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HEALTH AND SAFETY PLAN FOR SITE 22 UNDERGROUND STORAGE TANK 26
TREATABILITY STUDY NAS PENSACOLA FL
6/1/2002
TETRA TECH

Health and Safety Plan

Treatability Study

Site 00022/UST 26

at

Naval Air Station Pensacola

Pensacola, Florida



Southern Division
Naval Facilities Engineering Command

Contract No. N62467-94-D-0888

Contract Task Order 0241

June 2002

HEALTH AND SAFETY PLAN

TREATABILITY STUDY

SITE 00022/UST 26

AT

**NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA**

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

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

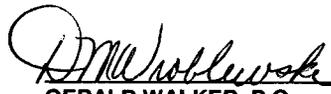
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**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0241**

June 2002

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1.0 INTRODUCTION

Authorization: This Health and Safety Plan (HASP) and the work described within are completed under the authorization of:

Contract: Comprehensive Long-Term Environmental Action Navy (CLEAN III)

Contract Number: N62467-94-D-0888

Contract Task Order: 0241

Proposed Dates of Work: Field work to commence in August 2000, with quarterly sampling thereafter

Application: This Health and Safety Plan (HASP) has been written to encompass site activities that are to be conducted at the NAS Pensacola located in Pensacola, Florida. Activities to be conducted as per this HASP are defined in detail in Section 3.0 & 3.1.

Compliance: The elements of this HASP are intended to be in compliance with the requirements established by:

- OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER)
- Applicable sections of 29 CFR 1926 "Safety and Health Regulations For Construction."
- Tetra Tech NUS Health and Safety Program

This HASP must be accompanied by the Tetra Tech NUS, Inc. Health and Safety Guidance Manual. The Guidance Manual provides additional information on program support, standard operating procedures, and safe work practices.

Modifications/Changes: The following conditions are considered sufficient basis review and possible changes to this document

- The addition or modification of activities outside of those specified in Section 3.0, Scope of Work.
- New information becomes available through the course of the investigation or from outside sources.

All changes to this HASP will be requested through the Task Order Manager (TOM) to the Tetra Tech NUS Health and Safety Manager (HSM). It is the responsibility of the TOM to notify all affected personnel of all changes to this HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

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

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.
- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
 - i. Providing information regarding site contaminants and physical hazards associated with the site.
 - ii. Establishing air monitoring and decontamination procedures.
 - iii. Assigning personal protective equipment based on task and potential hazards.
 - iv. Determining emergency response procedures and emergency contacts.
 - v. Stipulating training and medical surveillance requirements.
 - vi. Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
 - vii. Modifying this HASP, if/as necessary.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- The SSO supports site activities by advising the FOL on all aspects of health and safety on-site. In this capacity the SSO:
 - i. Coordinates all health and safety activities with the FOL.
 - ii. Selects, applies, inspects, and maintains personal protective equipment.
 - iii. Establishes work zones and control points in areas of operation.
 - iv. Implements air monitoring program for onsite activities.
 - v. Verifies training and medical clearance of onsite personnel status in relation to site activities.
 - vi. Implements Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
 - vii. Coordinates emergency services.

- viii. Provides site-specific training for all onsite personnel.
- ix. Investigates all accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
- x. Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.

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

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

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Air Station Pensacola **Address:** Pensacola, Florida

Navy Engineer-in-Charge (EIC): Mr. Byas Glover **Phone Number:** (843) 820-5651

Facility Contact: Mr. Greg Campbell **Phone Number:** (850) 452-4611 Ext. 103

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 3.0).

Project Team:

TtNUS Personnel:	Discipline/Tasks Assigned:	Phone Number:
<u>Gerald Walker, P.G.</u>	<u>Task Order Manager (TOM)</u>	<u>850/385-9899</u>
<u>Matthew M. Soltis, CIH, CSP</u>	<u>CLEAN Health and Safety Manager (HSM)</u>	<u>412/921-8912</u>
<u>Thomas M. Dickson, CSP</u>	<u>Project Health and Safety Officer (PHSO)</u>	<u>412/921-8457</u>
<u>TBD*</u>	<u>Field Operations Leader (FOL)</u>	<u></u>
<u>TBD*</u>	<u>Site Safety Officer (SSO)</u>	<u></u>
<u>Tom Patton</u>	<u>Equipment Manager</u>	<u>412/262-4583</u>

NAS Pensacola

Tetra Tech NUS, Inc.

Project Support Staff

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Non-TtNUS Personnel	Affiliation/Discipline/Tasks Assigned	
<u>TBD*</u>	<u>Analytical Laboratory</u>	<u></u>
<u>TBD*</u>	<u>DPT Contractor</u>	<u></u>
<u>FedEx</u>	<u>Parcel/Sample Shipment</u>	<u>1(800)463-3339</u>

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

Matthew M. Soltis, CIH, CSP

*TBD - TO BE DETERMINED

1.3 SITE BACKGROUND

1.3.1 NAS Pensacola

NAS Pensacola is approximately 5,800-acres and is located on a peninsula bounded on the east and south by Pensacola Bay and Big Lagoon, and on the north by Bayou Grande.

1.3.2 Site 00022/UST 000026 Refuel Repair Shop

Site 22/UST 000026 is southwest of the intersection of John Tower and Taylor Roads (See Figure 1-1). This irregularly shaped site is approximately 300 x 400-foot open area, which is covered by crushed oyster shell, hard packed gravel or soil, and weedy vegetation. The site's southwestern edge is paved and Building 1659 occupies the southwest corner. The site is currently used for vehicle and equipment parking. A large pile of debris is located near the center of the site. The debris pile consists of discolored sand and woody organic materials said to be generated during street sweeping operations. This material is currently used as landscaping mulch.

Historical information indicates that the site was active between 1958 and 1977 as the Public Works departments Refueler Shop. During that period the area east northeast of Building 1681 was used to dispose of residual fuels drained from the Refueler trucks during maintenance. Although speculation, it is estimated that some 19,000 gallons of fuel (aviation gasoline and JP-4) may have been deposited at this location.

Based on historical evidence Site 00022/UST 000026 has been impacted by past practices. Over the last four sampling events, concentrations of benzene have exceeded groundwater clean-up criteria. Groundwater concentrations have ranged from 95 to 125 µg/L. Impact due to the benzene appears to be largely confined to the upper surficial aquifer and laterally from its center. Evaluations of data from these previous sampling efforts indicate that a residual mass in soil is likely quite small.

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 incidental or emergency release or occurrence. Tetra Tech NUS will, through necessary services, include incidental response measures for incidents such as:

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

Incidental response measures will only be provided to the capabilities of on-site personnel and available resources. Incidental response measures are not considered an emergency response as per 29 CFR 1910.120 (b). Incidents and situations that are deemed to be an emergency response as defined by 29 CFR 1910.120 (b) will be handled by outside resources. It has been determined that these off-site response agencies are capable of providing the most effective response and will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. These agencies will be contacted through NAS Pensacola Emergency Dispatch. This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(l)(1)(ii).

2.2 EMERGENCY PLANNING

Based on planned activities, the potential for field personnel to encounter significant emergency situations is minimal. However, some potential exists for injuries or illnesses resulting from exposure to chemical or physical hazards, and for encountering small spills or small fires. To minimize these potential emergency situations, the following emergency planning responsibilities are assigned to the FOL:

- Coordinating response actions with NAS Pensacola Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.
- Establishing and maintaining information at the project staging area (Support Zone) for easy access in the event of an emergency. This information is to include the following:
 - Chemical Inventory (for substances used onsite), with Material Safety Data Sheets.

- Onsite personnel Medical Data Sheets.
 - A logbook identifying personnel onsite each day.
 - Emergency notification phone numbers in all site vehicles
- Identifying a chain of command for emergency action.
 - Educating site workers to the potential hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible. This is to be accomplished by reviewing the relevant Safe Work Permits as part of daily tail gate safety briefings for each task planned for that day.

Also, it is the responsibility of the TtNUS FOL to ensure that a copy of this HASP and of the Health and Safety Guidance Manual are maintained at the site, in a location that they are available to all onsite personnel.

2.3 EMERGENCY RECOGNITION AND PREVENTION

The primary focus of this section is the ability to recognize and control factors that could contribute to an emergency situation/condition. The FOL, and/or the SSO will preview all site work location prior to committing personnel or resources. The objective of these work site previews will be to:

- Identify, remove, and/or barricade physical hazards within the estimated work area.
 - Ensure that approach paths to monitoring wells are maintained (cleared, mowed, etc.)
 - Inspect monitoring well protective casings to ensure that they are cleared of spider and insect nests, or to remove poisonous plants (e.g., poison ivy)
- Provide the necessary equipment to control potential emergencies (i.e., safety cans for flammable liquid storage, spill containment equipment, PPE, and emergency equipment such as portable fire extinguishers).
- Evaluate operations to ensure that necessary measures are taken to control and/or minimize the impact of emergency situations/conditions.

The members of the Field Crew shall also have responsibilities in emergency recognition and prevention. These include:

- Report any potential emergency situation to the FOL and/or the SSO.

- Assist in identifying, removing, or barricading physical hazards within their planned work area.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

Upon activation of the on-site emergency alarm system the following actions will occur:

- All operations will cease.
- Field personnel will note the direction of the wind based on the position of wind socks or other wind direction indicator
- Based on the wind direction, personnel will move cross and/or up wind to the designated primary or secondary safe place of refuge as identified in Figure 2-1.
- All personnel will remain at this location until directed otherwise by the FOL and/or the SSO.

The FOL and/or the SSO shall identify a safe place of refuge for site personnel to assemble in the event of an emergency. This location will be selected and conveyed to the Field Crew as part of the daily tailgate safety briefing.

2.4.1 Critical Operations

It is not anticipated that there will be any operations conducted under this scope of work which would be considered “critical” – meaning that they would require an individual or individuals to man during an emergency. Therefore, in the event of an emergency all operations will cease and all personnel will directly report to the designated safe place of refuge.

2.5 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During an evacuation, decontamination procedures will be performed only if they will not further jeopardize the welfare of site workers. It is unlikely that an emergency would occur which would require workers to evacuate the site without first performing appropriate decontamination procedures. Decontamination of medical emergencies will proceed in the following manner.

2.5.1 Non-life Threatening Medical Incident (bruises, cuts, scrapes, etc.)

The area of clothing or suit penetration will be isolated from the decontamination procedure by removing the protective garments or clothing surrounding the area of the injury and applying a light gauze wrap and plastic cover. Decontamination for unaffected areas will proceed as per Table 5-1 of this HASP.

2.5.2 Life threatening

- Notify off-site response agencies.
- If it will not endanger the injured individual (i.e., spinal cord injury, etc.) remove any outer PPE. Removal may require the use of bandage scissors to remove the outer garments.
- Begin life saving techniques as appropriate (first aid, cooling or warming regimens, etc.).
- Wrap the injured in a blanket for transport to the hospital.

Note: One person from the field team will accompany the injured to the hospital with his/her medical data sheet, appropriate MSDSs, a copy of this HASP, and the incident forms. This person will collect as much information as possible and transfer that information to the HSM and Work Care as per the Incident Response Protocol provided in Figure 2-2. All other personnel will engage site control/site security measures.

2.5.3 Emergency Medical Treatment

Tetra Tech NUS and subcontractor personnel are only permitted to provide treatment to the level of their First-Aid Training.

Emergency medical treatment will be initiated under the following guarded restrictions:

- Notify the FOL and/or the SSO of the incident.
- Take the necessary precautions to prevent direct contamination with the injured person's body fluids.
 - Use surgeons gloves when handling cuts, abrasions, bites, punctures, etc. or any part of the injured person. The use of safety glasses and surgeons masks maybe necessary, if there is the potential for uncontrolled spread of body fluids.
 - Should Cardio-Pulmonary Resuscitation (CPR) be required, use a CPR Micro-Shield mouthpiece when administering CPR.

2.6 **EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES**

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

- Initiate an emergency notification by hand signals, voice commands, air horn, or two-way radios to the FOL/SSO. Describe to the SSO (who will serve as the Incident Coordinator) what has occurred and provide as many details as possible.

- Evacuate non-essential persons from the incident scene, engage initial response measures given the emergency type (i.e., spill response, fire extinguisher, first-aid).

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

- Call NAS Pensacola Emergency Dispatch
- Give the emergency operator the location of the emergency and a brief description of what has occurred.
- Stay on the phone and follow the instructions given by the operator
- The appropriate agency will be notified and dispatched
- Call Navy On-Site Representative
- Call the TOM and the HSM

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

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

2.7 PPE AND EMERGENCY EQUIPMENT

A first aid kit, eye wash units, stretcher, and fire extinguishers will be maintained on-site at an easily accessible locations where they will be readily available for use.

The FOL and/or the SSO should ensure the First-Aid Kits are adequately stocked. All first-aid kits purchased for the job-site shall be American National Standards Institute (ANSI) approved for industrial applications. The SSO will determine the number of kits necessary based on the number of personnel and the number of remote operations being conducted under the scope of work. It is the SSO's responsibility to assess work site applications for specific first-aid needs based on operations being conducted. The SSO can contact the PHSO for guidance as necessary.

PPE levels to be used in an emergency will not exceed those items used in the completion of identified tasks. These are as follows:

2.7.1 Incidental Spill of Investigative Derived Wastes (IDW)

- PVC Rain-Suits or Tyvek based on the potential for soiling work clothes during clean-up
- PVC or Neoprene Over-boots (Pant legs on the outside of the over-boots)
- Nitrile inner surgeons gloves with Nitrile outer gloves over top
- Hard hat as conditions or overhead hazards exist

The determination to tape seams (pant legs and sleeves to boots and gloves will be decided based on existing climactic and work load conditions and the potential for heat stress.

Spill equipment (identified in Section 9.0) will be maintained in the investigative derived waste storage area to support rapid response.

2.7.2 Fire Fighting

Standard field attire will be used to combat incipient fires, from a sufficient distance as not to endanger field personnel. All personnel will be trained to use the fire extinguishers on-site as part of site-specific training. Fire extinguishers will be maintained at the following locations:

- Support trailer
- On each drill rig
- At all locations which store, dispense or otherwise handle flammable or combustible liquids.

All personnel authorized to use portable fire extinguishers must first be trained in their proper selection and use and maintenance of the fire extinguishers provided by their employer for use. The training information to be provided during site-specific training may be found in Attachment VI of this document.

2.8 EMERGENCY CONTACTS

Prior to performing work at the site, all personnel will be briefed on the emergency procedures to be followed in the event of an incident. A means of communication with outside agencies (such as a mobile phone) shall be available on site. Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table must be posted on site where it is readily available to all site personnel.

**TABLE 2-1
EMERGENCY CONTACTS
NAS PENSACOLA**

AGENCY	TELEPHONE
NAS Pensacola – Emergency Dispatch	(850) 452-3333
EMERGENCY (outside services) (Police, Fire, and Ambulance Services)	911
Navy Engineer-in-Charge – Byas Glover	(843) 820-5651 Code ES 24
Navy Facility Contact – Greg Campbell	(850) 452-4611 Ext. 103
Navy Hospital	(850) 505-6600
Baptist Hospital	(850) 469-2313
TiNUS Tallahassee Office Task Order Manager (Gerry Walker)	(850) 385-9899
CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Thomas Dickson, CSP	(412) 921-8457
WorkCare	(800) 455-6155

Note: All Emergency Notification for emergency services shall proceed through the Emergency Dispatch. This shall ensure access and support at the installation. All other notification can proceed through direct dial.

2.9 ROUTE TO HOSPITALS

For emergency care only, non-Navy personnel are permitted to go to the Navy Hospital.

Navy Hospital
Highway 98
Pensacola, Florida
(850) 505-6600

Directions to the Navy Hospital from the site are as follows:

Proceed out of Main Gate (Navy Blvd) heading north to US Highway 98. Turn left (heading west) on US 98 and proceed approximately 1 mile. Hospital will be on the right (Building 2268).

Baptist Hospital (850-469-2313) will be used for all non-emergency care services. Directions to this Hospital from the Main Gate of NAS Pensacola are:

Proceed out of Main Gate (Navy Blvd) heading north to Hwy 292. Turn right (heading east) on Hwy 292 until it turns into Garden Street (approx. 3 miles). Take Garden Street to intersection with “E” Street. Turn left onto “E” Street and proceed approximately 1 mile to Hospital on left.

A map indicating the travel route from the site to these Hospitals is provided as Figure 2-1.

Figure 2-1 Hospital Map

2.10 INJURY/ILLNESS REPORTING

TtNUS personnel who are injured or become ill on the job must notify appropriate company representatives. Figure 2-2 and Attachment I presents the procedure for reporting an injury/illness, and the form to use for this purpose. **If the emergency involves personnel exposures to chemicals, follow the steps in Figure 2-2.**

**FIGURE 2-2
EMERGENCY RESPONSE PROTOCOL**

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

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, or follow the voice prompt for after hours and weekend notification and be prepared to provide:
 - 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) 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 SCOPE OF WORK

The following is a list of activities that are covered in this HASP for CTO 0241:

- Mobilization/Utility Clearance/Demobilization
- Treatability Study
- Groundwater Sampling
- Decontamination
- IDW Management

3.1 MOBILIZATION/UTILITY CLEARANCE/DEMOBILIZATION

This task will include:

- Procurement and shipping of equipment, and materials for the field investigation.
- Review of planning documents (i.e., HASP, Sampling and Analysis Plan, Work Plan, etc.)
- Site Reconnaissance to include the layout of sampling locations and to secure the necessary utility clearances and isolate physical hazards, where applicable.
- Secure, construct, or equip decontamination facilities to support the field investigations.
- Secure, construct, or equip IDW storage facilities to support the field investigations.

Demobilization activities will involve arranging for departure of personnel and equipment, and securing the work area.

3.2 TREATABILITY STUDY

This activity will include the injection of approximately 2,240 pounds of ORC into the subsurface via 56 injection points via Direct Push Technology (DPT).

3.3 GROUNDWATER SAMPLING

There will be 5 groundwater sampling events: an initial pre-ORC injection baseline sampling event, followed by four quarterly monitoring events. Sampling will consist of low-flow sampling for volatile organic compounds, and natural attenuation sampling. Purge waters generated during sampling will be collected and managed as Investigation Derived Waste (IDW). Water level measurements will also be recorded as part of this task.

3.4 DECONTAMINATION

The equipment involved in the field activities for this investigation will be decontaminated prior to, during and after the sampling activities.

3.5 IDW MANAGEMENT

This task includes the containerization, labeling, staging, monitoring, and final deposition of Investigation Derived Wastes (IDW). These are as follows:

Containerization – Materials generated including development, decontamination, and purge waters (in other words, all materials that cannot be cleaned and which may have had direct contact with contaminated media). It is anticipated that containerization will involve using small containers such as United Nations/DOT approved 55-gallon drums (UN 1A2), and that larger bulk storage containers will not be necessary.

Labeling – All containers will be labeled as to their contents. The labels will include the following information

Site

Job Number

Location (SWMU)

Date – To be completed upon filling the container or when no more material is to be added

Drum # - Assign an inventory number to be added to a comprehensive log

Contents – Description

Volume – Final volume

Contact – This person should be available on base. To this end an up-dated inventory should be provided at the close of each shift to this person.

Emergency Number – Contact person provided above

Staging – All drums will be staged on pallets (no more than 4 drums to a pallet) with lid retention ring bolt accessible on the outside. Pallet rows will maintain a minimum of 3 feet between rows for access and monitoring for leaks.

Monitoring – During staging site personnel will examine containers to ensure they are not leaking.

Final Deposition – IDW materials will be separated as determined through sampling and disposed of through pre-determined routes.

For more detailed description of the associated tasks, refer to the Sampling and Analysis Plan (SAP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this HASP. The PHSO or a designated representative will submit all requested modifications to this document to the HSM.

4.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

4.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section specifies health and safety training and medical surveillance requirements for both Tetra Tech NUS and subcontractor personnel participating in on site activities.

4.1.1 Requirements for All Field Personnel

All Tetra Tech NUS and subcontractor personnel who will engage in field associated activities as described in this HASP must have:

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

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

NOTE: Failure to provide acceptable documentation (Bring this documentation with you on the initial day activities are to commence) concerning training qualifications and status will result in restriction of the Subcontractor from all activities identified in this HASP. Costs incurred by the Subcontractor through this delay in providing documentation regarding qualification and status of training, will be sustained by the Subcontractor.

4.2 SITE-SPECIFIC TRAINING

Tetra Tech NUS will provide site-specific training to all Tetra Tech NUS employees and subcontractor personnel who will perform work on this project.

Figure 4-1 will be used to document the provision and content of the project-specific and associated training. All site personnel will be required to sign this form prior to commencement of site activities.

4.3 MEDICAL SURVEILLANCE

4.3.1 Medical Surveillance Requirements for Tetra Tech NUS and Subcontractor Personnel

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

Documentation for medical clearances will be maintained at the job site and made available, as necessary, to authorized company individuals. Subcontractor personnel may use alternative documentation for this purpose. The "Subcontractor Medical Approval Form" can be used to satisfy this requirement (see Tab 7, section 5.0 of the TtNUS Health and Safety Guidance Manual), or a letter from an authorized representative from their company. The letter should state that the persons listed in the letter participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR), Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response." The letter should further state the following:

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

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

NOTE: Failure for any site personnel to provide acceptable documentation concerning medical clearance will result in restriction from all activities identified in this HASP. Subcontractors will be responsible for any costs incurred for failure of their personnel to produce this documentation upon arrival at the site.

4.3.2 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 also supplied to eligible subcontractors as part of the Bid Specifications Package. 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. Medical Data Sheets can be found in Tab 7, section 5.0 of the TtNUS Health and Safety Guidance Manual.

4.4 SUBCONTRACTOR EXCEPTION

Subcontractor personnel who will not enter the exclusion zone and who have no potential for exposure to site contaminants may be exempt from the training and medical surveillance requirements specified in this section (with the exception of Section 4.2, attendance at site-specific training). Examples of subcontractors who may qualify as exempt from training and medical surveillance requirements may include surveyors who perform their activities only in site perimeter areas or areas where there is no potential for exposure to site contaminants. **Use of this Subcontractor Exception is strictly limited to the authority of the CLEAN Health and Safety Manager.**

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section identifies the tasks that are to be performed as part of the scope of work, as well as the recognized task-specific hazards, recommended control measures, air-monitoring recommendations, required Personal Protective Equipment (PPE), and decontamination measures. This table is subject to review and possible modification if the scope of work, contaminants of concern, or other conditions change.

The FOL/SSO will utilize Table 5-1 as the primary reference for completing the task-specific Safe Work Permits. The Safe Work Permit is the primary tool for accomplishing safety and health reviews with field personnel prior to the initiation of any tasks. Safe Work Permits are to be issued for all Exclusion Zone activities (See Section 8.1.1 and Attachment IV). 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 take precedence. These permits have been completed to the extent possible as part of preparing this HASP, and they are to be completed by the FOL/SSO and reviewed with all field personnel at the beginning of each day's activities.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1 and the Safe Work Permits, the following general safe work practices are to be followed when conducting work on-site. These safe work practices address general precautions and measures for reducing risks associated with site operations. This list is not all inclusive and may be amended as necessary.

- Do not eat, drink, chew gum or tobacco, take medication, or smoke in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.
- Avoid contact with potentially contaminated substances. Avoid puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Keep monitoring equipment away from potentially contaminated surfaces.
- Obey all instructions in the site-specific HASP.

- Practice good housekeeping at all work areas. Maintain these work areas in a clear and orderly manner to prevent tripping and other hazards.
- Take note of the location of the nearest telephone and all emergency telephone numbers. See Section 2.0, Table 2-1.
- Attend and participate in daily tailgate safety briefings on anticipated hazards, equipment requirements, emergency procedures, and communication methods.
- Plan and designate entrance, exit, and emergency escape routes. See Section 2.0.
- Rehearse unfamiliar operations prior to implementation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone) and other operational areas such as decontamination pads. Non-essential vehicles and equipment should be to remain within the Support Zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Safety Officer (SSO).
- Matches and lighters are restricted from entering in the Exclusion Zone or Contamination Reduction Zone.
- Observe coworkers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DIRECT PUSH OPERATIONS - SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working with or around Direct Push Operations.

5.2.1 Before Direct Push Operations

- Identify all underground utilities and buried structures before breaking ground surfaces. Use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.
- All direct push rigs will be inspected by a Competent Person (the SSO or designee), prior to the acceptance of the equipment at the site and prior to the use of the equipment. All repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment III. Inspection frequencies will be once every 7 or 10 day shift or following repairs.
- The work areas around point of operations will be guarded to the extent possible to remove any hazards near or surrounding operating equipment.
- The DPT operator and helper(s) will establish an equipment staging and laydown plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as DPT flights will be provided to avoid the collapse stacked equipment.
- All potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.

5.2.2 During Direct Push Operations

- Minimize contact to the extent possible with contaminated tooling and environmental media.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the direct push rig. This minimum distance will be the height of the DPT mast plus five feet.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT rig.
- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should move heavy tooling, where necessary.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted at all times.

5.2.3 After Direct Push Operations

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determined cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.
- All motorized equipment will be fueled prior to the commencement of each day's activities. During fueling operations, all equipment must be shutdown and bonded to the fuel provider.
- When not in use DPT rigs are to be shutdown, with emergency brakes set, and if ground surface is not level, the wheels are to be properly chocked.
- All areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
NAS PENSACOLA, PENSACOLA, FLORIDA
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
Mobilization/Utility Clearance/ and Demobilization	<p>Chemical hazards:</p> <p>1) The on-site Hazard Communication Program (Section 5.0 of the Health and Safety Guidance Manual) will be followed. All chemicals brought onto the site by Tetra Tech NUS and subcontractor personnel will be inventoried and have an MSDS on site. This effort shall include</p> <ul style="list-style-type: none"> - Creating and maintaining an accurate Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS) This list, which also includes quantities and storage locations may be provided to NAS Pensacola Emergency Response Units. - MSDS's will be maintained in a central location, accessible to all personnel. <p>All containers will have labels specifying the following information:</p> <ul style="list-style-type: none"> - Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List) - Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.) - Manufacturer's Name Address and Phone Number <p>Physical hazards:</p> <p>2) Lifting (strain/muscle pulls) 3) Pinches and compressions/Struck by 4) Slips, trips, and falls 5) Heavy equipment hazards (operation-based hazards, material handling, etc.) 6) Vehicular and foot traffic 7) Ambient temperature extremes (heat/cold stress)</p> <p>Natural hazards:</p> <p>8) Insect/animal bites and stings, poisonous plants, etc. 9) Inclement weather 10) Contact with underground or overhead utilities</p>	<p>Chemical hazards:</p> <p>1) All personnel will be required to review the appropriate MSDS's, prior to the use of a specified chemical substance. This direction should also be communicated on the Safe Work Permit completed for this task.</p> <p>2) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques</p> <ul style="list-style-type: none"> - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. <p>In determining whether you can lift an item several factors must be considered, these are as follows:</p> <ul style="list-style-type: none"> - Maximum weight lifted by a single person should not exceed 70 pounds. Items over 70 pounds or the amount you feel you can confidently lift up to 70 pounds should define a point where assistance in the lift is sought. Other conditions impacting when assistance should be sought include: <ul style="list-style-type: none"> • Area available to maneuver the lift. • Area of the lift – Work place clutter, slippery surfaces • Each individual's physical condition <p>3) Keep any machine guarding in place. Do not modify tooling without manufacturer's expressed permission.</p> <ul style="list-style-type: none"> - Avoid moving parts. - Use tools or equipment where necessary to avoid contacting pinch points. - Adjust machine guarding as necessary to minimize distance between guards and point of operation. - When staging equipment, insure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. <p>4) Preview work locations for unstable/uneven terrain.</p> <ul style="list-style-type: none"> - Cover, guard and barricade all open pits, ditches, and floor opening as necessary. The FOL and the SSO should identify these potential hazards during site surveys and site preparation. <p>5) All equipment will be:</p> <ul style="list-style-type: none"> - Inspected in accordance with OSHA and manufacturer's design. - Operated by knowledgeable operators and ground crew. <p>6) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> - Establish safe zones of approach (i.e. Boom or mast + 5 feet). - Foot and vehicular traffic routes shall be well defined - Secure all loose articles. - All self-propelled equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the site requirements. <p>7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat and cold stress is provided in Section 4.0 of the Health and Safety Guidance Manual.</p> <p>8) Avoid nesting areas, use repellents, and tape up pant legs to the top of work boots. In high vegetation/brush areas (knee high or greater) wear Tyvek taped to work boots. Report potential hazards to the SSO. Follow guidance presented in Section 4.0 of the Health and Safety Guidance Manual and Attachment V of this HASP.</p> <p>9) Suspend or terminate operations until directed otherwise by SSO (Thunderstorms, high heat, etc.) Take necessary precautions for protection against the sun (See Section 6.3.4.2 of this HASP).</p> <p>10) Follow Attachment II regarding SOP for Utility Locating and Excavation Clearance.</p>	Visual observation of work practices by the SSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, etc.).	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Safety glasses - Hardhat (when overhead hazards exists, or identified as a operation requirement) - Reflective vest for high traffic areas - Hearing protection for high noise areas, or as directed on an operation by operation scenario. <p>Additional Protective measures include</p> <p>Insect Repellant Sunscreen Tape up bottom of pant legs to work boots Tyvek coveralls taped to work boots for high brush</p> <p>Note: Provisions addressing site specific conditions will be recorded on the Safe Work Permit and presented on-site by the FOL and/or the SSO as part of the daily briefing.</p>	Perform close body inspections for ticks and other insects when exiting suspected nesting/habitat areas.

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
NAS PENSACOLA, PENSACOLA, FLORIDA
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06/18/02

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment	<p>Chemical hazards:</p> <p>1) Previous analytical data identified that contaminants of concern in the groundwater at this work area are fuel related. The fuel component that represents the greatest toxicological concern is benzene. Exposure to site contaminants at levels that could represent an inhalation exposure concern during this task are considered unlikely.</p> <p>Benzene (Primary Contaminant - Range 95 to 125 µg/L – Monitoring well GS-01-Source well) No residual mass was noted within the soils.</p> <p>Table 6-1 provides additional information about potential site contaminants that may be present in site media.</p> <p>2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent)</p> <p>Physical hazards:</p> <p>3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Struck by 7) Slips, trips, and falls</p> <p>Natural hazards:</p> <p>8) Inclement weather</p>	<p>1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program (See Section 5.0 of the Health and Safety Guidance Manual).</p> <ul style="list-style-type: none"> - Use isopropanol only in well ventilated areas or outdoors <p>3) Use multiple persons where necessary for lifting and handling heavy equipment, such as auger flights for decontamination purposes.</p> <ul style="list-style-type: none"> - Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization. <p>4) Wear hearing protection when operating the Steam Cleaner or pressure washer. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA.</p> <p>5) Use eye and face protective equipment when operating the steam cleaner or pressure washer, due to flying projectiles. All other personnel must be restricted from the area. In addition to minimize hazards (flying projectiles, water lacerations and burns) associated with this operation, the following controls will be implemented</p> <ul style="list-style-type: none"> - A 25° Fan Tip will be used on pressurized systems over 3,000 psi. This will reduce the possibility of lacerations. - Thermostat control to regulate the temperature levels. - Visual evaluations of hoses and fittings for structural defects - Construct deflection screens as necessary to control overspray and to guard against dispersion of contaminants driven off by the spray. <p>6) Struck by – Ensure wash and drying racks are suitable construction to support heavier items such as auger flights and will secure them against falling during this process.</p> <p>7) The decontamination pad should be constructed to contain wash waters generated during decontamination procedures. Temporary decontamination pads are usually 10-30 mil polyethylene or polyvinyl chloride tarp construction. Although these items when used as a liner offer containment, they also present a slipping hazard. When these temporary liners are employed, it is recommended that a light coating of sand be spread over the walking surface to provide traction.</p> <ul style="list-style-type: none"> - In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decon workers do not have to walk through the wash waters while completing their tasks. - Hoses should be gathered when not in use to eliminate potential tripping hazards. <p>8) Suspend or terminate operations until directed otherwise by SSO.</p>	<p>Use visual observation and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried.</p> <p>After decontamination is completed and parts are visually clean and dry</p> <ul style="list-style-type: none"> - Screen equipment with a PID. If any elevated readings (i.e., above background) are observed, perform rinse process again and re-screen. Repeat until no elevated PID readings are noted. The intent is two-fold. First to ensure the removal of all site contaminants. Secondly, to ensure the removal of decontamination solvents to prevent cross contamination. 	<p>For Heavy Equipment This applies to steam cleaning and pressure washing operations and soap/water wash and rinse procedures.</p> <p>Level D Minimum requirements:</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Chemical resistant boot covers - Nitrile gloves - Safety glasses underneath a splash shield - Hearing protection (plugs or muffs) - <i>Hooded PVC Rainsuits or PE or PVC coated Tyvek</i> <p>For sampling equipment (trowels, Macro-Core Samplers, bailers, etc.), the following PPE is required</p> <p>Note: Consult MSDS for PPE guidance. Otherwise, observe the following.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves over nitrile inner gloves - Safety glasses - <i>Rubber Apron</i> <p>In the event of overspray of chemical decontamination fluids, employ PVC Rainsuits or PE or PVC coated Tyvek as necessary.</p> <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). This decontamination function may be subdivided into two locations.</p> <p>Gross contamination of outer boots and outer gloves will be removed at a satellite location near the operation.</p> <p>Final wash and rinse will take place at the centralized decontamination pad.</p> <p>The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Decon personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands</p> <p>Equipment Decontamination - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the on-site activity.</p> <p>Sampling Equipment Decontamination</p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
NAS PENSACOLA, PENSACOLA, FLORIDA
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
<p>Groundwater sampling.</p> <p>This task also includes well development of existing and newly installed ground water monitoring wells.</p> <p>Note: This task table does not address Natural Attenuation. That task has been addressed on its own merit, due to the use of various reagents.</p>	<p>Chemical hazards:</p> <p>1) Previous analytical data identified that contaminants of concern in the groundwater at this work area are fuel related. The fuel component that represents the greatest toxicological concern is benzene. Exposure to site contaminants at levels that could represent an inhalation exposure concern during this task are considered unlikely.</p> <p>Benzene (Primary Contaminant - Range 95 to 125 µg/L – Monitoring well GS-01-Source well) No residual mass was noted within the soils.</p> <p>Table 6-1 provides additional information about potential site contaminants that may be present in site media.</p> <p>2) Transfer of contamination into clean areas</p> <p>Physical hazards:</p> <p>3) Noise in excess of 85 dBA 4) Lifting (strain/muscle pulls) 5) Pinches and compressions 6) Slips, trips, and falls 7) Ambient temperature extremes (heat/cold stress) 8) Vehicular and foot traffic</p> <p>Natural hazards:</p> <p>9) Insect/animal bites and stings, poisonous plants, etc. 10) Inclement weather</p>	<p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. See decontamination of heavy and sampling equipment for direction in this task.</p> <p>3) When sampling at an operating DPT or other type of drill rig use hearing protection. The use of hearing protection outside of 25 feet from the DPT rig should be incorporated under the following condition:</p> <p style="padding-left: 40px;">If you have to raise your voice to talk to someone who is within 2 feet of your location, you may be approaching excessive noise levels (80-85dBA) and hearing protection should be worn until the noise source may be positively quantified.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques (See Lifting Mobilization/Demobilization, Page 1 of 6, Table 5-1).</p> <p>5) Avoid moving parts, do not remove any machine guarding.</p> <ul style="list-style-type: none"> - Use tools or equipment where necessary to avoid contacting pinch points. - A remote sampling device must be used to sample drill cuttings near rotating tools. The equipment operator shall shutdown machinery if the sampler is near moving machinery parts. - Remove any snag points - Follow Safe Work Permit and Safe Work Practices for DPT operations (See Section 5.1 & 5.2) <p>6) Preview work locations for unstable/uneven terrain.</p> <ul style="list-style-type: none"> - Ruts, roots, and other tripping hazards should be eliminated from around the point of operation to minimize trips and falls when approaching the percussion or hydraulic tooling. - Use multiple persons and small loads to pack sampling resources to remote locations. - Construct rope ladders and other engineered assistance for traversing hills and inclines > 45°. <p>7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat/cold stress is provided in Section 4.0 of the Health and Safety Guidance Manual.</p> <p>8) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> - Establish safe zones of approach (i.e. Mast or Boom + 5 feet). See Section 8.0 of the HASP for specific safety zones and established clearance recommendations. - All self-propelled equipment shall be equipped with movement warning systems. - When sampling along roadways, use signs to indicate men working as well flag persons, as necessary. Personnel working in and around any established traffic patterns should wear high visibility vests to increase visual recognition. <p>9) Avoid nesting areas, use repellents approved by the FOL. Report potential hazards to the SSO. Follow guidance presented in Section 4.0 of the Health and Safety Guidance Manual and Attachment V of this HASP. Some of the investigation area is more heavily vegetated. In addition the debris pile located in the middle of the site may offer harbor to insects and animals. Based on this care should be taken when in these areas. Taping up pant legs to boots, use of repellants, and close body examinations should be employed when this hazard exists.</p> <p>10) Suspend or terminate operations until directed otherwise by the SSO.</p>	<p>Site screening will encompass general screening activities for the source materials and benzene component during monitoring well installation and sampling.</p> <p>All samples will be screened for</p> <ul style="list-style-type: none"> - Volatile organic concentrations <p>VOCs Screening</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 5 minute in duration) above 5 ppm in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to below 5 ppm. If elevated readings in worker breathing zone occur more than three times through the course of a day or persists, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p><u>Correction Factor for PID 10.6 eV Lamp:</u></p> <p>Correction factor x meter readout = Actual results The correction factor for Benzene utilizing a 10.6 eV lamp is 0.53.</p> <p>Example – Meter readout 10 ppm x 0.53 = 5.3 ppm actual concentration</p> <p>The above information has been provided as a contingency measure. Given the task and potential for exposure in this open air setting and the concentrations available in the media occupational exposure is not anticipated.</p> <p>The generation of appreciable dusts is not anticipated during this activity.</p> <p>Frequency :</p> <p>Monitoring will be performed at periodic intervals. Initially, when one quarter of the extraction volume is pumped; and again when one half the extraction volume is pumped.</p>	<p>Level D protection will be utilized for the following sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (<i>double-layered if necessary</i>) - <i>Reflective vest for high traffic areas</i> - <i>Hardhat (when overhead hazards exists)</i> - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> <p>Note: The Safe Work Permit(s) for this task (See Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination</p> <p>Personal decontamination will vary based on the type of sampling conducted. These are as follows:</p> <p>Supporting subsurface investigations at the DPT.</p> <ul style="list-style-type: none"> - Decontamination will be the same as that prescribed for DPT activities in the Natural Attenuation task. <p>Sampling groundwater the following provisions will apply</p> <ul style="list-style-type: none"> - Upon completion of the sampling dedicated tubing will be bagged for transport back to the central decontamination area. - PPE (gloves) will be removed and also bagged for disposal. - Handi-Wipes or similar product will be used to clean hands prior to moving to the next location. Personnel will wash with soap and water at their earliest convenience, prior to lunch and/or breaks. <p>In addition if the potential exists for ticks and other insects a close body inspection will be performed when possible and upon leaving the vegetated area.</p> <p>Equipment Decontamination</p> <p>All equipment used in remote sampling locations will be brought back to the central decontamination area for decontamination and re-use or decontamination and gross removal of contamination prior to disposal.</p> <p>Note: Field screening instruments will be wrapped to minimize the necessary decontamination except for wiping down parts which are necessary to expose to the external environment. The equipment reference above is largely directed at hand tools.</p> <p>Decontamination of equipment (sampling and hand tools) will proceed as indicated in the Sampling and Analysis Plan and/or Work Plan.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring – Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
<p>Natural Attenuation</p> <p>This task will involve geochemical analysis of the groundwater samples obtained to determine natural attenuation propensity.</p>	<p>Chemical hazards:</p> <p>Previous analytical data identified that contaminants of concern in the groundwater at this work area are fuel related. The fuel component that represents the greatest toxicological concern is benzene. Exposure to site contaminants at levels that could represent an inhalation exposure concern during this task are considered unlikely.</p> <p>Benzene (Primary Contaminant - Range 95 to 125 µg/L – Monitoring well GS-01-Source well) No residual mass was noted within the soils.</p> <p>Table 6-1 provides additional information about potential site contaminants that may be present in site media.</p> <p>During Natural Attenuation sampling the following reagents will be employed.</p> <p>Dissolved Oxygen Chemical Extraction</p> <ul style="list-style-type: none"> - Manganous sulfate - Alkaline iodide azide - Sulfamic acid <p>Titration</p> <ul style="list-style-type: none"> - 0.02 N Sodium thiosulfate - Starch Indicator Solution <p>Ferrous Iron</p> <ul style="list-style-type: none"> - 1,10-phenanthroline indicator solution - Ferrous Iron Reagent <p>Hydrogen Sulfide</p> <ul style="list-style-type: none"> - Sodium/potassium bicarbonate <p>Carbon dioxide</p> <ul style="list-style-type: none"> - Sodium Hydroxide - Phenolphthalein solution <p>2) Transfer of contamination into clean areas</p> <p>Physical hazards:</p> <p>3) Lifting 4) Slips, trips, and falls 5) Sharps</p> <p>Natural hazards:</p> <p>6) Insect/animal bites and stings, poisonous plants, etc. 7) Inclement weather</p>	<p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.) and reagents used in the natural attenuation sampling process. Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected.</p> <p>The MSDSs for the Natural Attenuation Sampling Reagents are to be included in Section 5.0 of the Health and Safety Guidance Manual (Hazard Communication Section). The FOL is responsible for securing these MSDSs. All personnel identified as participating in the Natural Attenuation sampling must review the MSDSs prior to the commencement of that sampling.</p> <p>Spill containment - Establish a secondary containment (small mortar type tub) to conduct natural attenuation field screening parameter measurements, this will control the impact of potential spills.</p> <p>Portable Eyewash - As some of the reagent components are irritating and under extreme conditions corrosive a portable eyewash will be positioned nearby and maintained to flush skin and/or eyes should incidental contact occur.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. See Decontamination of heavy and sampling equipment for direction in this task.</p> <p>Physical hazards:</p> <p>3) Lifting Hazards - As some of the locations may require carrying sampling equipment and supplies the following precautions should be employed:</p> <ul style="list-style-type: none"> - Use machinery or multiple personnel for heavy lifts. - Use proper lifting techniques (See Lifting Mobilization/Demobilization, Page 1 of 6, Table 5-1). - Divide loads to be transported into smaller lighter increments. <p>4) Slip, trip, and Fall - Preview work locations for unstable/uneven terrain.</p> <ul style="list-style-type: none"> - Ruts, roots, and other tripping hazards should be eliminated from access paths to the extent possible. - Use multiple persons and small loads to pack sampling resources to remote locations. The consequences of a slip or fall while carrying a load could potentially magnify the severity of the outcome. - Construct rope ladders and other engineered assistance for traversing hills and inclines > 45°. <p>5) Sharps – Many of the reagents to be used for natural attenuation sampling are provided in glass ampules which require snapping the tip off and invert the ampule multiple times to mix the sample media with the reagent. To minimize hazards associated with this task, the following safe work practices will be used:</p> <ul style="list-style-type: none"> - Invert the glass ampule and place within the sampling stream inside the collection funnel. Apply pressure to the side when snapping the ampule head, NOT downward. - The ampule will fill with sample media, leaving a bubble to facilitate mixing. Place a gloved finger over the opening, invert the ampule to mix the sample and reagent. This procedure may require repeating several times. Care should be exercised as not to apply too much pressure which may result in damage to your glove. - Upon completion, broken ampule shall be rinsed and placed in a hard sided container for disposal. - If you must go into the disposable items in the trash, make sure you dump it out onto a table to retrieve the item you require. Do NOT reach into the trash. This will prevent injuries from sharp sticks in the event someone has mistakenly thrown a broken ampule away. <p>Natural hazards:</p> <p>6) Avoid nesting areas, use repellents approved by the FOL. Report potential hazards to the SSO. Follow guidance presented in Section 4.0 of the Health and Safety Guidance Manual and Attachment V of this HASP. Tape up pant legs to work boots; use Tyvek taped up to work boots for high brush areas (knee high or greater); perform close body inspections to detect and remove ticks and other associated insects.</p> <p>7) Suspend or terminate operations until directed otherwise by the SSO.</p>	<p>Site screening will consist of general screening protocol for benzene and source materials (gasoline and JP-4)</p> <p>All samples will be screened for</p> <ul style="list-style-type: none"> - Volatile organic concentrations <p>VOCs Screening</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 5 minute in duration) above 5 ppm in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to below 5 ppm. If elevated readings in worker breathing zone occur more than three times through the course of a day or persists, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p><u>Correction Factor for PID 10.6 eV Lamp:</u></p> <p>Correction factor x meter readout = Actual results The correction factor for Benzene utilizing a 10.6 eV lamp is 0.53.</p> <p>Example – Meter readout 10 ppm x 0.53 = 5.3 ppm actual concentration</p> <p>The above information has been provided as a contingency measure. Given the task and potential for exposure in this open air setting and the concentrations available in the media occupational exposure is not anticipated.</p> <p>The generation of appreciable dusts is not anticipated during this activity.</p> <p>Frequency :</p> <p>Monitoring will be performed at periodic intervals initially, quarter of the extraction volume is pumped; half the extraction volume is pumped.</p>	<p>Level D protection will be utilized for the following sampling activities.</p> <p>Groundwater samples</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (<i>double-layered or a heavy neoprene or nitrile glove for protection against the sharp edge ampoules</i>) - <i>Reflective vest for high traffic areas</i> - Hardhat (when overhead hazards exists, or when working on the golf course during operational hours) - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> <p>Note: This activity has not been identified as part of the scope of work, but may be incorporated at a later time. At that time the FOL and/or the SSO will complete a Safe Work Permit(s) for this task.</p>	<p>Personnel Decontamination</p> <p>Personal decontamination will vary based on the type of sampling conducted. These are as follows:</p> <p>Sampling surface water, groundwater, and sediments the following provisions will apply</p> <ul style="list-style-type: none"> - Upon completion of the sampling dedicated tubing, etc. will be bagged for transport back to the central decontamination area. - PPE (gloves) will be washed, removed and also bagged for disposal. - Handi-Wipes or similar product will be used to clean hands prior to moving to the next location, when access to soap and water is not feasible due to the location. - In all instances hands and face washing will be conducted upon arrival back at the central decontamination unit prior to scheduled breaks and when leaving the site. <p>When the potential exists for infestation by ticks and other insects, close body inspections shall be performed for the purpose of detection.</p> <p>Equipment Decontamination</p> <p>All equipment used in remote sampling locations will be brought back to the central decontamination area for decontamination and re-use or decontamination and gross removal of contamination prior to disposal.</p> <p>Note: Field screening instruments will be wrapped to minimize the necessary decontamination except for wiping down parts which are necessary to expose to the external environment. The equipment reference above is largely directed at hand tools.</p> <p>Decontamination of equipment (sampling and hand tools) will proceed as indicated in the Sampling and Analysis Plan and/or Work Plan.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
NAS PENSACOLA, PENSACOLA, FLORIDA
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
<p>Treatability Study</p> <p>This task will involve installing 56 injection wells via DPT and injecting 2,240 pounds of ORC</p>	<p>Chemical hazards:</p> <p>Previous analytical data identified that contaminants of concern in the groundwater at this work area are fuel related. The fuel component that represents the greatest toxicological concern is benzene. Exposure to site contaminants at levels that could represent an inhalation exposure concern during this task are considered unlikely.</p> <p>Benzene (Primary Contaminant - Range 95 to 125 µg/L – Monitoring well GS-01-Source well) No residual mass was noted within the soils.</p> <p>Table 6-1 provides additional information about potential site contaminants that may be present in site media.</p> <p>Well Construction Materials</p> <ul style="list-style-type: none"> - Bentonite - Grout - Filter Sand <p>2) Transfer of contamination into clean areas or onto persons</p> <p>Physical hazards:</p> <p>3) Heavy equipment hazards (pinch/compressions points, hydraulic lines, etc.)</p> <p>4) Noise in excess of 85 dBA</p> <p>5) Energized systems (contact with underground or overhead utilities)</p> <p>6) Lifting (strain/muscle pulls)</p> <p>7) Slips, trips, and falls</p> <p>8) Vehicular and foot traffic</p> <p>9) Ambient temperature extremes (heat/cold stress)</p> <p>10) Flying projectiles</p> <p>Natural hazards:</p> <p>11) Insect/animal bites and stings, poisonous plants, etc.</p> <p>12) Inclement weather</p>	<p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected.</p> <p>-Verify monitoring well construction materials (grout, bentonite, sand, and decontamination solutions) MSDS are included in Hazard Communication Program. This is the FOLs responsibility. Ensure personnel constructing wells have reviewed the MSDS and understand potential health effects.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site. Wrap all portable equipment to be transported across clean areas of the site to the central decontamination pad.</p> <p>3) All equipment will be:</p> <ul style="list-style-type: none"> - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design. All inspections will be documented using the Equipment Inspection Checklist found in Attachment III of this HASP. - Operated and supported by knowledgeable operators, and ground crew. - Used within safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 25 feet from the point of operation. See Section 8.0 of this HASP. This will be the area identified as the exclusion zone. <p>In addition to equipment considerations, the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none"> - Hydraulic masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities. - Hand signals will be established prior to the commencement of the operation. - A remote sampling device must be used to sample drill cuttings near rotating tools - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (e.g., flight connectors). - Work areas will be kept clear of clutter. - Secure all loose articles to avoid possible entanglement during coring activities. - All self-propelled equipment shall be equipped with movement warning systems. - All personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then periodically) to ensure its operational status. - Areas will be inspected prior to the movement of the drill rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - The DPT and support vehicles will be moved no closer than 3 feet to unsupported side-walls of excavations and embankments. <p>4) Hearing protection will be used during all subsurface activities using the DPT. Boundaries will be established to limit noise hazard. Height of the mast + 5 feet or a minimum of 25 feet is normal. Excessive noise levels are being approach when you have to raise your voice to talk to someone within 2 feet of your location.</p> <p>5) All drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II. All utility clearances will be obtained, in writing, and locations identified and marked prior to activities. Overhead utilities will also be identified.</p> <p>6) Use machinery or multiple personnel for heavy lifts. Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization.</p> <p>7) Preview work locations for unstable/uneven terrain.</p> <p>8) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when working in or along traffic thoroughfares.</p> <p>9) Wear appropriate clothing for weather conditions. Acceptable shelter and liquids for field crews.</p> <p>10) Wear eye protection and hard hat when the DPT rig is operating. Restrict all others from the area.</p> <p>11) Avoid nesting areas, use repellents, tape up pant legs to work boots, wear Tyvek coveralls taped to work boots for high brush areas (knee high or greater). Report potential hazards to the SSO. See Section 4.0 of the Health and Safety Guidance Manual Attachment V of this HASP.</p> <p>12) Suspend or terminate operations until directed otherwise by SSO.</p>	<p>Site screening will encompass only general protocol measures for monitoring</p> <ul style="list-style-type: none"> - Volatile organic concentrations <p>VOCs Screening</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 5 minute in duration) above 5 ppm in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to below 5 ppm. If elevated readings in worker breathing zone occur more than three times through the course of a day or persists, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <p><u>Correction Factor for PID 10.6 eV Lamp:</u></p> <p>Correction factor x meter readout = Actual results The correction factor for Benzene utilizing a 10.6 eV lamp is 0.53.</p> <p>Example – Meter readout 10 ppm x 0.53 = 5.3 ppm actual concentration</p> <p>The above information has been provided as a contingency measure. Given the task and potential for exposure in this open air setting and the concentrations available in the media occupational exposure is not anticipated.</p> <p>Visible dusts = >2mg/m³</p> <p>Generation of dusts should be minimized to avoid inhalation of contaminated dusts and/or particulates.</p>	<p>Level D protection will be utilized for the following soil boring and well installation activities.</p> <p>For Geologist examining the samples</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (double-layered or a heavier neoprene or nitrile gloves) - <i>Reflective vest for high traffic areas</i> - Hardhat (when overhead hazards exists) - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - Hearing protection for high noise areas, or as directed on an operation by operation scenario. <p>Driller and Driller Helper</p> <ul style="list-style-type: none"> - Standard field attire including sleeved shirt and long pants - Safety shoes (Steel toe/shank) - Safety glasses - Nitrile inner gloves; Nitrile outer gloves - Hard hat (as prescribed above) - Impermeable garment or Rubber apron and sleeves for handling auger flights is acceptable due to heat stress. - Hearing protection for high noise areas - <i>Reflective vest for traffic areas</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task. Protective levels may require modification should this activity be required to be conducted within a controlled zone due to an on-going operation.</p>	<p>Personnel Decontamination will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). This decontamination function may be subdivided into two locations.</p> <p>Gross contamination of outer boots and outer gloves will be removed at a satellite location near the operation. Final wash and rinse will take place at the centralized decontamination pad.</p> <p>The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Decon personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands</p> <p>When the potential exists for infestation by ticks and other insects, close body inspections shall be performed for the purpose of detection.</p> <p>Equipment Decontamination - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>Sampling Equipment Decontamination</p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES SUMMARY
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
IDW Management and Handling	<p>Chemical Hazards: The only anticipated hazard associated with IDW management is the potential for a spill. In situations such as that the spill containment program identified in Section 9.0 will be employed.</p> <p>1) Previous analytical data identified that contaminants of concern in the groundwater at this work area are fuel related. The fuel component that represents the greatest toxicological concern is benzene. Exposure to site contaminants at levels that could represent an inhalation exposure concern during this task are considered unlikely.</p> <p>Benzene (Primary Contaminant - Range 95 to 125 µg/L – Monitoring well GS-01-Source well) No residual mass was noted within the soils.</p> <p>Table 6-1 provides additional information about potential site contaminants that may be present in site media.</p> <p>Physical Hazards:</p> <p>1) Strains and sprains or other injuries resulting from lifting and manually handling materials</p>	<p>Chemical Hazards: It is not anticipated that chemical hazards will be significant during this operation, as the IDW will be in sealed containers. It is anticipated that the IDW will represent a limited chemical hazard if the container is breached. Control measures in this case will represent PPE and good work hygiene practices to control potential exposures during the implementation of the Spill Containment Program (See Section 9.0).</p> <p>Physical Hazards:</p> <p>1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques</p> <ul style="list-style-type: none"> - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. <p>In determining whether you can lift an item several factors must be considered, these are as follows:</p> <ul style="list-style-type: none"> - Maximum weight lifted by a single person should not exceed 70 pounds. Items over 70 pounds or the amount you feel you can confidently lift up to 70 pounds should define a point where assistance in the lift is sought. - Area available to maneuver the lift. - Area of the lift – Work place clutter, slippery surfaces - Overall physical condition <p>Material handling devices shall be used where necessary. This includes drum dollies, drum grapplers, etc. to handle drums of IDW</p>	None required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the Treatability Study task entry of this table.	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Leather or canvas work gloves - <i>Safety glasses</i> - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> <p>PPE changes may be made with the implementation of the Spill Containment Program.</p>	<p>Not required, unless the implementation of the Spill Containment Program is required due to a spill and/or release. At that point the decontamination procedures for drilling will be employed. These are as follows:</p> <p>The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable Stage 4: Disposable PPE will be removed and bagged.</p>

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards associated with the site and the activities that are to be conducted as part of the scope of work. Table 6-1 provides information on the identified site contaminants, including exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data. Certain information on this Table (such as glove selection) is based on clinical information regarding direct contact with pure chemicals. Assessment of hazards and recommended control measures are based on the diluted nature of media to be sampled and the limited contact anticipated. **The potential for significant contact through any route of exposure is not anticipated during this planned scope of work.**

6.1 CHEMICAL HAZARDS

The potential health hazards associated with work to be conducted at Site 22/UST 26 at NAS Pensacola include inhalation, ingestion, and dermal contact of various contaminants that may be present in groundwater, and soils. Volatile organic compounds (VOCs), including aviation gasoline and JP-4 (and components benzene, ethylbenzene, and xylene) are the principal contaminants of concern. Quantitative evaluation of historical sampling data indicate that it is unlikely that any of the site contaminants will be encountered in concentrations that could present an inhalation exposure concern. However, air monitoring and other measures specified in this HASP are to be observed as an added precaution.

It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (DPT and groundwater sampling). Contaminants may be present as volatiles or bound to particulates. Exposure to contaminants bound to particulates is most likely to occur through ingestion of contaminated soil or water, or hand-to-mouth contact during soil disturbance activities. For this reason, PPE and basic hygiene practices (washing face and hands before leaving site) will be extremely important. Wetting procedures will be initiated if any tasks produce visible dust in workers' breathing zones.

Table 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Benzene	71-43-2	PID: I.P 9.24 eV, 100% response with PID and 10.2 eV lamp. FID: 150% relative response ratio with FID.	Air sample using charcoal tube; carbon disulfide desorption; Sampling and analytical protocol in accordance with OSHA 07 or NIOSH Method #1500.	OSHA: 1 ppm ACGIH: 10 ppm NIOSH: 0.1 ppm IDLH: 500 ppm	Inadequate - Odor threshold 34-199 ppm. The use of air-purifying respirators with organic vapor cartridge up to 10 ppm is acceptable despite the inadequate warning properties, providing cartridges are changed at the beginning of each shift. Recommended gloves: Butyl/neoprene blend - >8.00 hrs; Silver shield as a liner - >8.00 hrs; Viton - >8.00 hrs	Boiling Pt: 176°F; 80°C Melting Pt: 42°F; 5.5°C Solubility: 0.07% Flash Pt: 12°F; -11°C LEL/LFL: 1.3% UEL/UFL: 7.9% Vapor Density: 2.77 Vapor Pressure: 75 mmHg Specific Gravity: 0.88 Incompatibilities: Strong oxidizers, fluorides, perchlorates, and acids Appearance and odor: Colorless to a light yellow liquid with an aromatic odor	Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. CNS effects include giddiness, lightheadedness, headaches, staggered gait, fatigue, and lassitude and depression. Additional effects may include nausea. Long duration exposures may result in respiratory collapse. Regulated as an OSHA carcinogen. May cause damage to the blood forming organs and may cause a form of cancer called leukemia.
Ethylbenzene	100-41-4	PID: I.P 8.76, High response with PID and 10.2 eV lamp. FID: 100% response with FID.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with OSHA Method #07 or NIOSH Method #1501 Aromatic Hydrocarbon.	ACGIH; NIOSH: 100 ppm; 125 ppm STEL OSHA: 100 ppm IDLH: 800 ppm	Adequate - Can use air-purifying respirator with organic vapor cartridge up to 800 ppm. Recommended gloves: Neoprene or nitrile w/ silver shield when potential for saturation; Teflon >3.00 hrs	Boiling Pt: 277°F; 136°C Melting Pt: -139°F; -95°C Solubility: 0.01% Flash Pt: 55°F; 13°C LEL/LFL: 1.0% UEL/UFL: 6.7% Vapor Density: 3.66 Vapor Pressure: 10 mmHg @ 79°F; 26°C Specific Gravity: 0.87 Incompatibilities: Strong oxidizers Appearance and odor: Colorless liquid with an aromatic odor. Odor Threshold of 0.092-0.60.	Regulated primarily because of its potential to irritate the eyes and respiratory system. In addition, effects of overexposure may include headaches, narcotic effects, CNS changes (i.e., coordination impairment, impaired reflexes, tremoring) difficulty in breathing, possible chemical pneumonia, and potentially respiratory failure or coma.
Diesel Fuel No.2-D	Mixture	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID.	Air sample using charcoal tube as a collection media; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with NIOSH Method #1550.	OSHA; NIOSH; ACGIH: 5 mg/m ³ as mineral oil mist. In addition NIOSH and ACGIH establish 10 mg/m ³ as a STEL.	Kerosene odor Recommended Air Purifying cartridges: Organic vapor Recommended gloves: Nitrile	Boiling Pt: <170-400°F; 77-204°C Melting Pt: Not available Solubility: Negligible Flash Pt: 125°F; 52°C LEL/LFL: 0.6% UEL/UFL: 7.5% Vapor Density: >5 Vapor Pressure: <1 mmHg @ 70°F; 21°C Specific Gravity: 0.86 Incompatibilities: strong oxidizers, halogens, and hypochlorites Appearance and odor: Colorless to amber with a kerosene odor	Prolonged or repeated exposures to this product may cause skin and eye irritation. Due to the defatting capabilities this exposure may lead to a dermatitis condition. High vapor concentrations are irritating to the eyes and respiratory tract. Exposure to high airborne concentrations may result in narcotic effects including dizziness, headaches, and anesthetic to unconsciousness. High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation.

Table 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
JP-4	N/A	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either the PID or FID.	Air sample using charcoal tube and carbon disulfide desorption; Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501.	USAF 8 hr - 200 ppm	Kerosene odor threshold ~ 800 ppm Rating - Poor to Adequate Recommended Air Purifying cartridges: Organic vapor Recommended gloves: Nitrile	Boiling Pt: <290-470°F; 143-243°C Melting Pt: Not available Solubility: Negligible Flash Pt: -10 to -50°F; -23 to -45°C LEL/LFL: <1% UEL/UFL: 8% Vapor Density: >1 Vapor Pressure: 75 mmHg; 70°F; 21°C Specific Gravity: 0.78 Incompatibilities: strong oxidizers Appearance and odor: Colorless to amber with a kerosene odor	Based on the constituents of jet fuels, it can be surmised that JP-4 is irritating to the eyes, skin, and respiratory tract. Direct contact may result in mild irritation with a possible drying and defatting of the skin Ingestion may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. Inhalation of vapors or mists of JP-4 may result in headache, nausea, confusion, narcotic effect, and drowsiness. Chronic inhalation of jet fuel vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers.
Xylene All isomers o-, m-, p-	1330-20-7	PID: I.P. 8.56 eV, High response with PID and 10.2 eV lamp. FID: 110% response with FID.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol shall proceed in accordance with OSHA 07, or NIOSH Method 1500.	ACGIH, & NIOSH: 100 ppm, 150 ppm STEL OSHA: 100 ppm IDLH: 900 ppm	Adequate - Odor thresholds for the following isomers: 0.6 m-; 5.4 p-; 20 o- ppm. Can use air-purifying respirator with organic vapor cartridge up to 1,000 ppm concentrations. Recommended gloves: PV Alcohol >12.67 hrs; Viton >8.00 hrs; CPE >1.00 hr; Butyl 0.87 hrs; Nitrile is acceptable for limited operations and contact (>0.20 hrs)	Boiling Pt: 269-281°F; 132-138°C Melting Pt: -13o/-54m/56p°F; -25o/-48m/13p °C Solubility: 0.02 % Flash Pt: 81-90°F; 27-32°C LEL/LFL: 0.9% UEL/UFL: 7.0% Vapor Density: 3.66 Vapor Pressure: 7-9 mmHg @ 70°F; 21° C Specific Gravity: 0.86-0.88 Incompatibilities: Strong oxidizers and strong acids Appearance and odor: Colorless liquid with an aromatic odor.	Effects may of overexposure include irritation at all points of contact, CNS changes (i.e. dizziness, excitement, drowsiness, incoherent, staggering gait), difficulty in breathing, pulmonary edema, and possibly respiratory failure. Chronic effects may include dermatitis and cornea vacuolization.

Table 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Gasoline	8006-61-9	Relative response ratios for the components of gasoline range from 100 - 200% for PID and FID detection.	See components for measurement considerations.	ACGIH & OSHA: 300 ppm 500 ppm STEL NIOSH: Reduce to lowest feasible concentration.	Respiratory Protection: Odor threshold 0.7 ppm, adequate air purifying respirator with organic vapor cartridges up to 100 ppm. Recommended Gloves: Nitrile >6.00 hrs; PV alcohol >6.00 hrs; Viton/neoprene >8.00 hrs	Boiling Pt: 102°F; 39°C Melting Pt: Not available Solubility: Negligible Flash Pt: -50°F; -45°C LEL/LFL: 1.4% UEL/UFL: 7.6% Vapor Density: ~5 Vapor Pressure: 38-300 mmHg (varies seasonally) Specific Gravity: 0.74 @ 20/20°C Incompatibilities: Strong oxidizers, peroxides, strong acids, and perchlorates Appearance and Odor: Colorless liquid with gasoline odor.	Overexposure to this substance may result in irritation to the eyes, skin, and mucous membranes. Systemically, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, possible convulsion, and chemical pneumonia (aspiration). Prolonged or chronic exposures may result in possible liver or kidney damage. Components of this substance have been determined to be confirmed human carcinogens.

6.2 PHYSICAL HAZARDS

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

- Heavy equipment hazards (pinch/compression points, etc.).
- Slips, trips, and falls
- Lifting (strain/muscle pulls)
- Energized systems (contact with underground or overhead utilities)
- Noise in excess of 85 decibels (dBA)
- Flying projectiles
- Ambient temperature extremes (heat stress)
- Vehicular and foot traffic

These physical hazards are discussed in Table 5-1 as applicable to each site task. Further, many of these hazards are discussed in detail in Tab 4, sections 4.0, 5.0, and 6.0 of the TtNUS Health and Safety Guidance Manual.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. Given the location of NAS Pensacola, alligators, snakes and fire ants are a particular concern. In general, avoidance of areas of known infestation or habitat will be the preferred exposure control for insects/animals and poisonous plants. As the majority of the work is to occur in improved areas limited discussion will be provided.

6.3.1 Insect/Animal Bites and Stings

Various insects and animals may be present and should be considered. As a precaution against spider bites, site personnel should always invert and shake out their boots before putting them on. Fire ants also present a unique situation when working outdoors in Florida. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom (formic acid) that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician. Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in

excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

The concerns for contracting Lyme's Disease from tick bites have expanded beyond just the northeastern US. In fact, cases of this disease have been noted in Florida. As a result, personnel must be aware of this hazard, and of necessary preventive measures. These issues are addressed in Attachment V.

The longer a disease-carrying tick remains attached to the body, the greater the potential for contracting the disease. Frequent close body checks will aid in detecting and removing ticks, hopefully before they become attached, but will at least 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.

Certain planned work areas (surrounding the debris pile in the center of the site) could be prime nesting and/or hiding locations for snakes. All initial efforts will be directed to avoid, where possible, nesting and territorial areas. However, should field personnel come in contact with these animals and receive a bite, the following actions are necessary.

- Obtain a detailed description of the snake. This and the bite mark will enable medical personnel administering medical aid to provide prompt and correct antidotes, as necessary.
- Immobilize the bite victim to the extent possible. Physical exertion will mobilize the toxins (if poisonous varieties) from the bite point systemically through the body.
- Wash the area of the bite (Soap & water or anti-septic wipes)
- Apply a pressure wrap (for extremities), just above and over the bite area. With a couple wraps of the pressure wrap in place over the bite area, apply a splint, and continue the application of the pressure wrap. The purpose for the splint is to restrict the movement of the extremity, this along with the pressure wrap will aid in restricting the toxins from leaving the site of the bite.
- Seek medical attention immediately.

All site 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 and the FOL and SSO notified.

The Office of Natural Resources or similar entity on NAS Pensacola should be contacted for further direction on the hazards and precautions of naturally occurring wildlife and insects.

6.3.2 Inclement Weather

Project tasks under the planned scope of work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, hurricanes, conditions of heat stress, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist or precautionary measures may be instituted to minimize the hazards.

6.3.2.1 Heat Stress

Based on the contaminants in question and the concentrations anticipated over exposure is not anticipated. Nor is the necessity to use PPE (protective garments) to isolate personnel from these hazards, and possibly contributing to conditions of heat stress. Identification of signs and symptoms and precautionary measures for conditions of heat stress are provided in Section 4.0 of the Health and Safety Guidance Manual.

6.3.2.2 Damaging Effects of the Sun

Fieldwork often results in prolonged exposure to the sun. The short-term effects of excessive exposure to mid-day sun include redness, pain, itching and dryness. Long-term affects of recurrent injury due to excessive sun exposure may include a prematurely aged appearance and an increased risk of developing certain skin cancers.

Certain medications may have a photosensitizing effect and make a sun bum more likely to occur for a given amount of sun exposure. Tetracycline (often used for acne), sulfonamides (frequently used for urinary tract infections), and thiazides (a diuretic) may have this effect in some users.

There is no specific treatment for sun bum and in general the symptoms listed above will abate over several days to weeks as the skin recovers from the bum injury. Cool showers, moisturizing lotions and antihistamines may reduce itching. Aspirin, acetaminophen (Tylenol) and ibuprofen (Advil) may be used to relieve pain symptoms.

Exercise, sweating, hot water, and additional sun exposure may exacerbate and prolong symptoms. Use of an antibacterial soap can limit the risk of infection to the injured skin. Tetanus immunization should be current--within the past 10 years.

Medical evaluation is indicated if significant blistering has occurred, pain is uncontrolled, a tetanus update is needed, or signs of infection or dehydration are present.

Here are a few safety precautions for exposure to the effects of the sun:

- Use sunscreen even on cloudy days, when 80 % of the sun's rays shine through. Reapply after bathing or sweating
- Wear clothing that covers or shades your skin – Long sleeves and a hat.
- Wear sunglasses that block ultraviolet A and B (UVA and UVB) rays.

7.0 AIR MONITORING

This section provides direction and protocol for the real time air monitoring. The monitoring of hazardous conditions has one primary objective: To qualify and quantify potential inhalation hazards that, may impact the work force or sensitive receptors in the immediate area. A secondary indirect objective accomplished by real time monitoring is that it allows for the evaluation of environmental sampling media, which will be sent off-site. The purpose of this evaluation will be to qualify potential hazards to provide sufficient warning to down stream parties, which may potentially encounter these hazards. This would include hazard qualification for transportation purposes as well as notification to the analytical laboratory of potentially high hazard samples.

7.1 TASKS TO BE CONDUCTED

The following tasks are to be conducted as part of the scope of work at NAS Pensacola. It is during the execution of the tasks that monitoring for the purpose of quantification/ qualification of those hazards will be conducted..

- Treatability Study (DPT and ORC injection)
- Groundwater Well Sampling
- Decontamination activities
- Geographical surveying
- IDW Management

7.2 OTHER HAZARDS SUBJECT TO MONITORING

Hazards associated with these tasks for which monitoring other than air monitoring may be used to qualify/quantify, may include:

- Noise – Information obtained from previous projects and efforts indicate that potential noise levels associated with these types of activities typically include:
 - DPT range from 90 to 102 dBA-TWA
 - Generators – When generators are used as portable power sources for well development or sampling, the generator should be placed a sufficient distance from the operation to eliminate the noise hazard. The generators emit approximately 82 to 88 dBA, again this is dependant on the model of generator.

- Steam Cleaners and pressure washers – Previous data indicate that these machines emit from 94 to 102 dBA.

Noise dosimetry may be performed to quantify noise levels associated with the type of rig selected to perform the subsurface investigation. In addition noise monitoring may be performed to insure the hearing protection devices selected attenuation capabilities are sufficient for those noise levels produced. All noise monitoring will proceed in accordance with the Hearing Conservation Program provided in Attachment VI, Hearing Conservation Program. Elements of the Hearing Conservation Program will be instituted at NAS Pensacola due to the use of hearing protection during DPT and decontamination operations.

7.3 HAZARD MONITORING INSTRUMENTS TO BE USED

The following instrument will be used for monitoring the hazards identified above.

7.3.1 Noise Dosimeters

Noise dosimeters are devices used to collect data on an individual's time-weighted average exposure to noise over a selected time period. Many of these devices are dual-purpose and can be used either as a dosimeter or as a sound level meter (i.e., to collect both instantaneous readings as well as time-weighted readings). These instruments must be calibrated in accordance with manufacturer's instructions. This commonly involves both a pre- and post calibration. Information regarding calibration must be recorded either on the Noise Dosimetry Log or the Sound Level Measurement Log, relative to the type of monitoring being performed. Tab 6 of the TtNUS Health and Safety Guidance Manual contains the written TtNUS Hearing Conservation Program, and is to be consulted for more information on noise and hearing protection.

7.3.1.1 Frequency of Monitoring

Noise dosimetry and sound level measurements will be performed under the following circumstances:

- To determine if any reduction in the use of hearing protection is appropriate.
- Noise source exists for which no similar data is available.
- Quantification is necessary to evaluate hearing protection attenuation capabilities.

Additional monitoring will only be performed if it is necessary to quantify other noise sources or through changes in procedure that may result in higher noise levels.

This monitoring may be conducted during intervals of the project, as deemed necessary, during the operation of powered equipment capable of generating noise levels over 85 dBA. Monitoring may also be done at the discretion of the SSO.

As a general rule of thumb, any activities where two individuals standing within 2 feet of each other have to raise their voice in order to communicate is probably over 85 dBA, and hearing protection must be used.

7.3.2 Chemical Contaminant (Air) Monitoring

Monitoring for airborne chemical contaminants released from environmental media will be performed:

- During intrusive activities in the Exclusion Zone
- During decontamination activities in the Contamination Reduction Zone
- In certain Support Zone activities such as IDW container screening.

Chemical air monitoring will be performed by the SSO using a photo-ionization detector (PID) equipped with a probe strength 10.2 electron volts (eV) or higher. The PID was selected because it is calibrated with isobutylene, which is essentially a "benzene equivalent". This means that the ionization potentials of these two chemicals are equivalent, so the instrument recognizes them as if they are the same chemical. Therefore, the PID is essentially calibrated to benzene, and it will respond to benzene as a 1:1 direct reading instrument. This is relevant because benzene is one of the principal contaminants of concern (COC), and has the most significant toxicological properties of these COCs.

The responsiveness of the PID is dependant on the strength of the probe in comparison to the ionization potential of the chemical of interest. For a 10.2 eV probed, it is essentially reading benzene at the actual concentration that it is present in the air. At higher probe strengths, a correction factor has to be applied to accurately determine a benzene in air concentration. This is illustrated below:

Contaminant	Ionization Potential (IP-eV)	Correction Factor 10.6 eV Lamp	Correction Factor 11.7 eV Lamp
Benzene (71-43-2);(Max. Conc. 125 µg/L)	9.24 eV	0.53	0.6

Note: The Correction Factor response ratio provided is in comparison to equal concentrations of the reference gas isobutylene. Actual results obtained on the PID will be multiplied by the correction factor of 0.53, which represents the worst case scenario for the mixture.

Example: PID with a 10.6 eV probe indicates a benzene concentration of 10 ppm. What is the actual benzene in air concentration?

Answer: 10 ppm (instrument reading) X 0.53(Correction Factor) = 5.3 ppm

It is important to note that based on quantitative evaluations of historical site data, the potential to encounter airborne concentrations of benzene or any of the COCs at levels that represent an inhalation exposure concern. PID monitoring is required as a precaution.

7.3.2.1 Action Levels

The action level established for this activity is 5 ppm for no longer than a 5 minute duration; no greater than three events (for the day's activities) in the workers breathing zone. Surpassing this action level will require notification of the PHSO and the HSM for further instructions.

7.4 INSTRUMENT PREPARATIONS FOR FIELD SERVICE

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager or commercial vendors. Operational checks and field calibration will be performed on all instruments each day prior to and after their use. Field calibration will be performed on instruments according to manufacturer's recommendations. 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 must 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

7.4.1 Calibration Requirements

All direct reading instruments will require calibration prior to use and then after use. The frequency of this calibration is stated below.

- Noise Dosimeter - Manufacturer yearly service and primary calibration
In the field – Pre and Post secondary calibration daily to a yearly calibrated acoustical reference.
- PID/FID – Manufacturer yearly service and primary calibration
In the field – Pre and Post secondary calibration daily to a reference gas.

7.5 INSTRUMENT MAINTENANCE

Maintenance activities to be conducted on site are as follows:

- Wiping down the outer shells of the monitoring equipment used – Daily
- Battery charging – Daily (As applicable)
- PID – Lamp Cleaning – Once per 10-day shift or as conditions dictate
- PID/FID – Filter Replacement – High level of contaminants – Daily; Low to moderate levels of contaminants – as needed

Extensive maintenance (greater than that mentioned above) requires the attention of certified technicians. Direct reading instruments will be used at the site to detect and evaluate the presence of site contaminants and other potentially hazardous conditions. As a result, specific air monitoring measures and requirements are established in Table 5-1 pertaining to the specific hazards associated with each planned task. Additionally, the Health and Safety Guidance Manual, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

8.0 SITE OPERATIONS AND CONTROL

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

8.1 WORK ZONES

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

8.1.1 Exclusion Zone

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

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

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

- Monitoring well installation (Direct Push Technology). The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, with a minimum of 25 feet.
- A table will be set up to screen all soil samples. This screening location will have a 10 foot exclusion zone.
- Monitoring well development and sampling. The exclusion zone for this activity will be set at 10 feet surrounding the well head and discharge collection container.
- Decontamination operation. The exclusion zone for this activity will be set at 25 feet surrounding the gross contamination wash and rinse as well as 25 feet surrounding the heavy equipment decontamination area.
- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

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

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

8.1.2 Contamination Reduction Zone

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

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

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

- Muddy over-boots and gloves may be required to go through a gross contamination wash and rinse at the exclusion zone or will be bagged to be transported to the central decontamination area for cleaning.
- Potentially contaminated tooling will be wrapped, when necessary, for transport to the decontamination area.
- Upon completion of the assigned tasks all personnel will move through the central decontamination area to clean reusable PPE and field equipment.

8.1.3 Support Zone

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

8.2 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 is included in Figure 8-1. The daily meetings conducted by the FOL/SSO will further support these work permits. The use of these permits will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. All SWP will require the signatures of either the FOL or the SSO. All personnel engaged in on-site activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

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

Upon completion of the work for which the SWP was assigned, the SWP will be turned into the FOL or the SSO. Concerns, complaints, and suggestions may be made on the reverse of the SWP for consideration by the FOL and/or the SSO.

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

8.3 SITE MAP

Once the areas of contamination, access routes, topography, dispersion routes are determined, a site map will be generated and adjusted as site conditions change. This map will be posted to illustrate up-to-date information of contaminants and adjustment of zones and access points. This map will be posted at the field support trailer. Figure 8-2 will serve as the preliminary version until investigation reveals more information.

8.4 BUDDY SYSTEM

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

8.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

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

8.6 COMMUNICATION

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized.

External communications will be accomplished utilizing telephones at predetermined and approved locations or through cellular telephones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the

FOL will determine and arrange for telephone communications, if it is determined a cellular means will not be used.

The hand-held radios and cellular telephones that may be used are as follows:

Motorola HT-1000	Power Output 5 watts
Cellular Phone	Power Output 5 watts

8.7 SITE VISITORS

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

- Personnel invited to observe or participate in operations by Tetra Tech NUS.
- Regulatory personnel (i.e., DOD, FDEP, EPA, OSHA, etc.)
- 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 TOM or designee and following established base access procedures.

Once access to the base is obtained, all personnel who require access to Tetra Tech NUS work sites (areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon gaining access to the work site, all site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated 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), who they represent, and the purpose for the visit. **The FOL is responsible for ensuring that site visitors are escorted at all times.**
- All site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for all Southern Division Navy Personnel), and medical surveillance as stipulated in Section 8.3, of this document. In addition, to enter the sites operational zones during planned

activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 4.2 of this HASP.

Once the site visitors have completed the above items they will be permitted to enter the site and applicable operational areas. All visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. 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 all on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

8.8 SITE SECURITY

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

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

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

8.9 SANITATION AND BREAK AREAS

This section will address the following items:

- Toilets
- Potable water
- Showers and change rooms
- Break Areas

8.9.1 Toilets

One toilet will be provided for every 20 people. All toilets will be unisex and will have locking doors. The toilet provided will be a chemical toilet and service provider, unless it has been determined that suitable provisions have been made. The surrounding buildings (3279, 1659, 3550) are not to be used by field crews unless expressed permission is provided.

8.9.2 Potable Water

Potable water as well as electrolyte balance sports drinks such as Gatorade will be provided to the field crews for fluid replacement. Storage and dispensing will proceed as follows:

- All containers will be clean and replenished daily.
- All containers will clearly marked as to their contents (Potable Water – Drinking Water Only; Gatorade, etc.).
- Dispensing locations will be placed in identified break areas within the support zone. The most likely location will be a break trailer or support vehicles outside of the exclusion zone. This will serve as an area for cooling or warming as well as an identified food and drink consumption area.
- If larger containers are used, dispensing cups will be provided.
- The coolers used for storage of potable drinks and cups (stored plastic bags) away from potentially contaminating materials.

8.9.3 Showers and Change Rooms

Based on the level of protection required and the level of contamination anticipated, and length of the field operation temporary work facilities including shower facilities and locker rooms will not be necessary in support of this operation.

8.9.4 Break Areas

Suitable locations will be provided for field personnel for the following use:

- Break areas for food and drink consumption

- Areas suitable for warming and cooling regimens
- Areas suitable for Safety Meetings

This location will be either the project trailer, or support vehicle. It is not anticipated that this area will require climate control to provide suitable shelter to combat heat or cold stress, as PPE requirements are limited and therefore heat stress is anticipated to be minimized.

**FIGURE 8-1
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. 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
 Bottle Trailer Skid Rig
 None
- Modifications/Exceptions: _____

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

- VI. Additional Safety Equipment/Procedures
- Hardhat..... Yes No Hearing Protection (Plugs/Muffs)... Yes No
- Safety Glasses..... Yes No Safety belt/harness..... Yes No
- Chemical/splash goggles..... Yes No Radio..... Yes No
- Splash Shield..... Yes No Barricades..... Yes No
- Splash suit/coveralls (Type: _____) Yes No Gloves (Type)..... Yes No
- Steel toe/shank Workboots..... Yes No Work/rest regimen..... Yes No
- Chemical Protective Over-boots (Type: _____) Yes No
- Modifications/Exceptions: _____

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

- VII. Site Preparation
- Utility Locating and Excavation Clearance completed..... Yes No NA
- Equipment and Foot Traffic Routes Cleared and Established.....
- Physical Hazards Barricaded and Isolated.....
- Emergency Equipment Staged.....

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

IX. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

9.0 SPILL PREVENTION AND CONTAINMENT PROGRAM

9.1 SCOPE AND APPLICATION

This program applies to the single or aggregate accumulation of bulk storage materials (over 55-gallons). It is not anticipated that a single container with a capacity greater than this amount will be necessary on this project. However, over time, it is likely that numerous 55-gallon drums of Investigation Derived Wastes (IDW) will accumulate in staging areas. It is at these staging areas (and at areas where potential hazardous substances such as liquid fuels) that the requirements of this program must be administered.

As the classification of certain materials such as IDW is unknown, all materials will be treated as hazardous, pending laboratory certification to the contrary. The types of materials for which this program will apply are as follows:

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

The spill containment and control will be engaged any time free product is encountered to minimize associated hazards.

9.2 POTENTIAL SPILL AREAS

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

- Resource deployment
- Waste transfer
- Central staging

It is anticipated that 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.

9.3 CONTAINMENT AREAS

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

9.3.1 IDW

- 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 3 feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management. If so, the size and dimensions will be restricted to the estimated volume plus 10 percent for rain water and container displacement.
- Storage Tank – Polyethylene Construction – Should a tank be used for bulk storage, the Tank shall be placed into a bermed enclosure of sufficient size to accommodate 110% of anticipated volume (Largest container plus 10% for rainwater and container displacement).

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

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

9.3.2 Flammable/POL Storage

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

- All fuels, which will be stored and dispensed from portable containers, will utilize safety cans.
- All portable hand held storage containers will be labeled per Hazard Communication requirements.
- Larger volumes stored for fueling equipment will be stored in approved mobile Above Ground Storage Tanks with secondary containment capable of holding the tank volume plus 10%.

- All portable flammable liquid storage tanks will be properly grounded and will have bonding capabilities for the transfer of loading and off-loading of its contents.
- All dispensing locations will be supported by a Fire Extinguisher positioned no closer than 50 feet from the storage tank, properly mounted and identified.
- The storage location will be well marked with proper signage, protective bumper poles and will have straight through access/egress for vehicles.

9.4 MATERIALS HANDLING

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

- A drum cart with pneumatic tires will be required, if drums are used for IDW storage. This cart will be used to relocate drums within the staging and satellite storage location.
- In addition, a mechanized means such as a suitably equipped skid loader, back-hoe, or some other mechanized means will be provided to move IDW containers from the field location to the staging and satellite storage location.

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

9.5 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums or in the Resource Deployment area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the FOL will be notified and the Spill Containment/Control Response Plan as specified in Section 9.8 will be engaged. All inspections will be documented in the project logbook.

9.6 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/or the SSO will serve as the Spill Response Coordinators for this operation, should the need arise. Personnel through the course of this project will be drilled as part of testing the EAP.

9.7 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 Containment/Control Plan.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Extra Drums (55-gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Pumps (Gas or Electric necessary for transferring liquids from leaking containers)/tubing
- Drum Repair Kit
- Shovels, rakes, and brooms
- Container labels
- Personal Protective Equipment
 - Nitrile outer gloves
 - Splash Shield
 - Impermeable over-boots
 - Rain suit

9.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

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

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

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

It is not anticipated that drums and containers of an unknown origin will be unearthed as this investigation of environmental media proceeds. Should a drum and/or container of an unknown origin be unearthed this plan will require modification to include Drum and Container Management Plan.

10.0 CONFINED SPACE ENTRY

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

- Is large enough and so configured that an employee can bodily enter and perform assigned work and,
- 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 in addition to meeting those definitions provided above also reflect one or more of the conditions below:

- 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 that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space operations, consult the SSO or call the PHSO. If confined space operations are to be performed this HASP will require modification to address, detailed procedures training requirements, and emergency rescue.

11.0 MATERIALS AND DOCUMENTS

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

- A complete copy of this HASP
- A copy of the Health and Safety Guidance Manual
- Safe Work Permits(Blanks and those partially completed in Attachment IV
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for all chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailers) – Copies are available either by contacting the Health Sciences Department in the Pittsburgh office, or can be downloaded off of the internet at <http://www.osha.gov/Publications/osha3165.pdf>.
- Training/Medical Surveillance Documentation Form (Blank)
- Emergency Reference Form (Section 2.0, extra copy for posting)

11.1 MATERIALS TO BE POSTED AT THE SITE

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

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

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

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

Site Clearance Posting - This list is found within the training section of the HASP (See Figure 4-1). This list identifies all site personnel, dates of training (including site-specific training), medical surveillance, etc. and indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

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

Site Maps – A periodically updated map will be posted in the Office trailer and at the entry to the Mustard Gas Burial Grounds. This map will be updated periodically by the FOL and/or the SSO. The information to be contained shall include control zones, points of entry, site layout information, the position of ongoing operations. As contaminant level are determined this information will also be added to the map.

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

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

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

Placards and Labels - Where chemical inventories have been separated, because of quantities and incompatibilities, these areas will be conspicuously marked using Department of Transportation (DOT) placards and acceptable [Hazard Communication 29 CFR 1910.1200 (f)] labels. The Tetra Tech NUS FOL shall ensure the following materials/documents are taken to the project site and utilized as required.

Signs and Postings – Signs and posting for regulated areas (i.e., Satellite Waste Accumulation Area, All Visitors Report to the Site Office Trailer, Exclusion Zone, etc.)

12.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienist
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPR	Cardio-Pulmonary Resuscitation
CSP	Certified Safety Professional
CTO	Contract Task Order
dB	Decibel
DI	De-Ionized Water
DO	Dissolved Oxygen
DPT	Direct Push Technology
DRI	Direct Reading Instruments
EAP	Emergency Action Plan
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
HSM	Health and Safety Manager
IDLH	Immediately Dangerous to Life and Health
IDW	Investigative Derived Waste
IP	Ionization Potential
mg/m ³	milligrams per cubic meter
MSDS	Material Safety Data Sheet
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
POL	Petroleum/oil/lubricants
PPE	Personal Protective Equipment
PPM	Parts Per Million

PVC	Poly Vinyl Chloride
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SWMU	Solid Waste Management Unit
SWP	Safe Work Practice
TOM	Task Order Manager
TtNUS	Tetra Tech NUS
TWA	Time Weighted Average
UN	United Nations
WP	Work Plan

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE WORKER'S COMPENSATION PROGRAM

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

- 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 Diethorn 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 Diethorn 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 TECH NUS, 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: _____ Prepared by: _____
Subsidiary Health and Safety Representative
Position: _____
cc: _____ Office: _____
Workers Compensation Administrator
Project name: _____ Telephone number: _____
Project number: _____ Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____ Office: _____
Home address: _____ Gender: M F No. of dependents: _____
Marital status: _____
Home telephone number: _____ Date of birth: _____
Occupation (regular job title): _____ Social security number: _____
Department: _____

Date of Accident: _____ Time of Accident: _____ a.m. p.m.
Time Employee Began Work: _____ Check if time cannot be determined

Location of Incident

Street address: _____
City, state, and zip code: _____
County: _____
Was place of accident or exposure on employer's premises? Yes No

Information About the Incident

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

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

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

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

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

Was employee performing regular job duties? Yes No

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

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

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? Yes No First aid only

Name of physician or health care professional: _____

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

Facility name: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? Yes No

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

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

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

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

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

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

 Printed Name of Injured Employee Telephone Number

 Signature of Injured Employee Date

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

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

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

Injury Illness

Result of Incident:

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

No. of days away from work _____

Date employee left work _____

Date employee returned to work _____

No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____

Date of hire: _____ Hire date for current job: _____

Wage information: \$ _____ per Hour Day Week Month

Position at time of hire: _____

Current position: _____ Shift hours: _____

State in which employee was hired: _____

Status: Full-time Part-time Hours per week: _____ Days per week: _____

Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____

Confirmation number: _____

Name of contact: _____

Field office of claims adjuster: _____

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

ATTACHMENT II

**STANDARD OPERATING PROCEDURE FOR
UTILITY LOCATION AND EXCAVATION CLEARANCE**



TETRA TECH NUS, INC.

STANDARD OPERATING PROCEDURES

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Effective	03/00	Date	Revision
			1
Applicability	Tetra Tech NUS, Inc.		
Prepared	Health & Safety		
Approved	D. Senovich <i>DS</i>		

Subject
UTILITY LOCATING AND EXCAVATION CLEARANCE

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1.0 PURPOSE

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

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of 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.

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.

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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 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.

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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, TINUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be

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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 T1NUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

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

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

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

Magnetics

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

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

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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 determined considering the geographical location of the work site. This approach recognizes that the

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placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand-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.

Title 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

TINUS Utility Locating and Clearance Policy
 TINUS SOP GH-3.1; Resistivity and Electromagnetic Induction
 TINUS SOP GH-3.2; Magnetic and Metal Detection Surveys
 TINUS SOP GH-3.4; Ground-penetrating Radar Surveys

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

ALABAMA Alabama Line Location (800) 292-8525 Tucson Blue Stake Center (800) 782-5348	Maine Dig Safe – Maine (800) 225-4977
Alaska Locate Call Center of Alaska Inc. (800) 478-3121	Maryland Miss Utility (800) 257-777 Miss Utility of Delmarva (800) 282-8555
Arizona Arizona Blue Stake Inc. (800) 782-5348	Massachusetts Dig Safe – Massachusetts (800) 322-4844
Arkansas Arkansas One Call System Inc. (800) 482-8998	Michigan Miss Dig System (800) 482-7171
California Underground Service Alert North (800) 227-2600 Underground Service Alert South (800) 227-2600	Minnesota Gopher State One Call (800) 252-1166
Colorado Utility Notification Center of Colorado (800) 922-1987	Mississippi Mississippi One-Call System Inc. (800) 227-6477
Connecticut Call Before You Dig (800) 922-4455	Missouri Missouri One Call System Inc. (800) 344-7483
Delaware Miss Utility of Delmarva (800) 282-8555	Montana Utilities Underground Location Center (800) 424-5555 Montana One Call Center (800) 551-8344
District of Columbia Miss Utility (800) 257-7777	Nebraska Diggers Hotline of Nebraska (800) 331-5666
Florida Call Sunshine (800) 432-4770	Nevada Underground Service Alert North (800) 227-2600
Georgia Utilities Protection Center Inc. (800) 282-7411	New Hampshire Dig Safe – New Hampshire (800) 225-4977
Idaho Palouse Empire Underground Coordinating Council (800) 882-1974 Utilities Underground Location Center (800) 424-5555 Kootenai County Utility Coordinating Council (800) 428-4950 Shoshone County One Call (800) 398-3285 Dig Line (800) 342-1585 One Call Concepts (800) 626-4950	New Jersey New Jersey One Call (800) 272-1000
Illinois Julie Inc. (800) 892-0123 Digger (Chicago Utility Alert Network) (312) 744-7000	New Mexico New Mexico One Call System Inc. (800) 321-ALERT Las Cruces-Dona Utility Council (505) 526-0400
Indiana Indiana Underground Plant Protection Services (800) 382-5544	New York Underground Facilities Protection Organization (800) 962-7962 New York City: Long Island One Call Center (800) 272-4480
Iowa Underground Plant Location Service Inc. (800) 292-8989	North Carolina The North Carolina One-Call Center Inc. (800) 632-4949
Kansas Kansas One-Call Center (800) 344-7233	North Dakota Utilities Underground Location Center (800) 795-0555
Kentucky Kentucky Underground Protection Inc. (800) 752-6007	Ohio Ohio Utilities Protection Service (800) 362-2764 Oil & Gas Producers Underground Protection Service (800) 925-0988
Louisiana Louisiana One Call (800) 272-3020	Oklahoma 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

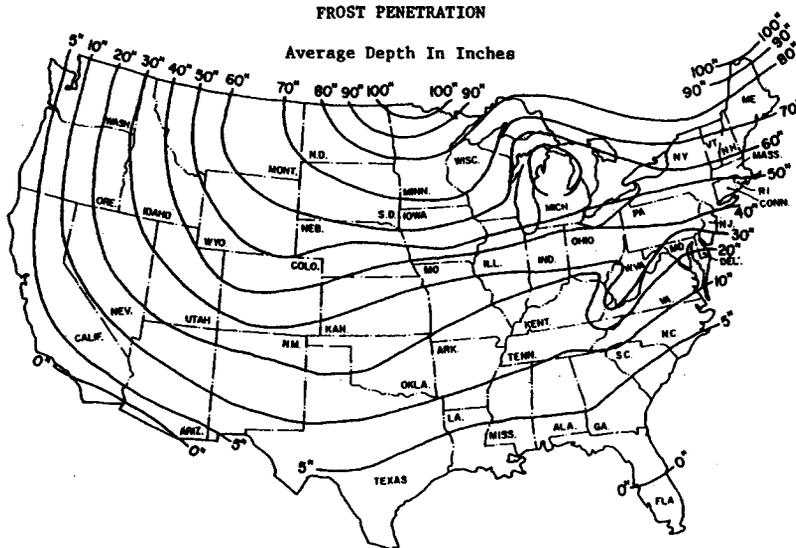
Wisconsin
Diggers Hotline Inc. (800) 242-8511

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

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ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



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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 N/A
 - b) Marked on site maps yes no N/A
 - c) Necessary to lockout/insulate/re-route yes no N/A
 - d) Document procedures used to lockout/insulate/re-route yes no N/A
 - e) Minimum acceptable clearance (SOP Section 5.2): _____

3. Notes:

Approval: _____
 Site Manager/Field Operations Leader Date

c: PM/Project File
 Program File

ATTACHMENT III
EQUIPMENT INSPECTION CHECKLIST

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| | Good | Needs Repaired | N/A |
| - Number of U-Type (Crosby) Clips
(5/16 – 5/8 = 3 clips minimum)
(3/4 – 1 inch = 4 clips minimum)
(1 1/8 – 1 3/8 inch = 5 clips minimum) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Kinks, bends – Flattened to > 50% diameter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Hemp/Fiber rope (Cathead/Split Spoon Hammer) | | | |
| - Minimum 3/4; maximum 1 inch rope diameter (Inspect for physical damage) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| - Rope to hammer is securely fastened | <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? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Hot pipes and surfaces exposed to accidental contact? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| All emergency shut offs have been identified and communicated to the field crew? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Are any structural members bent, rusted, or otherwise show signs of damage? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Are fueling cans used with this equipment approved type safety cans? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? _____ | <input type="checkbox"/> | <input type="checkbox"/> |

Cleanliness:

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

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)? _____
- Does the operator, understand the equipment's operating instructions? _____
- Is the operator experienced with this equipment? _____
- Is the operator 21 years of age or more? _____

ADDITIONAL INSPECTION REQUIRED PRIOR TO USE ON-SITE

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

Site Safety Officer Signature: _____

Approved for Use: Yes No

ATTACHMENT IV
SAFE WORK PERMITS

**SAFE WORK PERMIT
Treatability Study (DPT/ORC Injection)**

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): Treatability Study.
 Equipment to be Used: Direct Push Technologies/ORC injection supplies
- II. Names: _____
- III. Onsite Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: Upgrade to Level C Organic vapor cartridges based on concentrations greater than action levels listed in Item V. Change out of cartridges every four hours unless end of service life indicator is available

- | | | |
|----------------------------------|--|-------------------------------------|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>Fuel components (benzene)</u> | <u>> 5ppm > 5 minute duration</u> | <u>Evacuate-Call PHSO & HSM</u> |
| <u>Dusts and particulates</u> | <u>Visible dust cloud (>2 mg/m³)</u> | <u>Employ dust suppression</u> |
| | | <u>Area wetting</u> |

Note: Provisions have been provided in Table 5-1 for Ascension to Level C; > 5 ppm > 5minute duration; In the workers Breathing Zone; No greater than three separate events or persists during the day. This ascension is only permitted after notification of the PHSO and/or the HSM of the necessity to upgrade the level of protection.

Note: Review MSDSs for well construction supplies prior to use

VI. Additional Safety Equipment/Procedures – Check appropriate box for ALL entries

- | | |
|--|--|
| Hardhat..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs or 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..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type- Nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work-boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Chemical Resistant boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No | |

Modifications/Exceptions: Hard hats, hearing protection, Tyvek coveralls, boot covers, and reflective vests will be used at the SSO's direction. for incidental splash if there is potential for soiling work clothes. An impermeable apron is also acceptable to keep contaminated tooling away from the work clothes.

- | | | | | |
|---|--------------------------|--------------------------|-----------------------------|--|
| VII. Procedure review with permit acceptors | Yes | NA | Yes | NA |
| Safe Work Permit reviewed with identified personnel . | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms..... | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Procedure for safe job completion per HASP..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Safe Work Procedures Reviewed..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points(Bldg.1659) | <input checked="" type="checkbox"/> <input type="checkbox"/> |

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| VIII. Site Preparation | Yes | No | NA |
| Utility Clearances Obtained for any areas of subsurface investigations (Attachment II) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Preliminary Site Evaluation (Physical hazards removed or blockaded) (Section 2.3) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Site control boundaries/pathways and demarcated/signage (Section 8.1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dust Suppression Control Available (Table 5-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| IX. Equipment/Emergency Preparation | Yes | No | NA |
| Equipment Inspection Checklist Completed/10 Day Shift (Attachment III) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Stops tested (One Initial and Periodic tests/10 Day Shift) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Available for Use (Fire Extinguisher, First-Aid Kit, Eyewash, etc.) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Numbers Posted(Table 2-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Spill Containment Capabilities Available on-site(Section 9.7) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- X. Additional Permits required (Hot work, Confined Space Entry, Excavation etc.)..... Yes No
 If yes, contact the Health Sciences Department, Pittsburgh Office (412/921-7090)

XI. Special instructions, precautions: Activities conducted off of improved areas in heavily vegetated areas should employ provisions against ticks such as repellants, tape up pant legs to boots, close body inspections. When working outdoors where ample shade is not available use sunscreen long sleeves and hats to protect against sunburn.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT Groundwater Sampling

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): Groundwater sampling.
Equipment to be Used: _____
- II. Names: _____
- III. Onsite Inspection conducted Yes No Initials of Inspector _____

TtNUS

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

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

Modifications/Exceptions: Upgrade to Level C Organic vapor cartridges based on concentrations greater than action levels listed in Item V. Change out of cartridges every four hours unless end of service life indicator is available

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Fuel components (benzene)</u>	<u>PID > 5ppm in BZ > 5 minute</u>	<u>Evacuate-Call PHSO & HSM</u>
<u>Dusts and particulates</u>	<u>Visible dust cloud (>2 mg/m³)</u>	<u>Use dust suppression</u>
		<u>Area wetting</u>

Note:: If PID readings exceed 5 ppm for > 5minute duration in workers' Breathing Zone, retreat to an unaffected upwind areas and notify the PHSO and/or the HSM.

VI. Additional Safety Equipment/Procedures – Check appropriate box for ALL entries

- | | |
|--|---|
| Hardhat..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work-boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chemical Resistant boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs)..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Safety belt/harness..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Radio..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Gloves (Type- Inner nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
|--|---|

Modifications/Exceptions: Gloves - inner nitrile type surgeons gloves, layered if necessary. In areas where ticks are of concern, tape pant legs to boots and wear light colored clothing, use repellants, wear Tyvek in high brush and wooded areas. Perform close body inspections regularly when leaving work areas. Work-boots should have aggressive lug to control slip, trip, and fall hazards when traversing or coming up and down steep terrain. Hard hats and hearing protection at SSO direction.

- | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|---------------------------------|-------------------------------------|--------------------------|
| VII. Procedure review with permit acceptors | | Yes | NA | | Yes | NA |
| Safe Work Permit reviewed with identified personnel..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion per HASP..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Safe Work Procedures Reviewed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points(Bldg.1659)..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| VIII. Site Preparation | Yes | No | NA |
| Utility Clearances Obtained for any areas of subsurface investigations (Attachment II) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Preliminary Site Evaluation (Physical hazards removed or blockaded) (Section 2.3) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Site control boundaries/pathways and demarcated/signage (Section 8.1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dust Suppression Control Available (Table 5-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| IX. Equipment/Emergency Preparation | Yes | No | NA |
| Equipment Inspection Checklist Completed/10 Day Shift (Attachment III) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Stops tested (One Initial and Periodic tests/10 Day Shift) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Available for Use (Fire Extinguisher, First-Aid Kit, Eyewash, etc.) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Numbers Posted(Table 2-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Spill Containment Capabilities Available on-site (Section 9.7) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- X. Additional Permits required** (Hot work, Confined Space Entry, Excavation etc.)..... Yes No
 If yes, contact the Health Sciences Department, Pittsburgh Office (412/921-7090)

- XI. Special instructions, precautions:** Employ proper lifting techniques as described in Table 5-1.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
Natural Attenuation**

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

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

- IV. Work limited to the following (description, area, equipment used): Groundwater sampling.
 Equipment to be Used: _____
 V. Names: _____
 VI. Onsite Inspection conducted Yes No Initials of Inspector _____

TtNUS

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

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

Modifications/Exceptions: Upgrade to Level C Organic vapor cartridges based on concentrations greater than action levels listed in Item V. Change out of cartridges every four hours unless end of service life indicator is available

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Fuel components (benzene)</u>	<u>PID > 5ppm in BZ > 5 minute</u>	<u>Evacuate-Call PHSO & HSM</u>
<u>Dusts and particulates</u>	<u>Visible dust cloud (>2 mg/m³)</u>	<u>Use dust suppression</u>
		<u>Area wetting</u>

Note:: If PID readings exceed 5 ppm for > 5minute duration in workers' Breathing Zone, retreat to an unaffected upwind areas and notify the PHSO and/or the HSM.

VI. Additional Safety Equipment/Procedures – Check appropriate box for ALL entries

- | | |
|--|---|
| 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..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type- Inner nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work-boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Chemical Resistant boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No | |

Modifications/Exceptions: Gloves - inner nitrile type surgeons gloves, layered if necessary. In areas where ticks are of concern, tape pant legs to boots and wear light colored clothing, use repellants, wear Tyvek in high brush and wooded areas. Perform close body inspections regularly when leaving work areas. Work-boots should have aggressive lug to control slip, trip, and fall hazards when traversing or coming up and down steep terrain. Hard hats and hearing protection at SSO direction.

- | | | | | |
|---|--------------------------|--------------------------|----------------------------|--|
| VII. Procedure review with permit acceptors | Yes | NA | Yes | NA |
| Safe Work Permit reviewed with identified personnel . | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms..... | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Procedure for safe job completion per HASP..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Safe Work Procedures Reviewed..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points(Bldg.1659) | <input checked="" type="checkbox"/> <input type="checkbox"/> |

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| VIII. Site Preparation | Yes | No | NA |
| Utility Clearances Obtained for any areas of subsurface investigations (Attachment II) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Preliminary Site Evaluation (Physical hazards removed or blockaded) (Section 2.3) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Site control boundaries/pathways and demarcated/signage (Section 8.1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dust Suppression Control Available (Table 5-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| IX. Equipment/Emergency Preparation | Yes | No | NA |
| Equipment Inspection Checklist Completed/10 Day Shift (Attachment III) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Stops tested (One Initial and Periodic tests/10 Day Shift) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Available for Use (Fire Extinguisher, First-Aid Kit, Eyewash, etc.) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Numbers Posted(Table 2-1) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Spill Containment Capabilities Available on-site (Section 9.7) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- X. Additional Permits required** (Hot work, Confined Space Entry, Excavation etc.)..... Yes No
 If yes, contact the Health Sciences Department, Pittsburgh Office (412/921-7090)

- XI. Special instructions, precautions:** Wear cut-resistant gloves when handling sharps (such as when breaking glass vials). Employ proper lifting techniques as described in Table 5-1.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
Equipment Decontamination**

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 equipment and sampling tools.

Equipment to be Used: High pressure washer/steam cleaner – large equipment/isopropanol for sampling equipment

II. Names: _____

III. Onsite Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: If any chemicals are used in decontamination, consult and follow MSDS requirements.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>None</u>	<u>None</u>	<u>None</u>
<u>Decontamination solvents</u>	<u>None</u>	<u>Review the MSDSs Prior to use</u>

VI. Additional Safety Equipment/Procedures – Check appropriate box for ALL entries

Hardhat..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs or 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 type="checkbox"/> No	Radio..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type- <u>Nitrile - Outer</u>)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work-boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical Resistant boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No	

Modifications/Exceptions: If steam or high-pressure washing is performed, wear safety glasses, face-shield, hearing protection, and chemical resistant boots or boot covers. Also, wear splash suit and gloves as directed by SSO. Impermeable apron is acceptable to control incidental splash. The necessity for barricades will be determined on-site

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safe Work Permit reviewed with identified personnel.....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms.....	<input checked="" type="checkbox"/> <input type="checkbox"/>
Procedure for safe job completion per HASP.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input checked="" type="checkbox"/> <input type="checkbox"/>
Safe Work Procedures Reviewed.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points.....	<input checked="" type="checkbox"/> <input type="checkbox"/>

VIII. Site Preparation	Yes	No	NA
Utility Clearances Obtained for any areas of subsurface investigations (Attachment II)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preliminary Site Evaluation (Physical hazards removed/blockaded/identified)(Section 2.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site control boundaries/pathways and demarcated/signage (Section 8.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust Suppression Control Available (Table 5-1)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IX. Equipment/Emergency Preparation	Yes	No	NA
Equipment Inspection Checklist Completed/10 Day Shift (Attachment III)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Stops tested (One Initial and Periodic tests/10 Day Shift)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Emergency Equipment Available for Use (Fire Extinguisher, First-Aid Kit, Eyewash, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Numbers Posted (Table 2-1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spill Containment Capabilities Available on-site (Section 9.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

X. **Additional Permits required** (Hot work, Confined Space Entry, Excavation etc.)..... Yes No
If yes, contact the Health Sciences Department, Pittsburgh Office (412/921-7090)

XI. **Special instructions, precautions:** Review all MSDSs before using decontamination solvents. Use isopropanol in well ventilated areas/outdoors only. For pressure washers 2500 psi and greater a 25° deflection tip is required. Place sand over impermeable barrier (decon area floor) for added traction. Use sunscreen, hats long sleeves for protection from the sun.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
IDW Management**

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

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

VII. Work limited to the following (description, area, equipment used): IDW Management

Equipment to be Used: 55 gallon drums, pallets, temporary bermed/lined staging area, sand

VIII. Names: _____

IX. Onsite 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
 Escape Pack SAR Bottle Trailer
 Skid Rig None

Modifications/Exceptions: Sleeved shirts and long pants.

V. Chemicals of Concern

Fuel components such as benzene

Action Level(s)
Periodic screening with PID

Response Measures
Notify FOL and effect spill/leak response measures

Note: _____

VI. Additional Safety Equipment/Procedures – Check appropriate box for ALL entries

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..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suit/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type- <u>leather/cotton work</u>)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work-boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical Resistant boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No	

Modifications/Exceptions: If a spill is detected, don appropriate dermal protection based on the degree of the release (e.g., nitrile gloves, disposable coveralls, boot covers, etc.).

VII. Procedure review with permit acceptors

	Yes	NA	Yes	NA
Safe Work Permit reviewed with identified personnel.....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms..... <input checked="" type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion per HASP.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes..... <input checked="" type="checkbox"/>	<input type="checkbox"/>
Safe Work Procedures Reviewed.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points(Bldg.1659)..... <input checked="" type="checkbox"/>	<input type="checkbox"/>

VIII. Site Preparation

	Yes	No	NA
Utility Clearances Obtained for any areas of subsurface investigations (Attachment II)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preliminary Site Evaluation (Physical hazards removed or blocked) (Section 2.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site control boundaries/pathways and demarcated/signage (Section 8.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust Suppression Control Available (Table 5-1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. Equipment/Emergency Preparation

	Yes	No	NA
Equipment Inspection Checklist Completed/10 Day Shift (Attachment III)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Stops tested (One Initial and Periodic tests/10 Day Shift)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Available for Use (Fire Extinguisher, First-Aid Kit, Eyewash, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Numbers Posted (Table 2-1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spill Containment Capabilities Available on-site (Section 9.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. Additional Permits required (Hot work, Confined Space Entry, Excavation etc.)..... Yes No
 If yes, contact the Health Sciences Department, Pittsburgh Office (412/921-7090)

XI. Special instructions, precautions: Employ proper lifting techniques as described in Table 5-1.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V

TICK BITE AND LYME'S DISEASE PREVENTION

TICK BITE AND LYME'S DISEASE PREVENTION

The following are **requirements** (not guidelines) on our project sites where contact with ticks is a concern. The requirements below are to be followed the same as safety requirements for wearing hardhats around drill rigs or cut resistant gloves when handling cutting tools.

To Minimize the Potential for Tick Bites:

1. Be aware of the types of areas that are likely to be infested. Avoid these areas whenever possible.

These include moist or shaded environments, especially those with high grass or brushy conditions. Keep in mind also that tick bites are not only a concern in the northeastern US. Lyme's Disease has been detected as far south as Florida and as far west as California, and ticks can carry other diseases such as Rocky Mountain Spotted fever.

2. When work will involve potentially infested areas:

- Wear light-colored clothing (and wear Tyvek coveralls if you need to walk through or work in areas that are likely to be infested).
- Apply multiple layers of insect repellants. Use **both** the type that can be applied directly to the skin and the stronger type that is applied directly onto clothing. For repellants that are to be applied to the skin, ensure that DEET is the active ingredient. For clothing repellant, use a product that contains at least 0.5% permethrin, such as Permanone (see <http://shop.store.yahoo.com/cspoutdoors/permanone.html> for more information). We have field tested this product with very good results. These products are now available at common retail stores such as Target and WalMart. Always follow the manufacturer's recommendations for application and cleanup. Apply repellants before entering the work area, and never over areas to be sampled or near collected environmental samples.
- Always tape up (bottom of pants/Tyvek legs to top of work boots)
- When leaving a work area where ticks may exist, always perform a close self inspection to look for any ticks. If any are found, remove them immediately. If you find one attached, use tweezers to grasp it firmly near the head and pull straight out (don't twist it as the head could break off). Clean the bite area with a disinfectant. Report any tick incidents in accordance with our injury and illness procedure (<http://intranet.ttnus.com>).

For those of you who have in the past asked me about the Lyme's vaccine, that product has been taken off of the market. For more information on Lyme's disease, you can visit the CDC website at <http://www.cdc.gov/ncidod/dybid/lyme/index.htm>. Finally, I strongly encourage you to practice these avoidance measures in your off-the-job activities as well.

Please feel free to contact me with any questions.

Matthew M. Soltis, CIH, CSP
Tetra Tech NUS
Corporate Health and Safety Manager
Created June 07, 2002

ATTACHMENT VI

**PORTABLE FIRE EXTINGUISHER
USE AND INSPECTION**

PORTABLE FIRE EXTINGUISHER USE AND INSPECTION

Portable fire extinguishers are to be provided at strategic and accessible areas of the project work site (e.g., in site vehicles, near site working areas). Individuals who are familiar with proper extinguisher use and selection are authorized to use these devices in response of small, nonstructural fires. A small fire is defined as one that a knowledgeable portable fire extinguisher user judges can be effectively extinguished with one portable unit. No TtNUS employee is authorized to attempt to extinguish larger fires or fires affecting the structural integrity of a building.

Because the above use of these devices is authorized, Fire Extinguisher Use and Inspection procedures are required at this project site. The following text is intended to provide general instruction to the field personnel charged with this responsibility.

Fire Extinguisher Use

All personnel trained in incidental response measures may be required to use and operate a fire extinguisher in response to a incipient stage fire. Therefore, the following instruction is provided and will be conveyed to all field personnel as part of site-specific training.

To use a portable fire extinguisher, the user should be familiar with the operation and intended use of the specific fire extinguishers located in the workplace. These issues are addressed in the following pages of this Attachment.

1) IDENTIFY THE TYPE OF FIRE (CLASS A, B, C, D).

CLASSES OF FIRE/FIRE EXTINGUISHER IDENTIFICATION

Fire is divided into four classes for easy identification and extinguishment. The type of fuel or ignition source will determine the type of extinguishing medium required.

Class A - Ordinary combustibles (wood, paper, rubber, plastic, and cloth). Extinguishers suitable for Class A fires should be identified by a triangle containing the letter "A." If colored, the triangle is green.



Class B - Flammable liquids, gases, and greases. Extinguishers suitable for Class B fires should be identified by a square containing the letter "B." This type of extinguisher is effective on small petroleum product fires. If colored, the square is red.



Class C - Electrically energized systems. Extinguishers suitable for Class C fires should be identified by a circle containing the letter "C." If colored, the circle is blue.



Class D - Combustible metals (sodium, magnesium, phosphorus). Extinguishers suitable for fires involving metals should be identified by a five-pointed star containing the letter "D." If colored, the star is yellow.

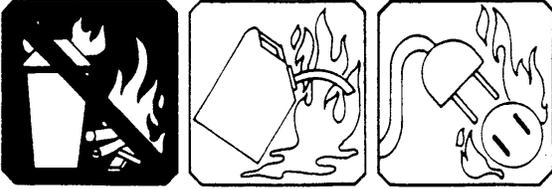


Note: Water and other extinguishing media, such as carbon dioxide and dry chemicals, are ineffective on metal fires.

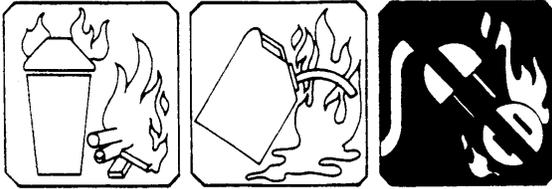
New NFPA Markings



Class A, B, C



Class B, C



Class A, B



In most cases, multi-class (Type ABC) portable fire extinguishers will be provided for use on site. If you buy a portable fire extinguisher, this is the type recommended. Size or rating recommended is 2 1/2 to 5 lbs.

Portable Fire Extinguisher Use

1. First – alert all nearby persons that you have discovered a fire. Designate an individual who is on hand to notify the FOL and the SSO, who will address other emergency notification decisions
2. Determine “Fight or Flight”. This means to make a determination if the fire is small enough to put out with only **one** portable fire extinguisher, and determine if the appropriate type of extinguisher for that fire is available. This includes considerations such as:

Rating number – The rating number assigned to a fire extinguisher is based on the capabilities of that fire class, for example

- Class 5 A – Will provide extinguishing capabilities equal to that of 5 gallons of water.
 - Class 20 B - Will provide extinguishing capabilities equal to 20 square feet of flammable liquid burning.
 - Class C & D are not rated as to their limitations.
3. Place the extinguisher on the ground, hold the extinguisher upright, and firmly twist and pull the ring pin (breaking the plastic tie that secures the ring pin).
 4. Stand upwind and at least 10 feet from the fire. Test the extinguisher to ensure that it is charged and in working order.
 5. Approach the fire and always remain upwind of the fire/smoke, squeezing the dispensing lever, aim at base of fire using a seeping motion. Be careful not to spread burning material with pressurized extinguishing material. Extinguish the fire completely.
 6. After the fire is extinguished, use a stick or other item that is several feet long to poke the embers to check for possible flashback. NEVER TURN YOUR BACK TO THE FIRE OR THE EMBERS. Back away from the scene and arrange for refilling/replacing of the extinguisher that was used.

Portable Fire Extinguisher Placement/Mounting

Portable Fire Extinguishers are to be placed/mounted in clear view in the areas where flammable or combustible materials are stored and/or dispensed. Mounting and placement of fire extinguishers will follow the following requirements

Fixed Locations (Flammable Storage)

- Extinguisher location will be marked by a red painted post to indicate extinguisher location
- The travel distance to access a fire extinguisher shall be no greater than 50 feet.
- The fire extinguisher will be mounted at a maximum height of four feet.

Mobile Locations (DPT/Drill Rigs, Support Vehicles)

All vehicles carrying fuel containers or used in the dispensing of fuel will carry at a minimum a 5 pound rated fire extinguisher.

Portable Fire Extinguisher Inspection

All fire extinguishers used in support of this field effort will be inspected on the following frequencies:

- A certified provider will perform maintenance checks of fire extinguishers at least once a year. A tag attached to the neck of the fire extinguisher will indicate documentation of the maintenance check.
- All fire extinguishers will have a current hydrostatic inspection. For the type of extinguishers commonly used at TtNUS project sites, hydrostatic inspections are required every 5 years.
- All fire extinguishers will be inspected monthly. The monthly inspection will cover the following
 - Are the fire extinguisher(s) placed in their designated location(s)?
 - Is the location conspicuously marked?
 - Is the access to the extinguisher unimpeded (i.e., not blocked or restricted in any way)?
 - Is the fire extinguisher fully completely charged/pressurized?
 - Is there signs of obvious physical damage?
 - Is the tamper indicator on the pull ring in place?

These inspection shall be documented on the attached tag provided by the maintenance/hydrostatic inspection service.

FIRE EXTINGUISHER CHECKLIST

Project Name: _____	CTO: _____	Date of Inspection: _____		
Fire Extinguisher Identification Number: _____	Fire Extinguisher Location: _____			
Inspection Criteria	Yes	No	N/A	Comments
Is the fire extinguisher(s) placed in its designated location?				
Is the location conspicuously marked (e.g., sign in place, if on a pole, is the top 18 inches of the mounting pole painted red)?				
Is the access impeding travel to the fire extinguisher blocked or restricted in any way?				
Has the fire extinguisher been partially or completely discharged?				
Is there signs of obvious physical damage?				
Does the fire extinguisher shows sufficient pressure and are all of the tamper indicators are in place?				

Project Name: _____	CTO: _____	Date of Inspection: _____		
Fire Extinguisher Identification Number: _____	Fire Extinguisher Location: _____			
Inspection Criteria	Yes	No	N/A	Comments
Is the fire extinguisher(s) placed in its designated location?				
Is the location conspicuously marked (e.g., sign in place, if on a pole, is the top 18 inches of the mounting pole painted red)?				
Is the access impeding travel to the fire extinguisher blocked or restricted in any way?				
Has the fire extinguisher been partially or completely discharged?				
Is there signs of obvious physical damage?				
Does the fire extinguisher shows sufficient pressure and are all of the tamper indicators are in place?				