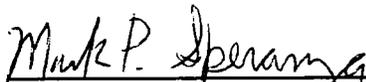
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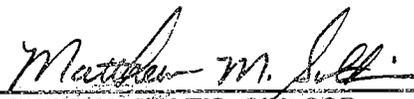
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REVISION 1  
SEPTEMBER 2003

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## **1.0 INTRODUCTION**

This Health and Safety Plan (HASP) has been developed to provide the minimum safety and health practices and procedures for Tetra Tech NUS, Inc. (TtNUS) and subcontractor personnel engaged in the field activities at Operable Unit (OU) 5, Site 15 of the Naval Air Station Cecil Field (NAS Cecil Field), Jacksonville, Florida.

This HASP has been designed to be used in conjunction with the TtNUS Health and Safety Guidance Manual. The Guidance Manual provides detailed information pertaining to procedures to be performed on site as directed by the HASP, as well as TtNUS standard operating procedures. This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 CFR 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response Standard. Both documents must be present at the site to satisfy these requirements.

This HASP has been written to support proposed tasks and techniques associated with the scope of work as presented in Section 4.0. It has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work at the site. Should the proposed work site conditions and/or suspected hazards change, or if new information becomes available, this document will be modified. All changes to the HASP will be made with the approval of the TtNUS Site Safety Officer (SSO) and the TtNUS Health and Safety Manager (HSM). Requests for modifications to the HASP will be directed to the SSO who will determine whether to make the changes. The SSO will notify the Task Order Manager (TOM), who will notify all affected personnel of changes.

### **1.1 AUTHORITY**

This work is authorized under the Comprehensive Long - Term Environmental Action Navy (CLEAN) contract, administered through the U.S. Navy Southern Division Naval Facilities Engineering Command, as defined under Contract No. N62467-94-D-0888; Contract Task Order Number 0039.

### **1.2 KEY PROJECT PERSONNEL AND ORGANIZATION**

This section defines responsibilities for site safety and health for TtNUS and subcontractor employees conducting environmental sampling and other field activities. Personnel assigned to these positions shall exercise the primary responsibility for all on site health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures.

The TtNUS TOM is responsible for the overall direction and implementation of health and safety for this work.

The TtNUS 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 will:

- Verify training and medical status of on-site personnel in relation to site activities.
- Assist and represent TtNUS with emergency services (if needed)
- Provide elements site-specific training for all on site personnel.

The TtNUS Site Safety Officer or their representative supports the FOL concerning all aspects of health and safety including, but not limited to:

- Coordinating all health and safety activities
- Selecting, applying, inspecting, and maintaining personal protective equipment
- Establishing work zones and control points
- Implementing air monitoring procedures
- Implementing hazard communication, respiratory protection, and other associated safety and health programs
- Coordinating emergency services
- Providing elements of site-specific training
- Compliance with these requirements is monitored by the Project Health and Safety Officer (PHSO) and is coordinated through the HSM.

**1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS**

**Site Name:** Naval Air Station - Cecil Field  
Jacksonville, Florida

**Remedial Project Manager:** Mr. Mark Davidson

**Phone Number:** (803) 820-5526

**Site Contacts:** Mr. Mark Roberts (JEDC)  
Mr. Roy Craigue (JAA)

**Phone Number:** (904) 573-0336

**Phone Number:** (904) 573-1607

**Project Team:**

<b>TtNUS Personnel:</b>	<b>Discipline/Tasks Assigned:</b>	<b>Phone Number:</b>
<u>Mark Speranza, P.E.</u>	<u>Task Order Manager (TOM)</u>	<u>(412) 921-8401</u>
<u>TBD</u>	<u>Field Operations Leader (FOL)</u>	<u>( )</u>
<u>TBD</u>	<u>Site Safety Officer (SSO)</u>	<u>( )</u>
<u>Matthew M. Soltis, CIH, CSP</u>	<u>CLEAN Health and Safety Manager (HSM)</u>	<u>(412) 921-8912</u>
<u>James K. Laffey</u>	<u>Project Health and Safety Officer (PHSO)</u>	<u>(412) 921-8678</u>
<u>TBD</u>	<u>Field Geologist</u>	<u>( )</u>
<u>_____</u>	<u>_____</u>	<u>( )</u>

<b>Non-TtNUS Personnel:</b>	<b>Affiliation/Discipline/Tasks Assigned:</b>	<b>Phone Number</b>
<u>_____</u>	<u>_____</u>	<u>_____</u>
<u>_____</u>	<u>_____</u>	<u>_____</u>

**Hazard Assessments (for purposes of 29 CFR 1910.132) and HASP preparation conducted by:**

James K. Laffey

## **2.0 EMERGENCY ACTION PLAN**

### **2.1 INTRODUCTION**

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. However, given the nature of the work planned significant emergencies are not anticipated. Also, since a majority of potential emergency situations will require assistance from outside emergency responders, TtNUS personnel will not provide emergency response support for emergency events beyond the capabilities of on site personnel. In the event of emergencies that cannot be handled by personnel, an evacuation will be initiated. In an evacuation, site personnel will move to a safe place of refuge and the appropriate emergency response agencies will be notified. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of operations, which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

TtNUS personnel will, through the necessary actions, provide incidental response measures for incidents such as:

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

### **2.2 PRE- EMERGENCY PLANNING**

Through the initial hazard/risk assessment effort, there is a very minor potential for injury or illnesses resulting from exposure to chemical, physical, or other hazards, and subsequently little likelihood of emergency situations. To further minimize or eliminate potential emergency situations, pre-emergency planning activities associated with this project shall be implemented. The FOL is responsible for:

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

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

## **2.3 EMERGENCY RECOGNITION AND PREVENTION**

### **2.3.1 Recognition**

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by visual observation. Visual observation will be the principal method of identifying any hazards that may be associated with the proposed scope of work. These potential hazards, the activities with which they have been associated, and the recommended control methods are discussed in detail in Sections 5.0 and 6.0 of this document.

### **2.3.2 Prevention**

TtNUS personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual, applicable OSHA regulations, and by following directions given by those persons responsible for the health, safety, and welfare of personnel.

## **2.4 SAFE DISTANCES AND PLACES OF REFUGE**

In the event that the site must be evacuated, all personnel will immediately stop activities and report to a pre-determined safe place of refuge. The safe place of refuge may also serve as the telephone communication point, as communication with emergency response agencies may be necessary. Telephone communication points and safe places of refuge will be determined prior to the commencement of site activities and will be conveyed to personnel as part pre-site training. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the TtNUS FOL or the On-Scene Incident Commander. The FOL will take a head count at this location to confirm the presence of all site personnel. Emergency response agencies will be notified of any unaccounted for personnel.

## **2.5 EVACUATION ROUTES AND PROCEDURES**

Once an evacuation is initiated, personnel will terminate site activities and proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such an event, personnel will proceed to a designated alternate location and remain there until further notification

from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services, should they be needed.

## 2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since TtNUS personnel will be working in close proximity to each other, voice commands will comprise the mechanisms to alert site personnel of an emergency. If an incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) verbally.
- Describe to the FOL (who will serve as the Incident Coordinator) what has occurred and provide as many details as possible.

If the FOL determines that the situation is beyond the capabilities of the site personnel emergency services will be contact using the emergency reference information listed in Table 2-1. Explain the situation and the appropriate emergency services will be dispatched. **Stay on the phone and follow the instructions of the emergency contact.**

## 2.7 EMERGENCY CONTACTS

Prior to performing work at the site, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. As indicated earlier, Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table will be made readily available to all site personnel.

**TABLE 2-1**

**EMERGENCY CONTACTS  
NAS - CECIL FIELD, JACKSONVILLE, FLORIDA**

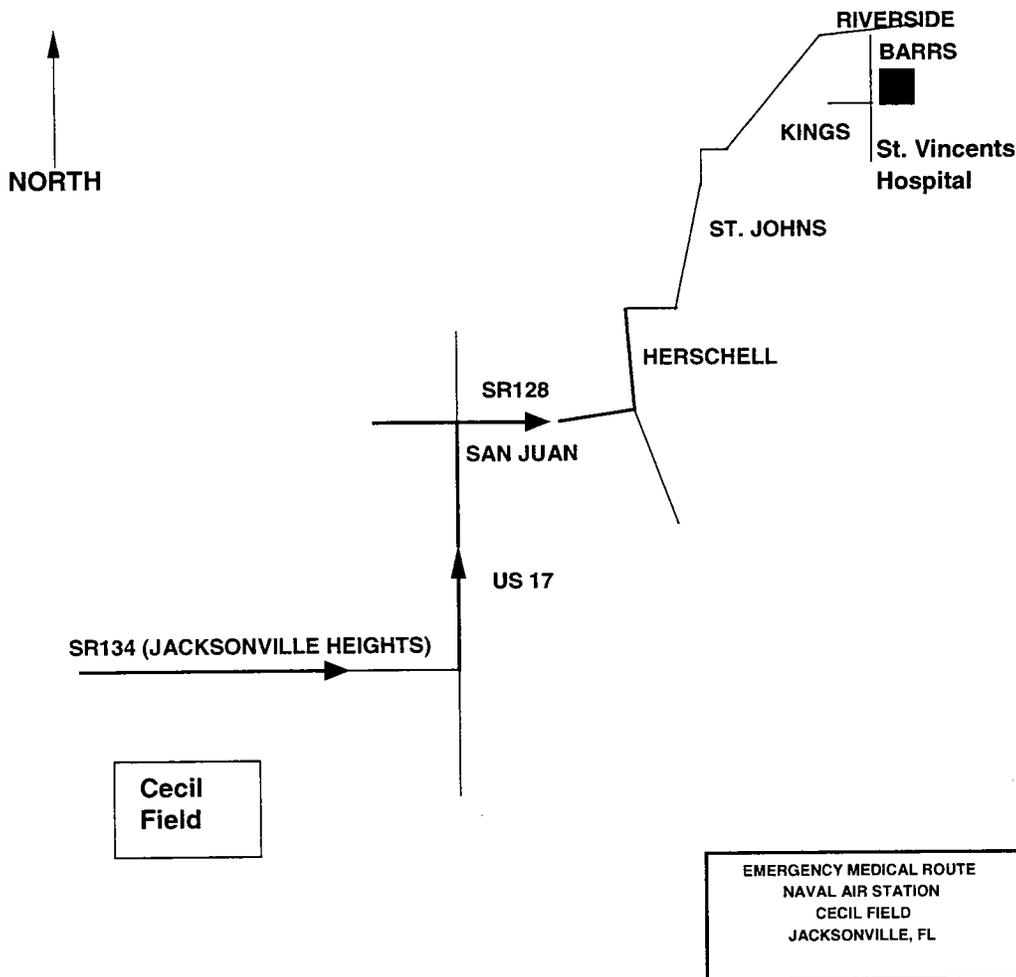
CONTACT	PHONE NUMBER
EMERGENCY (Police, Fire, Ambulance Service)	<b>911</b>
Primary Hospital - St. Vincent Hospital	(904) 387-7300
Poison Control Center	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
NAS - Cecil Field (Point-of-Contact) Mark Roberts (JEDC) Roy Crague (JAA)	(904) 573-0336 (904) 573-1607
NAS EOD (Unexploded Ordnance)	(904) 270-5412
TtNUS, Pittsburgh Office	(412) 921-7090
TtNUS, Cecil Field Site Office	(904) 317-9199
Task Order Manager Mark Speranza	(412) 921-8916
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer James K. Laffey	(412) 921-8678
Public Works (utilities, gas, water, sewage, telephone, fiber optics)  Jacksonville Port Authority Portion Ken Melchior Bob Simpson  City of Jacksonville  Lt. Doug McCutchen	(904) 573-1604 (904) 573-1601       (904) 778-5440

## 2.8 EMERGENCY ROUTE TO HOSPITAL

Directions to St. Vincent's Hospital, 1800 Barrs Street, Jacksonville, Florida (904) 387-7300 are as follows:

From Cecil Field: Take SR 134 (Jacksonville Heights) approximately 10 miles to US 17. Turn left and go north on US 17 approximately 2.5 miles to SR 128 (San Juan Ave.). Turn right on San Juan. Go east approximately 1/4 mile to Herschell. Turn left onto Herschell. Herschell will then turn in to St. Johns Ave. Follow St. Johns Ave. which will turn into Riverside. Take Riverside approximately 1 mile to King St. Turn right. Hospital will be on the corner of King Street and Barrs. See Figure 2-1.

**FIGURE 2-1  
SAINT VINCENTS HOSPITAL MAP**



## 2.9 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

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

TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.**

## 2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident.

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. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

**FIGURE 2-2**  
**EMERGENCY RESPONSE PROTOCOL**

The purpose of this protocol is to provide guidance for the medical management of injury situations.

In the event of a personnel injury or accident:

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

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

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

FIGURE 2-2 (continued)

WORKCARE  
POTENTIAL EXPOSURE REPORT

Name: \_\_\_\_\_ Date of Exposure: \_\_\_\_\_

Social Security No.: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Client Contact: \_\_\_\_\_ Phone No.: \_\_\_\_\_

Company Name: \_\_\_\_\_

I. **Exposing Agent**

Name of Product or Chemicals (if known): \_\_\_\_\_

Characteristics (if the name is not known)

Solid          Liquid          Gas          Fume          Mist          Vapor

II. **Dose Determinants**

What was individual doing? \_\_\_\_\_

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

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

Was their skin contact? \_\_\_\_\_

Was the exposing agent inhaled? \_\_\_\_\_

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

III. **Signs and Symptoms** (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat  
Tearing  
Headache  
Cough  
Shortness of Breath

Chest Tightness / Pressure  
Nausea / Vomiting  
Dizziness  
Weakness

Delayed Symptoms:

Weakness  
Nausea / Vomiting  
Shortness of Breath  
Cough

Loss of Appetite  
Abdominal Pain  
Headache  
Numbness / Tingling

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

Burning of eyes, nose, or throat  
Tearing  
Headache  
Cough  
Shortness of Breath  
Chest Tightness / Pressure  
Cyanosis

Nausea / Vomiting  
Dizziness  
Weakness  
Loss of Appetite  
Abdominal Pain  
Numbness / Tingling

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

Improved: \_\_\_\_\_ Worsened: \_\_\_\_\_ Remained Unchanged: \_\_\_\_\_

V. **Treatment of Symptoms** (check off appropriate response)

None: \_\_\_\_\_ Self-Medicating: \_\_\_\_\_ Physician Treated: \_\_\_\_\_

## 3.0 SITE BACKGROUND

### 3.1 SITE HISTORY

NAS Cecil Field is located in western Duval County, Florida, within the limits of the City of Jacksonville. In 1989, NAS Cecil Field was placed on the United States Environmental Protection Agency's (EPA's) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) as a result of pollution resulting from past waste disposal practices that predate CERCLA. In 1990, The United States Department of the Navy entered into a Federal Facilities Agreement (FFA) with EPA to define the overall extent of contamination. NAS Cecil Field has approximately 35 individual sites where hazardous wastes may have been handled, spilled, or buried. As a result, work at the various sites has been organized into eight Operable Units (OUs), as well as more than 100 other areas undergoing evaluation in the Base Alignment and Closure and Underground Storage Tank programs.

### 3.2 SITE 15 DESCRIPTION

Site 15 is located in the southwest section of the Yellow Water Weapons Area. The site is heavily forested, primarily with slash pine and understory vegetation and includes a paved access road, oriented northwest to southeast.

An area of stressed vegetation, referred to as the forest burn area, is present in the south-central portion of the site, approximately 900 feet south of the burn chamber and firing pad. Several slash pines are partially burned in this area. Controlled burns (burning of low-level vegetation in and around the trunks of slash pine) are commonly undertaken in this area to control understory growth in the planted pine forests. This is an area where elevated Polynuclear Aromatic Hydrocarbon (PAH) concentrations were detected.

From the early 1940s to the mid 1950s, the site was used as a skeet range. Ordnance was disposed of at Site 15 from the mid 1960s through 1977 and consisted of burning of ordnance materials in a large metal chamber and static firing of rockets. The ordnance disposal structures were located west of the skeet range. The majority of ordnance disposed of at the site was burned and included small arms munitions up to 20 millimeters in size, parachute and distress flares, Mark IV signal cartridges, rocket ignitors, cartridge activated devices, and 2.75-inch and 5-inch rockets. Rocket propellant also was reportedly placed on the ground and ignited in the area of the burn chamber.

A UXO survey completed at the site in 1995 found no unexploded ordnance, however, several pieces of metal, shell casing, etc. were located and removed.

## 4.0 SCOPE OF WORK

This section of the HASP addresses the proposed site activities that are to be conducted at Site 15. The activities to be conducted include, but may not be limited to:

- Mobilization/demobilization
- Soil borings and monitoring well installation using DPT.
- Multi-media sampling:
  - Groundwater
  - Soil sampling (0-1 foot) using hand cores
  - Investigation derived waste (IDW), if necessary
- Decontamination of sampling and heavy equipment
- Wetland delineation

The above listing represents a summarization of the tasks as they apply to the scope and application of this HASP. For more detailed description of the associated tasks, refer to the Sampling and Analysis Plan (SAP) and/or the Work Plan (WP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit all requested modifications to this document to the HSM.

## 5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

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

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

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

Safe Work Permits issued for all exclusion zone activities (See Section 9.4) will use elements defined in Table 5-1 as it's primary reference. The FOL and/or the SSO completing the Safe Work Permit will add additional site-specific information. In situations where the Safe Work Permit is more conservative than the direction provided in Table 5-1 due to the incorporation of site-specific elements, the Safe Work Permit will be followed.

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**TABLE 5-1**  
**TASKS/HAZARDS/CONTROL MEASURES FOR**  
**NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO require.)</i>	Decontamination Procedures
Mobilization/ Demobilization	<p><i>Physical Hazards</i></p> <ol style="list-style-type: none"> <li>1) Lifting (muscle strains and pulls)</li> <li>2) Slip, trips, and falls</li> <li>3) Moving machinery</li> <li>4) Natural hazards (Insect/animal bites and stings)</li> <li>5) Vehicular and equipment traffic</li> </ol>	<ol style="list-style-type: none"> <li>1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</li> <li>2) Preview work locations for unstable/uneven terrain. Barricade all excavations from access closer than two feet from the edge.</li> <li>3) All equipment will be               <ul style="list-style-type: none"> <li>- Inspected in accordance with OSHA, and manufacturers design.</li> <li>- Operated by knowledgeable operators and ground crew.</li> </ul> </li> <li>4) Avoid nesting areas, use repellents. Report potential hazards to the SSO.</li> <li>5) Traffic and equipment considerations are to include the following:               <ul style="list-style-type: none"> <li>- Establish safe zones of approach (i.e. Boom + 3 feet).</li> <li>- Secure all loose articles to avoid possible entanglement.</li> <li>- All equipment shall be equipped with movement warning systems.</li> <li>- Observe Base traffic regulations and postings.</li> </ul> </li> </ol>	Not required	Level D - (Minimum Requirements) <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- <i>Safety glasses</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i></li> </ul>	Not required
Wetland Delineation	<p><i>Physical Hazards</i></p> <ol style="list-style-type: none"> <li>1) Slip, trips, and falls</li> <li>2) Natural hazards (Insect/animal bites and stings)</li> <li>3) Ambient temperature extremes (heat stress)</li> <li>4) Water Hazards</li> <li>5) UXO and related debris</li> </ol>	<ol style="list-style-type: none"> <li>1) Preview work locations for unstable/uneven terrain. Use caution when walking o the site. Be aware of slippery or loose surfaces, steep grades, holes or depressions, or other obstacles that may present a slip/fall hazard.</li> <li>2) Avoid nesting areas use, tape ankle seams and use repellents in accorcance with manufactures recommendations. Report potential hazards to the SSO.</li> <li>3) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in Section 4 of the Tetra Tech NUS Health and Safety Guidance Manual.</li> <li>4) If working within 4 ft. of a body of water, lifelines, safety harnesses, and other personal safety devices will be used.</li> <li>5) Given the past operations at Site 15 the potential exists for encountering UXO or debris associated with past disposal practices. However, previous UXO survey activities did not discover any UXO. Avoid disturbing and debris and report any suspicious items to facility EOD personnel.</li> </ol>	Not required	Level D - (Minimum Requirements) <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants). Tuck pants into boots/socks and apply tape in grassy areas.</li> <li>- Steel toe safety shoes or boots</li> <li>- <i>Snake chaps in high grass areas</i></li> <li>- <i>Safety glasses</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Overboots if there is a possibility that work boots may become saturated.</i></li> </ul>	Not anticipated given nature of task.

**TASKS/HAZARDS/CONTROL MEASURES FOR  
NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO require.)</i>	Decontamination Procedures
<p>Soil borings and installation of monitoring wells using Direct Push Technology methods.</p>	<p><b>Chemical Hazards</b> 1) General site contaminants include SVOCs (primarily PAHs, methyl naphthalene, and carbazole), metals, nitroaromatic compounds, pesticides, and VOCs. These contaminants are most likely to be present in the form of airborne particulates (dusts) or bound to soils (incidental ingestion hazard).</p> <p>This sampling effort focuses on installing monitoring wells in locations with the highest concentrations of selected contaminants at the 0 to 1 foot interval. Specific contaminants of concern are as followed:</p> <p><b>CEF-015-09S</b> - High concentrations of PAHs such as fluoranthene, phenanthrene, and pyrene <b>CEF-015-10S</b> - High concentrations of lead <b>CEF-015-11S</b> - Moderate concentrations of 3-nitrotoluene and carbazole <b>CEF-015-12S</b> - Low concentrations of 4-nitrotoluene <b>CEF-015-13S</b> - Moderate concentrations of arsenic and antimony <b>CEF-015-14S</b> - Low concentrations of trinitrotoluene <b>CEF-015-02S</b> Moderate concentrations of methyl naphthalene and acenaphthalene</p> <p>Personnel exposure is most likely to occur through inhalation of airborne particulate matter containing these compounds, through ingestion of contaminated soil or water by hand-to-mouth contact, or through direct skin or eye contact with contaminated media (soil, groundwater, etc.). Of particular concern are potential exposures to lead. Although DPT operations do not tend to generate airborne dusts, exposure via incidental ingestion must be prevented through the use of PPE and good decontamination/personal hygiene practices. In the unlikely event that site activities generate any visible airborne dusts, use are wetting methods and contact the PHSO for additional monitoring guidelines and safe work practices.</p> <p>Further information on potential site contaminants is presented in Section 6.1 and Table 6-1.</p> <p>2) Transfer of contamination into clean areas or onto persons</p> <p><b>Physical hazards</b></p> <p>3) Contact/entanglement with moving equipment or machinery 4) Noise 5) Energized systems 6) Lifting 7) Natural Hazards (insect/animal bites and stings) 8) Inclement weather 9) Ambient temperature extremes (heat stress) 10) UXO and related debris</p>	<p>1) Screening for SVOCs and any other detectable compounds will be performed using real-time monitoring instrumentation. Action Levels and appropriate PPE will be used to control/minimize personnel exposures to contaminants. Also, generation of dusts <u>must</u> be minimized to the greatest extent possible to avoid exposure to particulates containing site contaminants particularly lead. If airborne dusts are observed, area wetting methods will be used to reduce the generation of dusts created during soil boring activities. If area wetting methods are not feasible, termination of activities will be used to minimize exposure to observed airborne dusts.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site.</p> <p>3) All equipment to be used will be</p> <ul style="list-style-type: none"> <li>- Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600, 601, 602), and manufacturers design and documented using the equipment inspection checklist provided in Attachment III.</li> <li>- Operated by knowledgeable operators and ground crew.</li> <li>- Used within establish safe zones and routes of approach</li> <li>- Only manufacturer approved equipment may be used in conjunction with equipment.</li> </ul> <p>In addition, the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none"> <li>- All personnel not directly supporting this operation will remain at least 25 feet from the point of operation.</li> <li>- Masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities.</li> <li>- Hand signals will be established prior to the commencement of the operation.</li> <li>- Only manufacturer approved equipment may be used in conjunction with equipment repair procedures.</li> <li>- Work areas will be kept clear of clutter.</li> <li>- Secure all loose articles to avoid possible entanglement.</li> <li>- All equipment shall be equipped with movement warning systems.</li> <li>- All personnel working in high equipment traffic areas are required to wear reflective vests for high visibility, and to establish unimpeded work areas around the operation. This activity may require areas of the building to be cordoned off during this operation.</li> <li>- All personnel will be instructed in the location and operation of the emergency shut off device(s). This device will be tested initially (and then periodically) to insure its operational status.</li> <li>- The driller may not leave the controls when the augers are rotating</li> <li>- Areas will be inspected prior to the movement of drilling and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO.</li> <li>- DPT rigs and support vehicles will be moved no closer than 3 feet from buildings or excavations.</li> </ul> <p>4) Hearing protection will be used during all subsurface activities.</p> <p>5) Utility clearances shall be obtained prior to subsurface activities. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked See Attachment II.</p> <p>6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>7) Avoid nesting areas, use repellents if necessary. Report potential hazards to the SSO.</p> <p>8) Suspend or terminate operations until directed otherwise by SSO</p> <p>9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in section 4 of the Tetra Tech NUS Health and Safety Guidance Manual.</p> <p>10) Given the past operations at Site 15 the potential exists for encountering UXO or debris associated with past disposal practices. However, previous UXO survey activities did not discover any UXO. Avoid disturbing and debris and report any suspicious items to facility EOD personnel.</p>	<p><b>Given the properties of the primary contaminants of concern, the greatest potential for exposure exists as a result of inhalation of airborne dusts or incidental ingestion as a result of hand to mouth activities. Site activities will be performed using the following hazard monitoring activities:</b></p> <p>A Photoionization Detector (PID) with a 10.6 eV lamp source (or equivalent) will be used to screen for VOCs and detectable SVOCs. The following guidance applies:</p> <p>Source (e.g., borehole/split acetate liners) monitoring will be conducted initially and periodically as the probe advances. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations.</p> <p>Most of the contaminants of concern are not detectable using direct reading instruments. Exposure to site contaminants is most likely to occur because contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. <u>Also, eye or skin contact with media (soil, groundwater, etc.) must be avoided as some of the site contaminants can be absorbed through intact skin or otherwise be ingested through hand to mouth activities and contribute to the overall exposure.</u> As a result, generation of dusts must be minimized to the greatest extent possible to avoid inhalation or eye/skin contact with contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles and eye/skin contact will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides). Additionally, incidental ingestion of site contaminants will be prevented through minimizing contact with media, the use of PPE and strict adherence to decontamination procedures and good personal hygiene practices (washing hands and face prior to performing hand to mouth activities).</p>	<p>All soil boring and monitoring well installation operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Nitrile gloves with surgical style nitrile inner gloves</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Safety glasses</li> <li>- Hardhat</li> <li>- Hearing protection for high noise areas, as directed by the SSO.</li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Tyvek coveralls and boot covers or boots (PVC, nitrile, etc.) if surface contamination is present or if the potential exists for soiling work attire.</i></li> </ul> <p>Items in <i>ITALICS</i> are based on observed conditions at the time site activities are performed or at the discretion of the SSO.</p>	<p><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for outer protective equipment (coveralls, boots, gloves, etc.). This function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>- Equipment drop</li> <li>- Soap/water wash and rinse of boots and gloves, as applicable</li> <li>- Coveralls, boot covers, and outer glove removal</li> <li>- Removal/disposal of non-reusable PPE (inner gloves, boot covers, etc.)</li> <li>- Wash hands and face, leave contamination reduction zone</li> </ul>

TABLE 5-1

TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR  
NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA  
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO require.)</i>	Decontamination Procedures
<p>Multi-media sampling including soils, groundwater and IDW sampling (if necessary)</p> <p>This activity also includes monitoring well development and purging activities.</p>	<p><i>Chemical Hazards</i></p> <p>1) Primary site contaminants include SVOCs (primarily methylnaphthalene, carbazole, and PAHs such as fluoranthene, phenanthrene, and pyrene), metals (including lead, arsenic, and antimony), nitroaromatic compounds (such as nitrotoluene) and to a lesser extent pesticides, and VOCs.</p> <p>Personnel exposure is most likely to occur through inhalation of airborne particulate matter containing these compounds, through ingestion of contaminated soil or water by hand-to-mouth contact, or through direct skin or eye contact with contaminated media (soil, groundwater, etc.). Of particular concern are potential exposures to lead. Exposure via incidental ingestion must be prevented through the use of PPE and good decontamination/personal hygiene practices. In the unlikely event that site activities generate any visible airborne dusts, use area wetting methods and contact the PHSO for additional monitoring guidelines and safe work practices.</p> <p>Further information on potential site contaminants is presented in Section 6.1 and Table 6-1.</p> <p>Further information on all potential site contaminants is presented in Table 6-1.</p> <p>2) Transfer of contamination into clean areas</p> <p><i>Physical hazards</i></p> <p>3) Noise 4) Lifting (muscle strains and pulls) 5) Pinches and compressions 6) Slip, trips, and falls 7) Natural hazards (Insect/animal bites and stings) 8) Inclement weather 9) Ambient temperature extremes (heat stress)</p>	<p>1) Screening for SVOCs and any other detectable compounds will be performed using real-time monitoring instrumentation. Action Levels and appropriate PPE will be used to control/minimize personnel exposures to contaminants. Also, generation of dusts <u>must</u> be minimized to the greatest extent possible to avoid exposure to particulates containing site contaminants and to minimize the likelihood of contacting DBCP. If airborne dusts are observed, area wetting methods will be used to reduce the generation of dusts created during drilling activities. If area wetting methods are not feasible, termination of activities will be used to minimize exposure to observed airborne dusts.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site.</p> <p>3) When sampling at the drilling rig use hearing protection. The use of hearing protection to protect against excessive noise outside of 25 feet from the point of operations should be incorporated under the following condition:</p> <p>Hearing protection during sample acquisition outside of the boring sample will be determine on a case by case scenario. As a general rule of thumb, if you have to raise your voice to talk to someone who is within 2 feet of your location, noise levels may be excessive.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Keep any machine guarding in place. Avoid moving parts. Secure loose clothing, jewelry, or long hair that could become entangled.</p> <p>6) Preview work locations for unstable/uneven terrain.</p> <p>7) Avoid nesting areas, use repellents if necessary. Report potential hazards to the SSO.</p> <p>8) Suspend or terminate operations until directed otherwise by SSO</p> <p>9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in section 4 of the Tetra Tech NUS Health and Safety Guidance Manual.</p>	<p><b>Given the properties of the primary contaminants of concern, the greatest potential for exposure exists as a result of inhalation of airborne dusts or incidental ingestion as a result of hand to mouth activities. Site activities will be performed using the following hazard monitoring activities:</b></p> <p>A Photoionization Detector (PID) with a 10.6 eV lamp source (or equivalent) will be used to screen for VOCs and detectable SVOCs. The following guidance applies:</p> <p>Source (e.g., borehole/split acetate liners) monitoring will be conducted initially and periodically as the probe advances. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations.</p> <p>Most of the contaminants of concern are not detectable using direct reading instruments. Exposure to site contaminants is most likely to occur because contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Also, <u>eye or skin contact with media (soil, groundwater, etc.) must be avoided as some of the site contaminants can be absorbed through intact skin or otherwise be ingested through hand to mouth activities and contribute to the overall exposure.</u> As a result, generation of dusts must be minimized to the greatest extent possible to avoid inhalation or eye/skin contact with contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles and eye/skin contact will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides). Additionally, incidental ingestion of site contaminants will be prevented through minimizing contact with media, the use of PPE and strict adherence to decontamination procedures and good personal hygiene practices (washing hands and face prior to performing hand to mouth activities).</p>	<p>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Nitrile gloves with surgical style nitrile inner gloves for groundwater and IDW sampling</li> <li>- Safety shoes (steel toe/shank)</li> <li>- <i>Safety glasses (when working near operating equipment or when eye hazards are present)</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hearing protection for high noise areas, or as directed on an operation by operation basis.</i></li> </ul> <p>Items in <i>ITALICS</i> are based on observed conditions at the time site activities are performed or at the discretion of the SSO.</p>	<p><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, etc.). Disposable PPE will be bagged between sampling events. This procedure will consist of</p> <ul style="list-style-type: none"> <li>- Sample acquisition</li> <li>- Clean (Deionized water spray) the outside of the sample containers/label/bag</li> </ul> <p>Decon will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>- Equipment drop</li> <li>- Soap/water wash and rinse boots and gloves, as applicable</li> <li>- Coveralls, boot covers, and outer glove removal</li> <li>- Removal/disposal of non-reusable PPE (inner gloves, boot covers, etc.)</li> <li>- Wash hands and face, leave contamination reduction zone</li> </ul>

TABLE 5-1

TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR  
NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA  
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO require.)</i>	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment	<p><i>Chemical Hazards</i></p> <p>1) Primary site contaminants include SVOCs (primarily methylnaphthalene, carbazole, and PAHs such as fluoranthene, phenanthrene, and pyrene), metals (including lead, arsenic, and antimony), nitroaromatic compounds (such as nitrotoluene) and to a lesser extent pesticides, and VOCs. Personnel exposure is most likely to occur through inhalation of airborne particulate matter containing these compounds, through ingestion of contaminated soil or water by hand-to-mouth contact, or through direct skin or eye contact with contaminated media (soil, groundwater, etc.). Skin or eye contact with media must be avoided to minimize exposure to lead and other potential site contaminants. Further information on all potential site contaminants is presented in Section 6.1 and Table 6-1.</p> <p>2) Decontamination fluids - Liquinox (detergent), acetone or methanol.</p> <p><i>Physical Hazards</i></p> <p>3) Lifting (muscle strains and pulls) 4) Inclement weather 5) Noise 6) Flying projectiles</p>	<p>1) and 2). Use protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination solvents used onsite. Use appropriate PPE as identified on MSDS. Follow Section 4 of the Guidance Manual, and complete the Chemical Inventory for all chemicals on site.</p> <p>3) Use multiple persons where necessary for lifting and handling sampling equipment for decontamination purposes.</p> <p>4) Suspend or terminate operations until directed otherwise by SSO</p> <p>5) Use hearing protection when operating high pressure washer for extended periods of time (e.g., 30 minutes or longer).</p> <p>6) Wear appropriate PPE (i.e., splash shield &amp; safety glasses)</p>	Use visual observation, and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried.	<p><i>For Heavy Equipment</i> This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Chemical resistant boot covers</li> <li>- Nitrile outer gloves, surgical style inner gloves or cotton liners</li> <li>- Impermeable coveralls (PVC Rainsuits, Saranex, PE/PVC coated Tyvek) and impermeable boot covers or boots (PVC, nitrile, etc.)</li> <li>- Safety glasses underneath a splash shield</li> <li>- Ear plugs or ear muffs</li> </ul> <p><i>For sampling equipment (trowels, MacroCore Samplers, bailers, etc.), the following PPE is required</i></p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Nitrile outer gloves, surgical style inner gloves or cotton liners</li> <li>- Safety glasses underneath a splash shield</li> </ul> <p>MSDS for any decon solutions (Alconox, isopropanol, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.).</p>	<p>This decontamination procedure for <b>Level D</b> protection will consist of</p> <ul style="list-style-type: none"> <li>- Soap/water wash and rinse of reusable coveralls, boots, and gloves, as applicable</li> <li>- Coveralls, boot covers, and outer glove removal</li> <li>- Removal/disposal of non-reusable PPE (inner gloves, boot covers, etc.)</li> <li>- Wash hands and face, leave contamination reduction zone</li> </ul> <p><b>Equipment Decontamination</b> - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment, such as the drill rig will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. Roadways shall be cleared of any debris resulting from the onsite activity. All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. No equipment will be authorized access or exit without this authorization.</p> <p>Evaluation will consist of</p> <ul style="list-style-type: none"> <li>- Visual inspection</li> <li>- Scanning equipment with monitoring instruments</li> </ul> <p><b>Equipment Decontamination</b> -</p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p>

TABLE 5-1

TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR  
NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA  
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO require.)</i>	Decontamination Procedures
Surveying	<p><i>Physical Hazards</i></p> <ol style="list-style-type: none"> <li>Slip, trips, and falls</li> <li>Natural hazards (Insect/animal bites and stings)</li> <li>Ambient temperature extremes (heat stress)</li> </ol>	<ol style="list-style-type: none"> <li>Preview work locations for unstable/uneven terrain.</li> <li>Avoid nesting areas, use repellents. Report potential hazards to the SSO.</li> <li>Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in section 4 of the Tetra Tech NUS Health and Safety Guidance Manual.</li> </ol>	Not required	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> <li>Standard field attire (sleeved shirt; long pants). Tuck pants into boots/socks and apply tape in grassy areas.</li> <li>Safety shoes (Steel toe/shank)</li> <li><i>Snake chaps in grass areas</i></li> <li>Safety glasses</li> <li>Hardhat (when overhead hazards exists, or identified as a operation requirement)</li> <li>Reflective vest for high traffic areas</li> </ul> <p><i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i></p>	Not anticipated given nature of task.
IDW management and moving IDW drums to storage area	<p><i>Chemical Hazards</i></p> <ol style="list-style-type: none"> <li>Primary site contaminants include SVOCs (primarily methylnaphthalene, carbazole, and PAHs such as fluoranthene, phenanthrene, and pyrene), metals (including lead, arsenic, and antimony), nitroaromatic compounds (such as nitrotoluene) and to a lesser extent pesticides, and VOCs. Personnel exposure is most likely to occur through inhalation of airborne particulate matter containing these compounds, through ingestion of contaminated soil or water by hand-to-mouth contact, or through direct skin or eye contact with contaminated media (soil, groundwater, etc.). Skin or eye contact with media must be avoided to minimize exposure to lead and other potential site contaminants. Further information on all potential site contaminants is presented in Section 6.1 and Table 6-1.</li> <li>Transfer of contamination into clean areas</li> </ol> <p><i>Physical hazards</i></p> <ol style="list-style-type: none"> <li>Noise</li> <li>Lifting (muscle strains and pulls)</li> <li>Pinches and compressions</li> <li>Slip, trips, and falls</li> <li>Natural hazards (Insect/animal bites and stings)</li> <li>Inclement weather</li> </ol>	<ol style="list-style-type: none"> <li>Screening for SVOCs and any other detectable compounds will be performed using real-time monitoring instrumentation. Action Levels and appropriate PPE will be used to control/minimize personnel exposures to contaminants. Also, generation of dusts <u>must</u> be minimized to the greatest extent possible to avoid exposure to particulates containing site contaminants and to minimize the likelihood of contacting lead and other site contaminants. If airborne dusts are observed, area wetting methods will be used to reduce the generation of dusts created during drilling activities. If area wetting methods are not feasible, termination of activities will be used to minimize exposure to observed airborne dusts.</li> <li>Decontaminate all equipment and supplies, if they become contaminated, between locations and prior to leaving the site.</li> <li>When working near heavy equipment, use hearing protection.</li> <li>Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</li> <li>Use appropriate material handling equipment (such as drum dollies).</li> <li>Preview work locations for unstable/uneven terrain.</li> <li>Avoid nesting areas, employ repellents. Report potential hazards to the SSO.</li> <li>Suspend or terminate operations until directed otherwise by SSO</li> </ol>	<p><b>Given the properties of the primary contaminants of concern, the greatest potential for exposure exists as a result of inhalation of airborne dusts or incidental ingestion as a result of hand to mouth activities. Site activities will be performed using the following hazard monitoring activities:</b></p> <p>A Photoionization Detector (PID) with a 10.6 eV lamp source (or equivalent) will be used to screen for VOCs and detectable SVOCs. The following guidance applies:</p> <p>Source (e.g., borehole/split acetate liners) monitoring will be conducted initially and periodically as the probe advances. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations.</p> <p>Most of the contaminants of concern are not detectable using direct reading instruments. Exposure to site contaminants is most likely to occur because contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. <u>Also, eye or skin contact with media (soil, groundwater, etc.) must be avoided as some of the site contaminants can be absorbed through intact skin or otherwise be ingested through hand to mouth activities and contribute to the overall exposure.</u> As a result, generation of dusts must be minimized to the greatest extent possible to avoid inhalation or eye/skin contact with contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles and eye/skin contact will be controlled by using water to suppress dusts or by avoiding dust plumes (i.e., termination of activities until dust subsides). Additionally, incidental ingestion of site contaminants will be prevented through minimizing contact with media, the use of PPE and strict adherence to decontamination procedures and good personal hygiene practices (washing hands and face prior to performing hand to mouth activities).</p>	<p>Level D protection will be utilized for the initiation of all activities.</p> <p>Level D (Minimum Requirements) include:</p> <ul style="list-style-type: none"> <li>Standard field attire (sleeved shirt; long pants)</li> <li>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</li> <li>Nitrile gloves with surgical style inner gloves</li> <li>Safety shoes (steel toe/shank)</li> <li>Safety glasses or goggles</li> <li>Hardhat (when overhead hazards exists, or identified as a operation requirement)</li> <li>Reflective vest for high traffic areas</li> <li>Hearing protection for high noise areas, or as directed on an operation by operation basis.</li> </ul>	<p><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, etc.). Disposable PPE will be bagged when removed. This procedure will consist of</p> <p>Decon will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>Equipment drop</li> <li>Soap/water wash and rinse of boots and gloves, as applicable</li> <li>Coveralls, boot covers, and outer glove removal</li> <li>Removal/disposal of non-reusable PPE (inner gloves, boot covers, etc.)</li> <li>Wash hands and face, leave contamination reduction zone</li> </ul>

## 6.0 HAZARD ASSESSMENT AND CONTROLS

This section provides reference information regarding the chemical and physical hazards which may be associated with activities to be conducted as part of the scope of work. Table 6-1 provides specific information related to the various chemical hazards that may be present or generated at the planned project areas within NAS Cecil Field. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in the table.

### 6.1 CHEMICAL HAZARDS

Proposed soil borings/monitoring wells will be installed in areas where the highest concentrations of select site contaminants (at the 0 to 1 foot interval) were previously noted. Specifically, the following lists each proposed monitoring well and the contaminants of concern that were previously detected at that location.

- CEF-015-09S - High concentrations of PAHs such as fluoranthene, phenanthrene, and pyrene
- CEF-015-10S - High concentrations of Lead
- CEF-015-11S - Moderate concentrations of 3-nitrotoluene and carbazole
- CEF-015-12S - Low concentrations of 4-nitrotoluene
- CEF-015-13S - Moderate concentrations of arsenic and antimony
- CEF-015-14S - Low concentrations of trinitrotoluene
- CEF-015-02S - Moderate concentrations of methyl naphthalene and acenaphthalene

Analytical data obtained during previous investigations indicates the presence of various contaminants that may be encountered during site activities including the use of hand coring devices to collect soil samples. SVOCs (particularly PAHs) were detected most frequently and at the highest concentrations, metals were detected with the next highest frequency but generally at lower concentrations and pesticides, herbicides, nitroaromatic compounds and VOCs were detected at the lowest frequency at concentrations that are unlikely to pose an exposure hazard to site personnel.

The contaminants of primary concern are most likely to be encountered during soil sampling and monitoring well installation activities and the most likely route of exposure is through inhalation of airborne dusts or the incidental ingestion of site contaminants as a result of improper decontamination and personal hygiene practices. It is unlikely that significant quantities of airborne dusts will be generated as a result of site activities. Additionally, the primary site contaminants of concern are SVOCs which based on their chemical and physical properties are unlikely to be present as airborne vapors. Potential exposures will be minimized through the use of applicable controls (e.g., area wetting of dusts), personal protective equipment (PPE), decontamination procedures, and/or site control measures. Additional information on site contaminants is presented in Table 6-1.

**TABLE 6-1  
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA  
SITE 15, NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
<b>SVOCs</b> Creosote / cresol (Fluoranthene, pyrene)	8001-58-9 1319-77-3 (206-44-0)	PID: I.P. of 8.97 eV, relative response ratio unknown.  FID: Response factor unknown but given the substances flammability, detection by FID can be anticipated.	Air sampling for cresol (a major constituent of creosote) by silica gel or xad-7 sorbent tube; Acetone desorption and analysis by gas chromatography - flame ionization detector or high-pressure liquid chromatography. Sampling and analytical protocol shall be in accordance with NIOSH Method #2001, or OSHA Method #32	OSHA; ACGIH: 5 ppm  NIOSH: 2.3 ppm  IDLH: 80 mg/m <sup>3</sup>	Adequate - use a full-face air-purifying respirator with organic vapor / dust/mist cartridge up to 250 ppm. Odor Threshold of cresol is 0.00005-0.0079 ppm.  <b>Recommended gloves:</b> Viton >96.00 hrs; butyl rubber >90.00 hrs; neoprene >4.50 hrs	<b>Boiling Pt:</b> 376-397°F; 191-203°C <b>Melting Pt:</b> 52-96°F; 10.9-35.5°C <b>Solubility:</b> Insoluble <b>Flash Pt:</b> 178°F; 81°C <b>LEL/LFL:</b> Not available <b>UEL/UFL:</b> Not available <b>Vapor Density:</b> 3.72 <b>Vapor Pressure:</b> 1 mmHg @ 100-127°F; 38-53°C <b>Specific Gravity:</b> 1.030-1.038 <b>Incompatibilities:</b> Nitric acid, oleum, chlorosulfonic acid, oxidizers <b>Appearance and Odor:</b> Yellowish or colorless, flammable, oily liquid (often brownish because of impurities or oxidation)	Regulated based on effects on central nervous system, and respiratory system. Acute exposures may result in difficulty breathing, respiratory failure and skin and eye burns. Chronic exposure may damage the liver, kidneys, lungs and skin.
Phenanthrene	85-01-8	Ionization potential for this compound is unknown. This material is combustible however the relative response ratio concerning FID detection is unknown.	Air sample using glass fiber filter, 37 mm cassette with pore size ranging from 0.8 to 1.0 microns in size; Gravimetric or HPLC-UV detection; Sampling and analytical protocol in accordance with OSHA Method #58.	It is recommended that 0.2 mg/m <sup>3</sup> for coal tar pitch volatiles be employed where excessive airborne concentrations may exist. This is more relevant for those PAHs considered carcinogenic. This substance is considered questionable regarding carcinogenic potential.	Information regarding this substance was limited. This material is a natural constituent of coal tar.  Adequate - Odor threshold 0.055-0.060 ppm. OSHA accepts the use of air-purifying respirators with organic vapor cartridge up to 10 ppm, providing cartridges are changed at the beginning of each shift.  <b>Recommended gloves:</b> Butyl - >8.00 hrs; are recommended for other coal tar pitch associated substances; Neoprene >4.00 hrs; Nitrile >1.00 hrs	<b>Boiling Pt:</b> 644°F; 340°C <b>Melting Pt:</b> 212°F; 100°C <b>Solubility:</b> Insoluble in water <b>Flash Pt:</b> Not available <b>LEL/LFL:</b> Not available <b>UEL/UFL:</b> Not available <b>Density:</b> 1.179 @ 77°F; 25°C <b>Vapor Density:</b> 6.14 <b>Vapor Pressure:</b> 1 mmHg @ 245°F; 118.3°C <b>Specific Gravity:</b> 1.025 <b>Incompatibilities:</b> Strong oxidizers, alkalis, and acids. <b>Appearance and Odor:</b> Colorless leaflets with a burnt acid odor.	Overexposure to this substance has shown to be a skin, eye, and mucous membrane irritant. This substance is considered a photosensitizer and mild allergen. This substance is considered mildly to moderately toxic by ingestion.

**TAL 6-1**  
**CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA**  
**SITE 15, NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
<b>SVOCs (Cont.)</b>							
Methylnaphthalene	90-12-0 (1-) 91-57-6 (2-) 1321-94-4	There is no information available regarding this substance. It is assumed that this substance based on its characteristics is detectable using an FID however, relative response ratio was not available.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection; Sampling and analytical protocol in accordance with OSHA 07 or NIOSH Method #1501.	None established for this compound. However, it is recommended that 0.2 mg/m <sup>3</sup> for coal tar pitch volatiles be employed where excessive concentrations may exist. This is more relevant for those PAHs considered carcinogenic.	Information regarding this substance was limited. This material is a natural constituent of coal tar.  Adequate - Odor threshold 0.012-0.023 mg/m <sup>3</sup> . OSHA accepts the use of air-purifying respirators with organic vapor cartridge/HEPA filter up to 10 ppm, providing cartridges are changed at the beginning of each shift.  <b>Recommended gloves:</b> Butyl - >8.00 hrs; are recommended for other coal tar pitch associated substances; Neoprene >4.00 hrs; Nitrile >1.00 hrs	<b>Boiling Pt:</b> 434-507°F; 241-264°C <b>Melting Pt:</b> -8°F(1-),94°F (2-); -22°C (1-), 35°C (2-) <b>Solubility:</b> Insoluble in water <b>Flash Pt:</b> Not available <b>LEL/LFL:</b> Not available <b>UEL/UFL:</b> Not available <b>Density:</b> 1.0058 (Beta isomer); 1.02 (alpha isomer) <b>Vapor Density:</b> 4.91 (1-) <b>Vapor Pressure:</b> 180-260 mmHg <b>Specific Gravity:</b> 0.994 (2-); 1.025(1-) <b>Incompatibilities:</b> Strong oxidizers, alkalis, and acids. <b>Appearance and Odor:</b> Colorless liquid (alpha isomer) with an acrid odor. The Beta isomer is a solid with slight odor.	Overexposure to this substance has shown to be a skin, eye, and mucous membrane irritant. This substance is not considered a photosensitizer. This substance is considered mildly to moderately toxic by ingestion.
<b>Nitroamomatic Compounds</b>							
Cyclotetramethylene tetranitramine Octagen, (HMX)	2691-41-0	No information found.	Air sampling use particulate filter; gravimetric detection. Sampling and analytical procedures shall be in accordance with NIOSH Method #0500 (Nuisance Dust, Total).	OSHA/NIOSH: 15 mg/m <sup>3</sup> total dust; 5 mg/m <sup>3</sup> respirable fraction.  ACGIH: 10 mg/m <sup>3</sup> for total dust.	Respiratory Protection: Can use air purifying respirator with an organic vapor cartridge for concentrations up to 75 mg/m <sup>3</sup> . Airborne concentrations above this level use an airline respirator or SCBA.  <b>Recommended Gloves:</b> Impermeable gloves suitable to prevent skin contact. Nitrile gloves have been selected for most other applications.	<b>Boiling Pt:</b> Not available <b>Melting Pt:</b> 530°F; 276.7°C <b>Freezing Pt:</b> Not available <b>Solubility:</b> Not available <b>Specific Gravity:</b> Not available <b>Vapor Pressure:</b> Not available <b>Flash Pt:</b> Not available <b>LEL:</b> Not available <b>UEL:</b> Not available  <b>Incompatibles:</b> Not available  <b>Appearance:</b> White powder	<b>Routes of exposure:</b> Inhalation, ingestion, and skin and eye contact.  Signs and symptoms of overexposure will be similar to those specified for RDX.

**TABLE 6-1  
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA  
SITE 15, NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
<b>Nitroaromatic Compounds (Cont.)</b>							
2,4,6-Trinitrotoluene (TNT) Synonyms: Trinitrotoluene (dry)	118-96-7	PID: Ionization Potential - 10.59 eV, relative response ratio is unknown.  FID: Relative response ratio is unknown it is estimated that the response will be slightly less than benzene (150%) or toluene (110%).	Air sample using a Tenax GC tube; Acetone desorption; GC/TEA detection. Sample and analytical protocol in accordance with OSHA Method #44.	OSHA: 1.5 mg/m <sup>3</sup> (skin)  ACGIH: 0.5 mg/m <sup>3</sup> (skin)  NIOSH: 0.5 mg/m <sup>3</sup> (skin)	Rapid heating to 466°F; 240°C will cause detonation. Pale yellow crystals, subject to detonation by exposure to shock or temperatures exceeding 466°F; 240°C.  Air purifying respirators recommended for escape purposes only.  <b>Recommended Gloves:</b> Any glove which is impermeable to contact.	<b>Boiling Pt:</b> 466°F; 240°C <b>Melting Pt:</b> 176°F; 80C <b>Detonation Pt:</b> 464°F; 240°C <b>Solubility:</b> 0.01% at 75°F 25°C <b>Specific Gravity:</b> 1.65 <b>Vapor Density:</b> 7.8 <b>Vapor Pressure:</b> 0.057 mmHg @ 178° F; 81°C <b>Flash Pt:</b> Explodes 842°F; 450°C <b>LEL:</b> Not available <b>UEL:</b> Not available <b>Incompatibles:</b> Strong oxidizers, ammonia, combustible materials, and heat. <b>Appearance and odor:</b> Colorless to light yellow solid or crushed flakes.	<b>Routes of Exposure:</b> inhalation, absorption, ingestion, and skin & eye contact. The following symptoms may be experienced: Sneezing, coughing, sore throat, muscle pain, peripheral nerve sensitization, and irritation of the skin and mucous membranes.  Chronic exposure may cause liver damage, jaundice, cyanosis, kidney damage, anemia, cataract, leukocytosis.
Nitrotoluene	o-88-72-2 m-99-08-1 p-99-99-0	PID: Ionization potential - 9.43 - 9.50 eV, relative response ratio unknown  FID: Relative response ratio is unknown it is estimated that the response will be slightly less than benzene (150%) or toluene (110%).	Air sample using silica gel capture media; methanol desorption; GC/FID detection; Sampling and analytical protocol in accordance with NIOSH Method #2005.	NIOSH/ACGIH: 2 ppm  OSHA: 5 ppm (skin)  IDLH: 200 ppm	Adequate - Odor threshold 0.03 - 0.05 ppm. The use of air-purifying respirators with organic vapor cartridge/HEPA filter up to 20 ppm (Half-face); <200 ppm (full-face), providing cartridges are changed at the beginning of each shift.  <b>Recommended gloves:</b> Butyl - >8.00 - >23.00 hrs; PV Alcohol >6.00 - >16.00 hrs; Silver shield >8.00 hrs; Nitrile 0.48 hrs	<b>Boiling Pt:</b> o-432°F, 222°C; m-450°F, 232°C; p-460°F, 237°C <b>Melting Pt:</b> o-25°F, -4°C; m-59°F, 15°C; p-126°F, 52°C <b>Solubility:</b> 0.04% - 0.07% in water <b>Flash Pt:</b> 223°F; 106°C <b>LEL/LFL:</b> o-2.2%; m-,p-1.6% <b>UEL/UFL:</b> Not available <b>Density:</b> o-,m-1.16; p-1.12 <b>Vapor Density:</b> 4.72 <b>Vapor Pressure:</b> 0.1 mmHg <b>Specific Gravity:</b> o-,m-1.16; p-1.12 <b>Incompatibilities:</b> Strong oxidizers, sulphuric acid <b>Appearance and Odor:</b> Yellow liquid with a weak aromatic odor	Typically this material is a skin and eye irritant. Systemically, overexposure can result in anoxia, cyanosis, headache, weakness, difficulty in breathing, loss of muscular coordination, accelerated heart rate, and possible nausea and vomiting. Repeated or prolonged exposure to the skin may result in dermatitis.

TAE 6-1  
**CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA**  
**SITE 15, NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
<b>Metals</b>							
Antimony	7440-36-0	Particulate form - unable to be detected by PID/FID.	Air sample using particulate filter; acid desorption; atomic absorption spectrometry PeCam Sampling and analytical protocol shall proceed in accordance with NIOSH Method #261.	OSHA/NIOSH/ACGIH: 0.5 mg/m <sup>3</sup>  IDLH: 50 mg/m <sup>3</sup>	Metallic taste resulting from exposure.  <b>Recommended Air Purifying Cartridges:</b> Protect from dusts, fumes, and mists use HEPA filters.  <b>Recommended gloves:</b> This is in the particulate form. Therefore any glove suitable to prevent skin contact.	<b>Boiling Pt:</b> 2975°F; 1635°C <b>Melting Pt:</b> 1166°F; 630°C <b>Solubility:</b> Insoluble <b>Flash Pt:</b> Nonflammable <b>LEL/LFL:</b> Nonflammable <b>UEL/UFL:</b> Nonflammable <b>NOTE:</b> This substance is nonflammable but may present a moderate explosion hazard when airborne dusts of an adequate concentration are exposed to flames. <b>Vapor Density:</b> Not available <b>Vapor Pressure:</b> 1 mmHg @ 1627° F; 886°C <b>Specific Gravity:</b> 6.684 @ 77°F; 25° C <b>Incompatibles:</b> Acids, oxidizers, halogens <b>Appearance and odor:</b> silvery gray, lustrous metal	This substance is considered a poison by ingestion, irritating to the skin and mucous membranes causing inflammation to the nose, mouth, and throat. Chronic exposure may result in some forms of dermatitis.  Ingestion may result in a metallic taste, vomiting, colic, and diarrhea. Chronic exposure may result in addition to those stated above indigestion, loss of appetite and weight, and diarrhea. Sores in the mouth along with a sore throat help distinguish this form of poisoning from other forms of metallic poisoning such as lead and arsenic. Inhalation at excessive concentrations may result in difficulty in breathing, headaches and a bloody discharge from the nose, and chemical pneumonitis.
Arsenic	7440-38-2	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using a particulate filter; acid desorption; AAS detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7900.	OSHA: Organic compounds 0.5 mg/m <sup>3</sup> Inorganic compounds 0.01 mg/m <sup>3</sup>  NIOSH: (Ceiling) 0.002 mg/m <sup>3</sup>  ACGIH: 0.01 mg/m <sup>3</sup>  IDLH: 5 mg/m <sup>3</sup> as arsenic	No identifiable warning properties to indicate presence and thereby detection.  <b>Recommended APR Cartridge:</b> Suitable for dust and fume. Organic vapor acid gases with HEPA filter. This substance may be presented as a pesticide, therefore a cartridge suitable for pesticides (MSA-GMP).  <b>Recommended Gloves:</b> This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	<b>Boiling Pt:</b> sublimation @ 1134°F; 612°C <b>Melting Pt:</b> 1497°F; 814°C @ 36 atm <b>Solubility:</b> Insoluble in water; soluble in nitric acid <b>Flash Pt:</b> Nonflammable, however, airborne in the form of a dust this substance will support combustion <b>LEL/LFL:</b> Nonflammable <b>UEL/UFL:</b> Nonflammable <b>Vapor Density:</b> Not available <b>Vapor Pressure:</b> 1 mmHg @ 372°C (sublimes) <b>Specific Gravity:</b> 5.73 <b>Incompatibilities:</b> Oxidizers, halogens, zinc, lithium, azides, and acetylides <b>Appearance and odor:</b> Gray to black, brittle, crystalline, amorphous, odorless.	Overexposure to this substance through inhalation or ingestion may result in ulceration of the nasal septum, GI disturbances resulting in violent purging and vomiting, hoarse voice, sore throat, excessive salivation, peripheral neuropathy (numbness and burning sensations beginning at the extremities followed by motor weakness), respiratory irritation leading to possible pulmonary edema. Skin or eye contact may result in irritation, conjunctiva, dermatitis, and hyperpigmentation (darkening of the areas exposed) of the skin. This substance has been judged to be a Human carcinogen by NTP, and IARC.

**TABLE 6-1  
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA  
SITE 15, NAVAL AIR STATION - CECIL FIELD, JACKSONVILLE, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
<b>Metals (Cont.)</b>							
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO <sub>3</sub> or H <sub>2</sub> O <sub>2</sub> desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m <sup>3</sup>  ACGIH: 0.05 mg/m <sup>3</sup>  NIOSH: 0.10 mg/m <sup>3</sup>  IDLH: 100 mg/m <sup>3</sup> as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m <sup>3</sup> .  <b>Recommended gloves:</b> This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	<b>Boiling Pt:</b> 3164°F; 1740°C <b>Melting Pt:</b> 621°F; 327°C <b>Solubility:</b> Insoluble <b>Flash Pt:</b> Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) <b>LEL/LFL:</b> Not applicable <b>UEL/UFL:</b> Not applicable <b>Vapor Density:</b> Not available <b>Vapor Pressure:</b> 0 mmHg <b>Specific Gravity:</b> 11.34 <b>Incompatibilities:</b> Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids <b>Appearance and Odor:</b> Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

## 6.2 PHYSICAL HAZARDS

The following is a list of physical hazards that may be encountered at the site or may be present during the performance of site activities.

- Contact/entanglement with rotating equipment
- Slip, trips, and falls
- Contact with underground or overhead utilities (electric lines, gas lines, water lines, etc.)
- Strain/muscle pulls from heavy lifting
- Noise in excess of 85 dBA
- Ambient temperature extremes (heat stress)
- Pinch/compression points
- Natural hazards (snakes, ticks, poisonous plants, etc.)
- Vehicular and equipment traffic
- Inclement weather
- Flying projectiles
- UXO

These hazards are discussed further below, and are presented relative to each task in Table 5-1.

### 6.2.1 Contact/Entanglement with Operating/Moving Equipment

As part of the site-specific training, site personnel shall be advised of the hazards associated with working in close proximity to moving machinery. Safety measures used to prevent hazards of this nature include: using only properly fitting PPE to avoid possible entanglement in moving parts; using lockout/tagout procedures prior to performing maintenance functions on equipment; and performing periodic inspections on all equipment to ensure all guards, protective cages, and emergency shut-off devices are in place and functioning properly. All equipment on site will be properly maintained. Maintenance performed on equipment shall be conducted in accordance with the manufacturer's specifications. All equipment will be subject to inspection using the Equipment Inspection Checklist provided in Attachment III of this HASP.

### 6.2.2 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. All activities will be performed using the buddy system.

### **6.2.3 Contact with Underground or Overhead Utilities**

Underground utilities such as pressurized lines, water lines, telephone lines, buried utility lines, and high voltage power lines are known to be present throughout the facility. Clearance of underground and overhead utilities for each sample location will be coordinated with either Jacksonville Port Authority or City of Jacksonville Public Works personnel, depending on the location of the work. Additionally, soil boring operations will be conducted at a safe distance (>20 feet) from overhead power lines unless they are shielded. Spotters will be used if equipment such as the drill rig is to be moved in or around any overhead utility lines. Whenever underground utilities are suspected within close proximity to subsurface sampling locations, the borehole will be advanced to a minimum of 5.0 feet with a hand auger prior to drilling. As built drawings may also be utilized for additional clarification. In certain cases, Public Works personnel may need to de-energize electrical cables using facility lockout/tagout procedures to insure electrical hazards are controlled. See Attachment II for the TtNUS SOP for utility clearance.

### **6.2.4 Strain/Muscle Pulls from Heavy Lifting**

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. To avoid injury during lifting tasks personnel are to lift with the force of the load carried by their legs and not their backs. 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.

### **6.2.5 Noise in Excess of 85 dBA**

Various site activities, particularly those utilizing machinery and tools, have the potential to create noise levels that exceed 85 dBA. Hearing protection will be available on site and required for use by personnel adjacent to soil boring operations. Hearing protection will also be used during other tasks identified by the SSO as producing excessive noise levels.

### **6.2.6 Ambient Temperature Extremes (Heat Stress)**

Given the geographic location of the site and the project schedule, overexposure to high ambient temperatures (heat stress) may exist during performance of this work depending on the project schedule.

Work performed when ambient temperatures exceed 70 °F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additionally, work load and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. Additional information such as Work-Rest Regimens and personnel monitoring may be found in section 4.0 of the Health & Safety Guidance Manual.

#### **6.2.7 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, avoiding moving parts and using additional tools or devices as necessary to avoid hazards.

#### **6.2.8 Natural Hazards**

Natural hazards such as poisonous plants or bites from poisonous, disease carrying, or otherwise dangerous animals or insects (snakes, ticks, etc.) are often prevalent at sites that are being investigated as part of hazardous waste site operations. 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 Section 7 of the Health and Safety Guidance Manual), and the FOL or SSO notified.

#### **6.2.9 Vehicular and Equipment Traffic**

Hazards associated with vehicular and equipment traffic are likely to exist during various site activities and whenever site personnel perform work near roadways. To minimize the potential for injuries associated with these hazards, site personnel will maintain awareness of traffic and moving equipment. When working near roadways, site personnel will wear high visibility vests. During movement of machinery, spotters will be used and site personnel will maintain visibility with equipment operators. Additionally, all site equipment will be subject to routine equipment inspections to ensure all guards, emergency stops, and safety devices are present and operational.

#### **6.2.10 Inclement Weather**

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

#### **6.2.11 Flying Projectiles**

During decontamination activities using powered equipment (e.g., pressure washers), projectiles in the form of liquids and solids may be present and present an eye and/or face hazard. Recognition of this possible hazard and the wearing of appropriate PPE is recommended to control exposures.

#### **6.2.12 UXO Hazards**

Past activities at Site 15 involved the disposal of ordnance material. Although numerous site activities have been performed at the site and a UXO survey failed to identify any UXO items, the potential exists for site personnel to encounter UXO or debris related to past disposal activities. As a result, all visible debris and materials will be avoided. Any discovery of suspected UXO items will require site personnel to avoid the area and alert facility EOD personnel.

## 7.0 AIR MONITORING

Although the primary contaminants of concern are unlikely to be present in a volatile form, air monitoring devices such as Direct Reading Instruments (DRIs) will be used at the site to detect and evaluate the presence of site contaminants and other potentially harmful agents. The specific type of monitoring and the associated instruments, frequency of use, and applicable action levels are dependent upon the specific scope of work and the contaminants of concern. As a result, specific air monitoring measures and requirements will be established in Table 5-1 of this site specific HASP. Section 1.0 of the TtNUS Health and Safety Guidance Manual contains detailed information regarding direct reading instrumentation, personal and area air sampling procedures, as well as general calibration procedures of various instruments.

### 7.1 INSTRUMENTS AND USE

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

#### 7.1.1 Photoionization Detector

As a precautionary measure, a Photoionization Detector (PID) with a 10.6 eV (or equivalent) lamp will be used to monitor potential source areas (boreholes) and to screen collected samples and breathing zones of employees during sampling and other intrusive activities. The PID has been selected because it is capable of detecting various organic gases and vapors. When calibrated with isobutylene the PID has a one to one correspondence with benzene. Prior to the commencement of any field activities, the background level of the site must be determined and noted. Daily background readings must be taken away from areas of potential contamination to obtain accurate results. These readings, and any influencing conditions (i.e., weather, temperature, humidity) and location will also be documented in the Health and Safety Logbook as a matter of reference.

#### 7.1.2 Hazard Monitoring Frequency

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

## 7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

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

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



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

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

#### **8.1.1 Requirements for Subcontractors**

Identified TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120(e)(8) prior to performing field work at the NAS Cecil Field. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided in Figure 8-1. This letter will be accompanied by training certificates or some other form of official documentation for all subcontractor personnel participating in site activities.

### **8.2 SITE-SPECIFIC TRAINING**

TtNUS will provide site-specific training to all TtNUS personnel who will perform work on this project. Site-specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment

**FIGURE 8-1**

**TRAINING LETTER**

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

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

Month, day, year

Mr. Mark Speranza P.E.  
Task Order Manager  
TtNUS, Inc.  
Foster Plaza 7, 661 Andersen Drive  
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Training for Naval Air Station Cecil Field, Jacksonville, Florida

Dear Mr. Speranza:

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

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

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

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

Sincerely,

(Name and Title of Company Officer)

- Work practices to minimize risks from hazards
- Medical surveillance requirements
- Contents of the Health and Safety Plan
- Signs and symptoms of overexposure to site contaminants
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Emergency response procedures (evacuation and assembly points)
- Associated hazards and restricted areas within the NAS Cecil Field.

Site-specific training documentation will be established through the use of Figure 8-2.

### **8.3 MEDICAL SURVEILLANCE**

All TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program. Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office and made available, as necessary.

#### **8.3.1 Medical Surveillance Requirements for Subcontractors**

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

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



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

For employees of \_\_\_\_\_  
Company Name

Participant Name: \_\_\_\_\_ Date of Exam: \_\_\_\_\_

**Part A**

The above-named individual has:

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

- qualified to perform work at the NAS Cecil Field work site
- not qualified to perform work at the NAS Cecil Field work site

and,

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

- qualified to wear respiratory protection
- not qualified to wear respiratory protection

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

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

**Part B**

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

and have determined the following information:

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

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NAS Cecil Field work site, this participant

- may  
 not

perform his/her assigned task.

Physician's Signature \_\_\_\_\_

Address \_\_\_\_\_

Phone Number \_\_\_\_\_

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

\_\_\_\_\_  
Address

**FIGURE 8-4**

**MEDICAL SURVEILLANCE LETTER**

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

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

Month, day, year

Mr. Mark Speranza, P.E.  
Task Order Manager  
Tetra Tech NUS, Inc.  
Foster Plaza 7, 661 Andersen Drive  
Pittsburgh, Pennsylvania 15220

Subject: Medical Surveillance for NAS Cecil Field, Jacksonville, Florida

Dear Mr. Speranza:

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

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

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

Sincerely,

(Name and Title of Company Officer)

### **8.3.2 Requirements for All Field Personnel**

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

### **8.4 SUBCONTRACTOR EXCEPTIONS**

In situations in which the exclusion zone is not entered or when there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from some of the training and medical surveillance requirements. All subcontractors and visiting personnel are required to receive site-specific training (as discussed in Section 8.2) regarding information provided in this HASP. Examples of subcontractors who may be exempt from training and medical surveillance requirements may include surveyors who perform surveying activities at the site perimeters or in areas where there is no potential for exposure to site contaminants, and in this case the subcontractor providing concrete coring services.

**The use of the subcontractor exception is strictly limited to the authority of the CLEAN Health and Safety Manager.**

## 9.0 SITE CONTROL

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

### 9.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of the site of known or suspected contamination. The exclusion zones for this project will be limited to those areas of the site where active work is being performed plus a designated area surrounding the point of operation (see Table 5-1 for a list of specific operations). The exclusion zone for most site activities will be fragmented to represent the areas where the soils are disturbed through soil boring or sampling activities. All exclusion zones will be delineated using barrier tape, cones, and postings to inform and direct facility personnel.

#### 9.1.1 Exclusion Zone Clearance

A pre-startup site visit will be conducted by members of the identified field team in an effort to identify proposed subsurface investigation locations, conduct utility clearances, and provide up-front notices concerning scheduled activities within the facility.

In all cases, no subsurface activities will proceed without utility clearance. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Section 2.7, 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. Decontamination will be conducted at a central location. All equipment potentially contaminated will be bagged and taken to that location for decontamination. Given this consideration, equipment required to complete this operation may include hand augers and stainless steel bowls and spatulas for each location.

### **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. In all cases, the support zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

### **9.4 SAFE WORK PERMITS**

All exclusion zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. Partially completed Permits for the work to be performed are included in Attachment IV. The daily meetings conducted at the site will further support these work permits. This effort will ensure all site-specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signature of the FOL and SSO.

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

**FIGURE 9-1  
SAFE WORK PERMIT**

Permit No. \_\_\_\_\_ Date: \_\_\_\_\_ Time: From \_\_\_\_\_ to \_\_\_\_\_

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

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

II. Names: \_\_\_\_\_

III. Onsite Inspection conducted  Yes  No Initials of Inspector TINUS

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

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

Modifications/Exceptions: \_\_\_\_\_

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

VI. Additional Safety Equipment/Procedures	
Hardhat..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Radio..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suits/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type)..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe/shank..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Workboots..... <input type="checkbox"/> Yes <input type="checkbox"/> No	

Modifications/Exceptions: \_\_\_\_\_

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

VIII. Site Preparation	Yes	NA
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Cleared and Established.....	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged.....	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.).....  Yes  No  
If yes, contact Health Science, Pittsburgh, PA Office

X. Special instructions, precautions: \_\_\_\_\_

Permit Issued by: \_\_\_\_\_ Permit Accepted by: \_\_\_\_\_

Job Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

## 9.5 SITE VISITORS

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

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (i.e., DOD, EPA, OSHA)
- Southern Division Navy Personnel
- Other authorized visitors
- All non-DOD personnel working on this project are required to gain initial access to the base by coordinating with the TtNUS FOL or designee and following established base access procedures.

Once access to the base is obtained, all personnel who require site access into areas of ongoing operations will be required to obtain permission from the FOL and the Site Contact. Upon gaining access to the site, **all site visitors wishing to observe operations in progress will be escorted by a TtNUS representative** and shall be required to meet the minimum requirements discussed below:

All site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), the entity which they represent, and the purpose of the visit.

All site visitors will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items, they will be permitted to enter the operational zone. All visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. All visitors entering the exclusion zones during ongoing operations will be accompanied by a TtNUS representative. Any and all 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 the termination of all on site activities until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from the Site Contact and the Jacksonville Sheriff's Office. If necessary, the Site Contact will be notified of any unauthorized visitors.

## **9.6 SITE SECURITY**

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As this activity takes place at a Navy facility open to public access, the first line of security will take place using exclusive zone barriers, site work permits, and any existing barriers at the sites to restrict the general public. The second line of security will take place at the work site referring interested parties to the Site Contact. The Site Contact will serve as a focal point for personnel, interested parties, and serve as the final line of security and the primary enforcement contact.

## **9.7 SITE MAP**

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. 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 all personnel involved in this operation.

## **9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS**

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

## **9.10 COMMUNICATION**

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

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

## **10.0 SPILL CONTAINMENT PROGRAM**

### **10.1 SCOPE AND APPLICATION**

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

### **10.2 POTENTIAL SPILL AREAS**

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

- Resource deployment
- Waste transfer
- Central staging

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

### **10.3 LEAK AND SPILL DETECTION**

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

#### **10.4 PERSONNEL TRAINING AND SPILL PREVENTION**

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

#### **10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT**

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

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 17-E or 17-H)
- Shovels, rakes, and brooms
- Container labels

#### **10.6 SPILL CONTROL PLAN**

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

1. Notify the SSO or FOL immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove all non-essential personnel.
2. Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.
3. Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.
4. Re-containerize spills, including 2-inch of top cover impacted by the spill. Await test results for treatment or disposal options.

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

## 11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces.** A confined space is defined as an area which has one or more of the following characteristics:

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

A Permit-Required Confined Space is one that:

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

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

## 12.0 MATERIALS AND DOCUMENTATION

The TtNUS 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 all chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- Follow-up Reports (to be completed by the FOL)
- 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)
- Soil Boring Log Forms for logging the soil borings
- Directions to the Medical Center

### 12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

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

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

**Material Safety Data Sheets (MSDS) (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, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. Section (a)(3) states that reproductions or facsimiles of the poster shall be at least 8 1/2 by 14 inches with 10-point type. See Attachment V of this HASP for a copy.

**Site Clearance (maintained)** - This list is found within the training section of the HASP (See Figure 8-2). 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.

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

**Personnel Monitoring (maintained)** - 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, as stated above, is to allow site personnel quick access to this information. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

### 13.0 ACRONYMS / ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirators
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
DOD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
eV	electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
N/A	Not Available
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photo Ionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
SAP	Sampling and Analysis Plan
SCBA	Self Contained Breathing Apparatus
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SVOCs	Semi-Volatile Organic Compounds
TOM	Task Order Manager
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds

# **ATTACHMENT I**

## **INJURY/ILLNESS PROCEDURE AND REPORT FORM**

## **TETRA TECH NUS, INC.**

### **INJURY/ILLNESS PROCEDURE WORKER'S COMPENSATION PROGRAM**

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

- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room.
- If incident involves a chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours. You will be required to complete an Injury/Illness Report (attached). You may also be required to participate in a more detailed investigation from the Health Sciences Department.
- If further medical treatment is needed, The Hartford Network Referral Unit will furnish a list of network providers customized to the location of the injured employee. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work. Please call Marilyn Duffy at (412) 921-8475 for the number of the Referral Unit.

#### **ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:**

Contact your local human resources representative, corporate health and safety coordinator, or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries (Tetra Tech or Company) pay premiums on behalf of their employees. The type of injuries or illnesses covered and the amount of benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

#### **WHO IS COVERED:**

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits. All

**TETRA TECHNUS, INC.**  
**INJURY/ILLNESS PROCEDURE**  
**WORKER'S COMPENSATION PROGRAM**

---

employees must follow the above injury/illness reporting procedures. Consultants, independent contractors, and employees of subcontractors are not covered by Tetra Tech's Worker's Compensation plan.

**WHAT IS COVERED:**

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported. Please note that if you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: \_\_\_\_\_  
Subsidiary Health and Safety Representative

Prepared by: \_\_\_\_\_

cc: \_\_\_\_\_  
Workers Compensation Administrator

Position: \_\_\_\_\_

Project name: \_\_\_\_\_

Office: \_\_\_\_\_

Project number: \_\_\_\_\_

Telephone number: \_\_\_\_\_

Fax number: \_\_\_\_\_

**Information Regarding Injured or Ill Employee**

Name: \_\_\_\_\_

Office: \_\_\_\_\_

Home address: \_\_\_\_\_

Gender: M  F  No. of dependents: \_\_\_\_\_

Home telephone number: \_\_\_\_\_

Marital status: \_\_\_\_\_

Occupation (regular job title): \_\_\_\_\_

Date of birth: \_\_\_\_\_

Social security number: \_\_\_\_\_

Department: \_\_\_\_\_

Date of Accident: \_\_\_\_\_

Time of Accident: \_\_\_\_\_ a.m.  p.m.

Time Employee Began Work: \_\_\_\_\_

Check if time cannot be determined

**Location of Incident**

Street address: \_\_\_\_\_

City, state, and zip code: \_\_\_\_\_

County: \_\_\_\_\_

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

**Information About the Incident**

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

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

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

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

Did the employee die? Yes [ ] No [ ] Date of death: \_\_\_\_\_

Was employee performing regular job duties? Yes [ ] No [ ]

Was safety equipment provided? Yes [ ] No [ ] Was safety equipment used? Yes [ ] No [ ]

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

Witness (Attach additional sheets for other witnesses.)

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Street address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip code: \_\_\_\_\_

Telephone number: \_\_\_\_\_

Medical Treatment Required? [ ] Yes [ ] No [ ] First aid only

Name of physician or health care professional: \_\_\_\_\_

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

Facility name: \_\_\_\_\_

Street address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip code: \_\_\_\_\_

Telephone number: \_\_\_\_\_

Was the employee treated in an emergency room? [ ] Yes [ ] No

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

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

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

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

Date of Report: \_\_\_\_\_ Time of Report: \_\_\_\_\_

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

Printed Name of Injured Employee

Telephone Number

Signature of Injured Employee

Date

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

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

Injury  Illness

Result of Incident:

- First aid only
 Days away from work
 Remained at work but incident resulted in job transfer or work restriction
 Incident involved days away and job transfer or work restriction
 Medical treatment only

No. of days away from work
Date employee left work
Date employee returned to work
No. of days placed on restriction or job transfer:

OSHA Recordable Case Number

To Be Completed by Human Resources

Social security number:
Date of hire: Hire date for current job:
Wage information: \$ per Hour Day Week Month
Position at time of hire:
Current position: Shift hours:
State in which employee was hired:
Status: Full-time Part-time Hours per week: Days per week:
Temporary job end date:

To Be Completed during Report to Workers Compensation Carrier

Date reported: Reported by:
Confirmation number:
Name of contact:
Field office of claims adjuster:

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

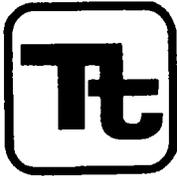
**ATTACHMENT II**

**STANDARD OPERATING PROCEDURE**

**FOR**

**UTILITY LOCATING AND EXCAVATION**

**CLEARANCE**



TETRA TECH NUS, INC.

# STANDARD OPERATING PROCEDURES

Number	HS-1.0	Page	1 of 1
Effective Date	01/00	Revision	1
Applicability	Tetra Tech NUS, Inc.		
Prepared	Health & Safety		
Approved	D. Senovich		

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 the TtNUS Utility Locating and Clearance Policy. The TtNUS Utility Locating and Clearance Policy must be reviewed by anyone potentially involved with underground or overhead utility services.

## 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 or absence of 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 development of detailed operating procedures. This guidance is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the geophysical methods 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 and the TtNUS Utility Locating and Clearance Policy.

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 and the TtNUS Utility Locating and Clearance Policy. 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.

Site Personnel – Responsible for understanding and implementing this SOP and the TtNUS Utility Locating and Clearance 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. The following procedure must be followed prior to beginning any 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

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of any emergency shut off switches. Any additional information regarding utility locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

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

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

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using such methods as passive and intrusive surveys, physical probing, or hand augering. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in many 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 with a hand auger or pole (tile probe) made of non-conductive material. 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

### 6.1 Geophysical Methods

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

#### **Electromagnetic Induction**

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

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

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

#### **Magnetics**

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

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

### **Ground Penetrating Radar**

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

## **6.2 Passive Detection Surveys**

### **Acoustic Surveys**

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

### **Thermal Imaging**

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

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

## **6.3 Intrusive Detection Surveys**

### **Vacuum Excavation**

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

### **Hand-auger Surveys**

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings must be hand-augered for all locations where there is a potential to impact buried utilities. The minimum hand-auger depth that must be reached is to be

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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 continental United States. At a minimum, hand-auger depths must be at least to the frost line depth plus two (2) feet, but never less than 4 feet below ground surface (bgs). For augering, the hole must be reamed by hand to 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-auger. It is important to note that a post-hole digger must not be used in place of a hand-auger.

### **Tile Probe Surveys**

For some soil types, site conditions, and excavation requirements, tile probes may be used instead of or in addition to hand-augers. Tile probes must be performed to the same depth requirements as hand-augers. Depending upon the site conditions and intended probe usage, tile probes should be made of non-conductive material such as fiberglass.

## **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 subsurface 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. 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**

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**

<b>Alabama</b> Alabama Line Location (800) 292-8525 Tucson Blue Stake Center (800) 782-5348
<b>Alaska</b> Locate Call Center of Alaska Inc. (800) 478-3121
<b>Arizona</b> Arizona Blue Stake Inc. (800) 782-5348
<b>Arkansas</b> Arkansas One Call System Inc. (800) 482-8998
<b>California</b> Underground Service Alert North (800) 227-2600 Underground Service Alert South (800) 227-2600
<b>Colorado</b> Utility Notification Center of Colorado (800) 922-1987
<b>Connecticut</b> Call Before You Dig (800) 922-4455
<b>Delaware</b> Miss Utility of Delmarva (800) 282-8555
<b>District of Columbia</b> Miss Utility (800) 257-7777
<b>Florida</b> Call Sunshine (800) 432-4770
<b>Georgia</b> Utilities Protection Center Inc. (800) 282-7411
<b>Idaho</b> Palouse Empire Underground Coordinating Council (800) 882-1974  Utilities Underground Location Center (800) 424-5555  Kootenai Country Utility Coordinating Council (800) 428-4950  Shoshone County One Call (800) 398-3285  Dig Line (800) 342-1585  One Call Concepts (800) 626-4950
<b>Illinois</b> Julie Inc. (800) 892-0123  Digger (Chicago Utility Alert Network) (312) 744-7000
<b>Indiana</b> Indiana Underground Plant Protection Services (800) 382-5544
<b>Iowa</b> Underground Plant Location Service Inc. (800) 292-8989
<b>Kansas</b> Kansas One-Call Center (800) 344-7233
<b>Kentucky</b> Kentucky Underground Protection Inc. (800) 752-6007
<b>Louisiana</b> Louisiana One Call (800) 272-3020

<b>Maine</b> Dig Safe – Maine (800) 225-4977
<b>Maryland</b> Miss Utility (800) 257-777  Miss Utility of Delmarva (800) 282-8555
<b>Massachusetts</b> Dig Safe – Massachusetts (800) 322-4844
<b>Michigan</b> Miss Dig System (800) 482-7171
<b>Minnesota</b> Gopher State One Call (800) 252-1166
<b>Mississippi</b> Mississippi One-Call System Inc. (800) 227-6477
<b>Missouri</b> Missouri One Call System Inc. (800) 344-7483
<b>Montana</b> Utilities Underground Location Center (800) 424-5555  Montana One Call Center (800) 551-8344
<b>Nebraska</b> Diggers Hotline of Nebraska (800) 331-5666
<b>Nevada</b> Underground Service Alert North (800) 227-2600
<b>New Hampshire</b> Dig Safe – New Hampshire (800) 225-4977
<b>New Jersey</b> New Jersey One Call (800) 272-1000
<b>New Mexico</b> New Mexico One Call System Inc. (800) 321-ALERT  Las Cruces-Dona Utility Council (505) 526-0400
<b>New York</b> Underground Facilities Protection Organization (800) 962-7962  New York City: Long Island One Call Center (800) 272-4480
<b>North Carolina</b> The North Carolina One-Call Center Inc. (800) 632-4949
<b>North Dakota</b> Utilities Underground Location Center (800) 795-0555
<b>Ohio</b> Ohio Utilities Protection Service (800) 362-2764  Oil & Gas Producers Underground Protection Service (800) 925-0988
<b>Oklahoma</b> Call Okie (800) 522-6543

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**Oregon**

Utilities Underground Location Center  
(800) 424-5555

Douglas Utilities Coordinating Council  
(503) 673-6676

Josephine Utilities Coordinating Council  
(503) 476-6676

Rogue Basin Utility Coordinating Council  
(503) 779-6676

Utilities Notification Center  
(800) 332-2344

**Pennsylvania**

Pennsylvania One Call System Inc.  
(800) 242-1776

**Rhode Island**

Dig Safe – Rhode Island (800) 225-4977

**South Carolina**

Palmetto Utility Protection Service Inc.  
(800) 922-0983

**South Dakota**

South Dakota One Call (800) 781-7474

**Tennessee**

Tennessee One-Call System (800) 351-1111

**Texas**

Texas One Call System (800) 245-4545

Texas Excavation Safety System (800) 344-8377

Lone Star Notification Center (800) 669-8344

**Utah**

Blue Stakes Location Center (800) 662-4111

**Vermont**

Dig Safe – Vermont (800) 225-4977

**Virginia**

Miss Utility of Virginia (800) 552-7001

Miss Utility (800) 257-7777

Miss Utility of Delmarva (800) 441-8355

**Washington**

Utilities Underground Location Center  
(800) 424-5555

Grays Harbor & Pacific County  
Utility Coordinating Council  
(206) 535-3550

Utilities County of Cowlitz County  
(360) 425-2506

Chelan-Douglas Utilities Coordinating Council  
(509) 663-6111

Upper Yakima County  
Underground Utilities Council  
(800) 553-4344

Inland Empire Utility Coordinating Council  
(509) 456-8000

Palouse Empire Utilities Coordinating Council  
(800) 822-1974

Utilities Notification Center (800) 332-2344

**West Virginia**

Miss Utility of West Virginia Inc. (800) 245-4848

**Wisconsin**

Diggers Hotline Inc. (800) 242-8511

**Wyoming**

West Park Utility Coordinating Council  
(307) 587-4800

Call-In Dig-In Safety Council (800) 300-9811

Fremont County Utility Coordinating Council  
(800) 489-8023

Central Wyoming Utilities Coordinating Council  
(800) 759-8035

Southwest Wyoming One Call (307) 362-8888

Carbon County Utility  
Utility Coordinating Council (307) 324-6666

Albany County Utility Coordinating Council  
(307) 742-3615

Southeast Wyoming Utilities Coordinating Council  
(307) 638-6666

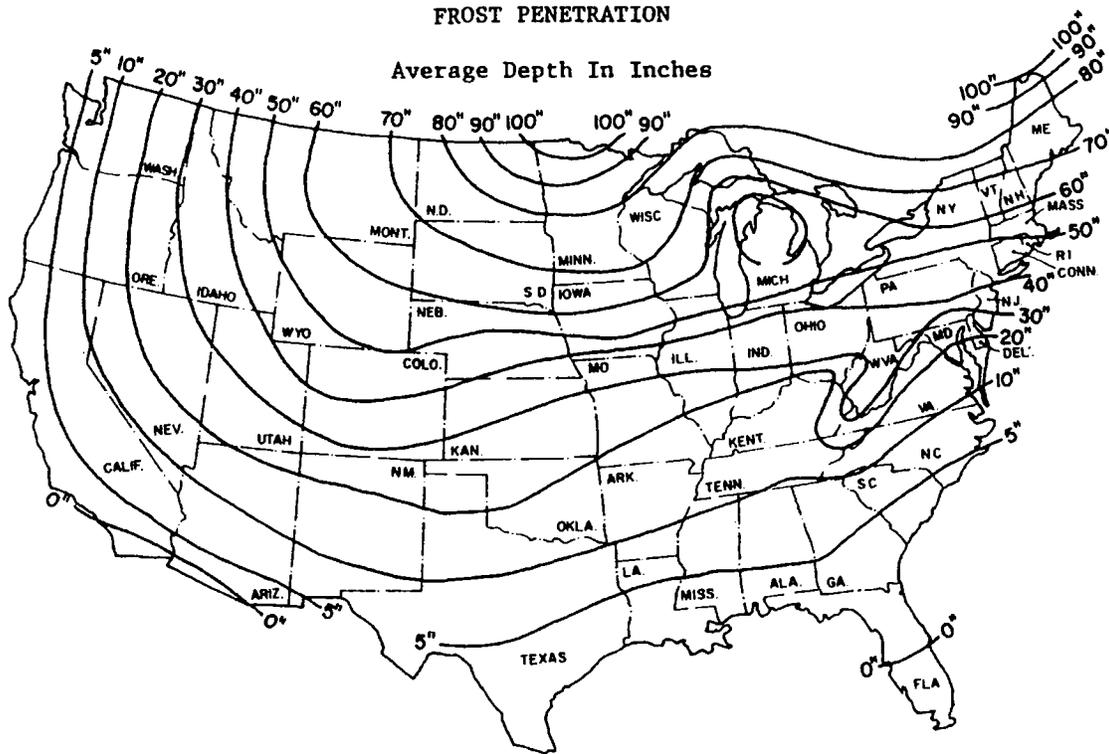
Wyoming One-Call  
(800) 348-1030

Utilities Underground Location Center  
(800) 454-5555

Converse County Utility Coordination Council  
(800) 562-5561

**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 augering performed? yes no N/A  
 Augering 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
  - 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: \_\_\_\_\_

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\_\_\_\_\_  
Site Manager/Field Operations Leader

\_\_\_\_\_  
Date

c: PM/Project File  
Program File

## **ATTACHMENT III**

# **EQUIPMENT INSPECTION CHECKLIST**

## EQUIPMENT INSPECTION

COMPANY: \_\_\_\_\_

UNIT NO. \_\_\_\_\_

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

Inspection Date: \_\_\_/\_\_\_/\_\_\_ Time: \_\_\_\_\_ Equipment Type: \_\_\_\_\_

(e.g., bulldozer)

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

**Safety Guards:**

**Yes      No**

- Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? \_\_\_\_\_
- Hot pipes and surfaces exposed to accidental contact? \_\_\_\_\_
- All emergency shut offs have been identified and communicated to the field crew? \_\_\_\_\_
- Have emergency shutoffs been field tested? \_\_\_\_\_
- Results? \_\_\_\_\_
- Are any structural members bent, rusted, or otherwise show signs of damage? \_\_\_\_\_
- Are fueling cans used with this equipment approved type safety cans? \_\_\_\_\_
- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? \_\_\_\_\_

**Portable Power Tools:**

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

**Cleanliness:**

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

**Operator Qualifications (as applicable for all heavy equipment):**

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

**Identification:**

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

**Additional Inspection Required Prior to Use On-Site**

- |   | <b>Yes</b>               | <b>No</b>                |
|---|--------------------------|--------------------------|
| - Does equipment emit noise levels above 90 decibels?       | <input type="checkbox"/> | <input type="checkbox"/> |
| - If so, has an 8-hour noise dosimetry test been performed? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Results of noise dosimetry: _____                         |                          |                          |
| - Defects and repairs needed: _____                         |                          |                          |
| - General Safety Condition: _____                           |                          |                          |
| - Operator or mechanic signature: _____                     |                          |                          |
- Approved for Use:     Yes             No

\_\_\_\_\_  
Site Safety Officer Signature

# **ATTACHMENT IV**

## **SAFE WORK PERMITS**

**SAFE WORK PERMIT  
WETLANDS DELINEATION AND SURVEYING  
NAS CECIL FIELD, JACKSONVILLE, FLORIDA**

Permit No. \_\_\_\_\_ Date: \_\_\_\_\_ Time: From \_\_\_\_\_ to \_\_\_\_\_

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

- I. Work limited to the following (description, area, equipment used): This activity includes traversing the site for wetland delineation and surveying purposes.  
Monitoring Equipment Required: None
- II. Names: \_\_\_\_\_
- III. On-site Inspection conducted  Yes  No Initials of Inspector TtNUS

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

- IV. Protective equipment required  
 Level D  Level B   
 Level C  Level A
- Respiratory equipment required  
 Full face APR  Escape Pack   
 Half face APR  SCBA   
 PAPR  Bottle Trailer   
 Skid Rig  None
- Modifications/Exceptions: None anticipated

- V. Chemicals of Concern \_\_\_\_\_ Action Level(s) None Response Measures Follow HASP Direction

- VI. Additional Safety Equipment/Procedures
- |  |  |
|--|--|
| Hardhat..... <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 checked="" type="checkbox"/> No           | Safety belt/harness ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                           |
| Chemical/splash goggles ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  | Radio (At least one radio per crew)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No            | Signs and Barricades ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No               |
| Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No                | Gloves (Type – Leather or canvas) ..... <input type="checkbox"/> Yes <input type="checkbox"/> No             |
| Steel toe work shoe/boots .... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                   |

Modifications/Exceptions: Hard hat – As conditions (overhead hazards) or work zone requirements dictate. Splash Suit – Tyvek coveralls may be required depending on the time of the year (i.e., Ticks, poisonous plants); Reflective vests when working near traffic patterns; Snake chaps when moving through heavy brush. Nitrile/rubber overboots as necessary

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

- VII. Site Preparation
- |   |                              |                             |                             |
|---|------------------------------|-----------------------------|-----------------------------|
| Utility Locating and Excavation Clearance completed .....       | Yes <input type="checkbox"/> | No <input type="checkbox"/> | NA <input type="checkbox"/> |
| Equipment and Foot Traffic Routes Cleared and Established ..... | Yes <input type="checkbox"/> | No <input type="checkbox"/> | NA <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated .....                  | Yes <input type="checkbox"/> | No <input type="checkbox"/> | NA <input type="checkbox"/> |
| Emergency Equipment Staged .....                                | Yes <input type="checkbox"/> | No <input type="checkbox"/> | NA <input type="checkbox"/> |

- VIII. Additional Permits required (Hot work, confined space entry, excavation, etc.).  Yes  No  
 If yes, See SSO for appropriate permit

- IX. Special instructions, precautions: Use rope ladders or other means suitable to traverse terrain greater than 45° angle. Review the Health and Safety Guidance Manual regarding poisonous plant varieties and ticks for additional precautions. Use lifelines, safety harnesses or other personal safety devices if working within 4 feet of a body of water.

Permit Issued by: \_\_\_\_\_ Permit Accepted by: \_\_\_\_\_



**SAFE WORK PERMIT  
MULTI-MEDIA SAMPLING – GROUND WATER AND SOILS  
NAS CECIL FIELD, JACKSONVILLE, FLORIDA**

Permit No. \_\_\_\_\_ Date: \_\_\_\_\_ Time: From \_\_\_\_\_ to \_\_\_\_\_

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

- I. Work limited to the following (description, area, equipment used): Sample acquisition will occur through the use of hand coring devices. Samples may also be collected from split acetate liners. Groundwater samples will be collected using low-flow sampling techniques. This activity also include well development and purging activities as well as handling of IDW.  
Monitoring Equipment Required: PID with 10.6 eV lamp source or equivalent
- II. Names: \_\_\_\_\_
- III. On-site Inspection conducted  Yes  No Initials of Inspector TtNUS

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

- IV. Protective equipment required  
Level D  Level B   
Level C  Level A
- Respiratory equipment required  
Full face APR  Escape Pack   
Half face APR  SCBA   
PAPR  Bottle Trailer   
Skid Rig  None

Modifications/Exceptions: PPE will consist of pants and sleeved shirt, steel-toe safety footwear, and layered surgical style gloves to prevent contact with potentially contaminated media. Hard hats, safety glasses, and hearing protection will be used when working near operating equipment. Tyvek coveralls will be required if the potential for soiling work cloths exists or to control contact with ticks and other natural hazards.

- V. Chemicals of Concern  
SVOCs (including PAHs), metals, nitro-aromatic compounds.  
VOCs and pesitcides (remote hazard)
- |  |                                     |  |
|--|-------------------------------------|--|
|  | Action Level(s)                     | Response Measures                                  |
|  | <u>Any detection / visible dust</u> | <u>Retreat to safe area.</u>                       |
|  | <u>Any detection / visible dust</u> | <u>Use area wetting, avoid dusts, contact PHSO</u> |

- VI. Additional Safety Equipment/Procedures
- |                               |   |  |   |
|-------------------------------|---|--|---|
| Hardhat.....                  | <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 checked="" type="checkbox"/> No |
| Chemical/splash goggles ..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio (At least one radio per crew)..... | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| Splash Shield .....           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Signs and 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 |
| Steel toe/shank Workboots ..  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen.....                   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Hard hat – As conditions (overhead hazards) or work zone requirements dictate. Splash Suit – Sampler - Tyvek unless saturation of work clothes are anticipated; Reflective Vests when sampling near traffic patterns; Hearing Protection – When sampling near noise sources (i.e., DPT rigs). Gloves – Samplers -Nitrile gloves (surgeons style) for incidental contact. Double layer gloves for added protection.....

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

- VII. Site Preparation
- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
|   | Yes                      | No                       | NA                       |
| Utility Locating and Excavation Clearance completed .....       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment and Foot Traffic Routes Cleared and Established ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated .....                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged .....                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- VIII. Additional Permits required (Hot work, confined space entry, excavation, etc.).  Yes  No  
*If yes, See SSO for appropriate permit*

- IX. Special instructions, precautions: Follow all safe work practices when working in and around the DPT rig. Avoid uneven and unstable terrain when and where possible. Use multiple persons or pack lighter loads and make more trips to remote sampling locations. Upon sample completion - Bag all equipment for transport to central decontamination location. Personal Decontamination - Use Handi-Wipes or similar product between remote sampling locations, until you have access to the central decontamination unit.

Permit Issued by: \_\_\_\_\_ Permit Accepted by: \_\_\_\_\_

**SAFE WORK PERMIT  
DECONTAMINATION OF HEAVY AND SAMPLING EQUIPMENT  
NAS CECIL FIELD, JACKSONVILLE, FLORIDA**

Permit No. \_\_\_\_\_ Date: \_\_\_\_\_ Time: From \_\_\_\_\_ to \_\_\_\_\_

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

- I. Work limited to the following (description, area, equipment used): Decontamination of machinery and sampling equipment will take place at the central decontamination location. This activity will employ steam cleaning to remove contaminants. When this procedure is not possible, sampling equipment will undergo a gross contamination wash and rinse, wash and rinse and then decontamination with soap and water, potable rinse, isopropanol rinse; deionized rinse, air dry. All equipment decontaminated will be evaluated visually and scanned with the PID to insure contaminant and decontamination solvent free.  
Monitoring Equipment Required: PID with 10.6 eV lamp source
- II. Names: \_\_\_\_\_
- III. On-site Inspection conducted  Yes  No Initials of Inspector TtNUS

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

- IV. Protective equipment required      Respiratory equipment required
- |   |                                  |   |   |
|---|----------------------------------|---|---|
| Level D <input checked="" type="checkbox"/> | Level B <input type="checkbox"/> | Full face APR <input checked="" type="checkbox"/> | Escape Pack <input type="checkbox"/>    |
| Level C <input type="checkbox"/>            | Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/>            | SCBA <input type="checkbox"/>           |
|   |                                  | PAPR <input type="checkbox"/>                     | Bottle Trailer <input type="checkbox"/> |
|   |                                  | Skid Rig <input type="checkbox"/>                 | None <input type="checkbox"/>           |
- Modifications/Exceptions: Decontamination will be initiated in Level D.

- V. Chemicals of Concern      Action Level(s)      Response Measures
- |  |                                     |  |
|--|-------------------------------------|--|
| <u>SVOCs (including PAHs), metals, nitro-aromatic compounds.</u> | <u>Any detection / visible dust</u> | <u>Retreat to safe area.</u>                       |
| <u>VOCs and pesticides (remote hazard)</u>                       | <u>Any detection / visible dust</u> | <u>Use area wetting, avoid dusts, contact PHSO</u> |
| <u>Decontamination</u>   | <u>No action level</u>              | <u>Follow precautions specified on the MSDS</u>    |

- VI. Additional Safety Equipment/Procedures
- |   |  |
|---|--|
| Hardhat..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                  | Hearing Protection (Plugs/Muffs) ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Safety Glasses ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No          | Safety belt/harness ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                |
| Chemical/splash goggles ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio (At least one radio per crew)..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No           | Signs and Barricades ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                          |
| Splash suit/coveralls..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    | Gloves (Type – Nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No             |
| Steel toe/shank Workboots.. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   | Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No                              |

Modifications/Exceptions: Splash Suit – Decon personnel – Hooded Rain suit; Hearing Protection – During operation of noise sources (i.e., steam cleaner etc.) All zones and entry control points and stations will be clearly demarcated.

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

- VII. Site Preparation      Yes      No      NA
- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| Utility Locating and Excavation Clearance completed .....       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment and Foot Traffic Routes Cleared and Established ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated .....                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged .....                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- VIII. Additional Permits required (Hot work, confined space entry, excavation, etc.).       Yes  No
- If yes, See SSO for appropriate permit

IX. Special instructions, precautions: Review MSDSs for all decontamination solvents prior to use.

Permit Issued by: \_\_\_\_\_ Permit Accepted by: \_\_\_\_\_

**ATTACHMENT V**

**MEDICAL DATA SHEET**

**MEDICAL DATA SHEET**

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

Project \_\_\_\_\_

Name \_\_\_\_\_ Home Telephone \_\_\_\_\_

Address \_\_\_\_\_

Age \_\_\_\_\_ Height \_\_\_\_\_ Weight \_\_\_\_\_

Name of Next Kin \_\_\_\_\_

Drug or other Allergies \_\_\_\_\_

Particular Sensitivities \_\_\_\_\_

Do You Wear Contacts? \_\_\_\_\_

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What medications are you presently using? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Do you have any medical restrictions? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name, Address, and Phone Number of personal physician: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

Signature

\_\_\_\_\_

Date