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HEALTH AND SAFETY PLAN FOR SUPPLEMENTAL CONTAMINATION ASSESSMENT  
PLAN AT THE BOCA CHICA FLYING CLUB WITH TRANSMITTAL LETTER NAS KEY WEST  
FL  
1/10/2006  
TETRA TECH NUS



TETRA TECH NUS, INC.

AIK-05-0120

January 10, 2006

Project Number HK N0383

*via U.S. mail*

Commander  
Department of the Navy  
SOUTHDIV NAVFACENGCOM  
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Reference: CLEAN Contract No. N62467-94-D-0888  
Contract Task Order No. 0383

Subject: Health and Safety Plan for Supplemental Contamination Assessment Plan at the Boca Chica Flying Club, Rev. 0, Naval Air Station, Key West, Florida

Dear Mr. Magwood:

I have enclosed a CD containing the PDF file for the Health and Safety Plan for Supplemental Contamination Assessment Plan at the Boca Chica Flying Club, Rev. 0, Naval Air Station, Key West, Florida. I am not expecting to receive any comments on this report.

Please call me at (803) 641-4943, if you have any questions regarding the enclosed document.

Sincerely,

C. M. Bryan  
Project Manager

CMB:spc

c: Ms. Debra M. Humbert (Cover Letter Only)  
Ms. T. Vaught, FDEP (Hard copy)  
Mr. R. Courtright, NAS Key West

Mr. M. Perry/File  
Files 00077-4.2



# Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



Rev. 0  
December 2005

## Health and Safety Plan for the Supplemental Contamination Assessment Plan at the Boca Chica Flying Club

Naval Air Station Key West  
Key West, Florida

Contract Task Order 0383

December 2005



Southern Division

Naval Facilities Engineering Command  
2155 Eagle Drive

North Charleston, South Carolina 29406



**HEALTH AND SAFETY PLAN  
FOR  
SUPPLEMENTAL CONTAMINATION ASSESSMENT PLAN  
at  
BOCA CHICA FLYING CLUB  
at the  
NAVAL AIR STATION  
KEY WEST, FLORIDA**

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

**Submitted to:  
Southern Division  
Naval Facilities Engineering Command  
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**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0383**

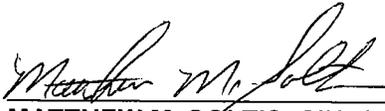
**MAY 2005**

**PREPARED UNDER THE SUPERVISION OF:**

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- IV SAFE WORK PERMITS
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## 1.0 INTRODUCTION

The objective of this Health and Safety Plan (HASP) is to provide the minimum safety practices and procedures to Tech NUS (TtNUS) personnel conducting monitoring well installation and media sampling activities in support of these Site Evaluation activities at the Naval Air Station Key West, located in Key West, Florida.

**Authorization:** This Health and Safety Plan (HASP) and the work described herein have been completed under the authorization of:

**Contract:** Comprehensive Long Term Environmental Action – Navy (CLEAN) – Southern Division Naval Facilities Engineering Command

**Contract Number:** N62467-94-D-0888

**Contract Task Order Number (CTO):** 0383

**Statement of Work/Application:** This HASP will support the following activities

- DPT - Surface and subsurface soil sampling
- Multi-media sampling - Groundwater sampling temporary and permanent monitoring wells
- HSA – Monitoring Well Installation
- Analysis of Samples Using On-site Laboratory
- Geographical Land Surveying
- IDW Management

**Proposed Dates of Work:** July 2004

**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
- NAS Key West Policies and Procedures, where and as applicable.

This HASP must be accompanied by the Tetra Tech NUS, Inc. Health and Safety Guidance Manual (TtNUS HSGM). The Guidance Manual provides additional information in the areas of program support, standard operating procedures, and safe work practices.

**Modifications/Changes:** This HASP has been prepared using the latest available information regarding known or suspected chemical contaminants and potential and foreseeable physical hazards associated with the planned work at NAS Key West. The following conditions are considered sufficient basis for review and possible changes to this document:

- The addition or modification of activities/tasks outside of those specified in Section 4.0, 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 PM to notify all affected personnel of all changes to this HASP.

## **1.1 KEY PROJECT PERSONNEL AND ORGANIZATION**

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

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.
- The PHSO is responsible for the development of this HASP in accordance with applicable OSHA regulations as specified in Section 1.0 and to serve as technical support.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SHSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- The SHSO supports site activities by advising the FOL on all aspects of health and safety on site as they may pertain to regulatory requirements or task related hazards. These duties may include:
  - Verify training and medical status of on-site personnel in relation to site activities.
  - Assist and represent TtNUS coordinating emergency services (if needed)
  - Provide elements site-specific training for on site personnel.

- Coordinating health and safety activities
  - Selecting, applying, inspecting, and maintaining personal protective equipment
  - Establishing work zones and control points
  - Implementing air monitoring procedures
  - Implementing hazard communication, respiratory protection, and other associated safety and health programs
- Compliance with the requirements stipulated in this HASP is monitored by the SHSO 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 Key West, the FOL may also be responsible for the SHSO duties. This action will be performed only as credentials, experience, and availability permits.



## 2.0 EMERGENCY ACTION PLAN

### 2.1 INTRODUCTION

This section of the HASP is part of a preplanning effort to direct and guide field personnel in the event of an emergency. The first measure in accomplishing this objective is to define, what is and is not, an emergency.

**An emergency as defined in 1910.120 is:**

*An occurrence or condition that can or has resulted in an uncontrolled release of a hazardous substance or potential safety hazard (i.e., fire, explosion, chemical exposure) associated with that release.*

**An incidental release as defined in 1910.120 is:**

*The releases of a hazardous substance that can be absorbed, neutralized, or otherwise controlled and will not result in potential safety hazard (i.e., fire, explosion, chemical exposure) are not considered emergency responses.*

Based on the above definitions, TtNUS will provide initial incident response measures for incidents such as:

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

Incidents and conditions above this level of participation will be considered emergencies that are considered beyond the capabilities of field personnel will require the use of outside emergency responders. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders in the event of an emergency. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time.

This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(I)(1)(ii).

The FOL and/or the SHSO are responsible for this plans implementation. Any and all questions should be directed to them for clarification.

## **2.2 EMERGENCY PLANNING – RECOGNITION AND PREVENTION**

The primary focus of this section is the ability to recognize and control factors that could contribute to an incident/emergency situation and/or condition. Situations and/or conditions recognized that could lead to an incident/emergency situation include

### **Physical Hazards**

- Drilling activities
  - Struck by – Movement in and around operating equipment; pressurized systems
  - Entanglement into rotating equipment
  - Contact with overhead or underground energized sources

See Section 6.2 Physical Hazards, Table 5-1 Monitoring Well Installation, and Section 9.0 Site Control for identified control measures to minimize or eliminate these hazards.

### **Chemical Hazards**

- Groundwater sampling
  - Groundwater contamination
  - Decontamination solvents
  - Laboratory chemicals

See Section 6.1 Chemical Hazards and Tables 5-1 Mobilization/Demobilization, Monitoring Well Installation, Multi-media sampling for identified control measures to minimize or eliminate these hazards.

### **Natural Hazards during**

- Mobilization/Demobilization
- Surveying
  - Snakes/Snake bite
  - Alligators

See Section 6.3 Natural Hazards and Tables 5-1 Mobilization/Demobilization, Monitoring Well Installation, Multi-media sampling, and surveying for identified control measures to minimize or eliminate these hazards.

### 2.2.1 General Practices – Emergency Planning

To further minimize and eliminate these potential emergency situations, emergency planning activities associated with this project, the following responsibilities are assigned to the FOL and/or the SHSO:

- The FOL and/or the SHSO will coordinate response actions with NAS Key West Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with facility emergency response procedures. This will serve as the initial review of the Emergency Action Plan.
- Establish and maintain information at the project staging area (Support Zone) for easy access in the event of an emergency. This information includes the following:
  - Chemical Inventory (for substances used on-site), with Material Safety Data Sheets.
  - On-site personnel medical records (medical data sheets).
  - A logbook identifying personnel on-site each day.
  - Emergency notification phone numbers and maps indicating the route to the hospital in site vehicles.

**Note:** It is the responsibility of the TtNUS FOL and/or the SHSO to ensure that this information is available and present at the site.

- **Identifying a chain of command for emergency action** – The FOL and/or the SHSO will serve as Incident Commander in the event of an on-site incident. He or she will remain in this position unless the incident progresses to an emergency situation. Once emergency response crews arrive he or she will relinquish command to the responding agency.
- **Educating site workers** - Educating site workers to the potential emergency situations that may exist and the associated control measures will be critical in early recognition and prevention. This will be accomplished through
  - Site specific training
  - Use and application of the Safe Work Permit System (See Section 10.2)
  - Daily Tool Box Meetings
  - Previewing work areas to identify, barricade, or remove physical hazards where identified.
- **Survey Work Areas before committing personnel and resources** - 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 are cleared of spider and insect nests.

- Inspect remote sample locations for signs of natural hazards (i.e., heavy brush – ticks; snakes, etc.)

It should be noted that the soil borings and monitoring well installation will be conducted in improved/maintained areas. Natural hazards including snakes, alligators, insect nesting areas are not considered prevalent.

- **Provide the necessary emergency action 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. This includes actions such as, but not limited to, securing the necessary permits and clearances such as Utility and Excavation Clearances provided by the Base and Sunshine State One-Call of Florida; Ensuring equipment and resources are at the ready for response to on-site incidents; ensuring personnel are adequately trained in the provisions of this HASP and this Emergency Action Plan; ensuring control measures specified within Table 5-1 and the Safe Work Permits are being incorporated into the applicable tasks.

Field Crew shall:

- Identify, remove, or barricade physical hazards within the estimated work area identified by the FOL and/or the SHSO.
- Follow the guidelines for control of emergency conditions
- Report any potential emergency situation to the FOL and/or the SHSO.

### **2.3 SAFE DISTANCES AND PLACES OF REFUGE/EMERGENCY ALERTING**

In the event of an incident, personnel will engage identified resources necessary to prevent the condition/situation from becoming an emergency. In the event these initial response measures cannot control the incident personnel will undertake the following measures:

- Evacuate non-essential personnel to identified safe places of refuge and secure the immediate area.
- The FOL and/or the SHSO will notify emergency services
  - 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.
- Field personnel will provide perimeter security of the work area until emergency services arrive.

- Once emergency services arrive TtNUS and subcontractor personnel will report to the designated safe place of refuge.

### **2.3.1 Critical Operations**

There are no operations being conducted under this scope of work that are considered critical and would require an individual or individuals to man during an emergency. Therefore in the event of an emergency all personnel will cease all operations and report to the safe place of refuge.

## **2.4 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT**

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

### **2.4.1 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.

### **2.4.2 Life Threatening**

- Engage Emergency Notification Sequence
- Notify off-site response agencies.
- If it will not endanger the injured individual remove any outer PPE. Removal may require the use of bandage scissors to remove the outer garments.
- Begin life saving techniques as appropriate (CPR, cooling or warming regimens, etc.).
- Cover the injured in a blanket to prevent the onset of shock.
- Follow instructions provided in Attachment I.

**Note:** One person from the field team will accompany the injured to the hospital with his/her medical data sheet, appropriate MSDSs (if applicable), 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 WorkCare as per the Incident Response Protocol provided in Figure 2-1. All other personnel will engage site control/site security measures.

The SHSO upon insuring care for the injured party will engage an investigation of the incident to gather as much information as possible. This includes as a minimum answering the questions Who? What? Where? When? Why? and How?. This information will then be communicated to the PM and the HSM. Attachment I Tetra Tech NUS, Inc. Injury/Illness Procedure will be used to accomplish this task.

### **2.4.3      Emergency Medical Treatment**

Tetra Tech NUS and subcontractor personnel are only permitted to provide treatment to the level of their First-Aid Training. It should also be noted all first aid shall be administered voluntarily. Provisions for medical treatment will be available within 5-minutes travel time or two persons of the field crew will be trained in First Aid and CPR as well as provisions within the Bloodborne Pathogen Standard 29 CFR 1910.1030.

All First-Aid provided will incorporate the following protective measures:

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

- Take the necessary precautions to prevent direct contact with the injured person's body fluids. This may be accomplished through the employment of the following measures:
  - 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 is recommended, if there is the potential for uncontrolled spread of body fluids. The PHSO will be immediately notified in event that personnel providing emergency first-aid come into contact with body fluids or other potentially infectious tissues.
  - Should Cardio-Pulmonary Resuscitation (CPR) be required, use a CPR Micro-Shield mouthpiece when administering CPR to prevent contact with the injured person's body fluids.

In order to engage these protective measures the FOL shall ensure that these items are part of each first-aid kit.

## **2.5            EMERGENCY CONTACTS**

Prior to performing work at the site, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. A mobile/cellular phone shall be available on site. It will be the responsibility of the FOL and/or the SHSO to test or otherwise ensure that the signal strength is sufficient to contact emergency services. If it is not then an alternate provider or means of communication will be used. 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  
NAVAL AIR STATION KEY WEST, FLORIDA**

AGENCY	TELEPHONE
Key West Police/Rescue Services	(305) 293-2971
NAS Key West Facility Point of Contact, Robert Courtright	(305) 293-2881
Base Police	(305) 293-2114
Base Fire Department Boca Chica	(305) 293-3333
Hospital: Lower Florida Keys Health System	(305) 294-5531
Base Officer of the Day (OOD)	(305) 293-2971
Poison Control Center	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Task Order Manager Chuck Bryan	(803) 649-7963 x345
Health and Safety Manager, Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer, Donald J. Westerhoff, CSP	(412) 921-7281

**Figure 2-1  
Route to Hospital**



1. From Boca Chica, exit NAS Key West and get on U.S. 1 South.
2. Go west across the bridge; pass Texaco and turn right on Junior College Road. Golf course will be on left; and on right, you will see hospital sign.
3. Follow road to Hospital, which

will be on the left. Hospital is located at 5900 College Road on Stock Island.

## 2.6 INJURY/ILLNESS REPORTING

In addition, 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) and Human Resources Manager Marilyn Duffy at 1-800-245-2730.
- As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

WorkCare will compile the results of the data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

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

**FIGURE 2-2 (continued)**  
**WORKCARE**  
**POTENTIAL EXPOSURE REPORT**

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

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

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

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

**I. Exposing Agent**

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

Characteristics (if the name is not known)

Solid          Liquid          Gas          Fume          Mist          Vapor

**II. Dose Determinants**

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

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

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

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

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

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

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

**Immediately With Exposure:**

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

Chest Tightness / Pressure  
Nausea / Vomiting  
Dizziness  
Weakness

**Delayed Symptoms:**

Weakness  
Nausea / Vomiting  
Shortness of Breath  
Cough

Loss of Appetite  
Abdominal Pain  
Headache  
Numbness / Tingling

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

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

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

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

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

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

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

## **3.0 SITE BACKGROUND**

### **3.1 SITE DESCRIPTION**

NAS Key West is in southern Monroe County, Florida. The U.S. Navy manages 6,323 acres of land divided into twenty separate tracts in the lower Florida Keys, concentrated around Key West and Boca Chica Key. The Naval Station at Key West was disestablished in 1974, resulting in the relocation of several units. At present, NAS Key West is proceeding with realignment of aviation operations, a research laboratory, communications intelligence, counternarcotics air surveillance operations, a weather service, and several other activities on Key West. In addition to the Naval activities and units, other DOD and Federal agencies at NAS Key West include the U.S. Air Force, U.S. Army, and U.S. Coast Guard.

Several installations in various parts of the lower Florida Keys comprise the Naval Complex at Key West. Most of these are on Key West and Boca Chica Key. Key West, one of the two westernmost major islands of the Florida Keys, is approximately 150 miles southwest of Miami and 90 miles north of Havana, Cuba. Key West connects to the mainland by the Overseas Highway (U.S. Highway No. 1). The topography at the NAS Key West is generally flat.

### **3.2 SITE LOCATION AND HISTORY**

The former Flying Club is located at NAS Key West along the northwest boundary of Taxiway H of Boca Chica Field. The Flying Club area includes a former motor pool refueling point that used underground storage tanks (USTs) to store gasoline. Four above-ground storage tanks (ASTs) containing aviation gasoline (AVGAS) were located approximately 50 feet south of the former motor pool refueling area. The area is currently used as an electrical repair and maintenance facility (Building A-126) and a transformer storage area (Building A-133).

#### **3.2.1 Site Assessment Activities**

A Contamination Assessment was completed in April 1994, including soil screening with an organic vapor analyzer (OVA) to detect contaminated soil. OVA screening results indicated the presence of excessively contaminated soils (greater than 50 parts per million [ppm]) in four areas. The largest of these areas measured approximately 70 feet by 40 feet and was located southeast of Building A-133. Three smaller areas of excessively contaminated soil were identified near the former AVGAS dispenser, north of Building A-133, and northwest of Building A-133 (ABB, 1994).

Groundwater samples were also collected during the Contamination Assessment and analyzed for Kerosene Analytical Group (KAG) parameters. KAG analyses consisted of volatile organic compounds

(VOCs), polynuclear aromatic hydrocarbons (PAHs), ethylene dibromide (EDB), total lead, and total and total recoverable petroleum hydrocarbons (TRPH). Two areas of VOC contamination were identified, one near the former AVGAS ASTs and dispenser, and the other near the former motor pool USTs.

Groundwater was sampled again in August 1996, as part of the Remedial Action Plan (RAP) preparation. The data indicated significant changes in the degree and extent of contamination originally defined in the Contamination Assessment Report (CAR). The highest VOC concentrations were found in samples from monitoring well FC-MW-06. Based on the 1996 sampling results, the RAP recommended the removal of 2,126 cubic yards of contaminated soil. The largest volume of soil recommended for excavation was in the vicinity of the former motor pool USTs, near Building A-133 (ABB, 1997). In 1998, based on recommendations in the RAP, approximately 983 cubic yards of soil were removed from the Flying Club site. The amount of excavated soil was less than scoped in the RAP because natural attenuation had reduced soil contamination since the contamination assessment was performed, and cleanup goals had been revised since production of the RAP.

A monitoring program presented in the RAP for the Flying Club Site was implemented in August 1999. Four of the sites monitoring wells were sampled for the KAG parameters for a period of one year. At the end of the program, only one monitoring well (FC-MW-06) had concentrations that exceeded FDEP Groundwater Cleanup Target Levels (GCTLs). Based on these results, TtNUS recommended that future monitoring at the site include only the sampling of monitoring well FC-MW-06 for an additional year (TtNUS, 2000). In August 2000, FDEP approved the recommendation but requested that monitoring well FC-MW-20 (replaced by FC-MW-22 in June 2002) be added to the sampling program as a perimeter well. The first quarterly monitoring event was conducted in October 2000. After three quarters of monitoring, hydrocarbon levels had decreased substantially in FC-MW-06. However, naphthalene and TRPH concentrations had increased in FC-MW-20. Because concentrations of several contaminants did not decrease following several quarter of groundwater monitoring, TtNUS recommended that a treatability study be performed to investigate the efficacy of enhancing the degradation of contaminants under aerobic conditions (TtNUS, 2001).

In May 2002, an air sparging (AS)/soil vapor extraction (SVE) Treatability Study was initiated at the site to remediate residual hydrocarbon contaminants in the soil and groundwater. The remedial system operated from June 2002 through January 2003. TtNUS performed routine operation and maintenance during monthly site visits. The trailer containing the AS/SVE system was removed in February 2003 after completion of the treatability study. Quarterly groundwater samples were collected during operation of the AS/SVE system, in September 2002 and January 2003. The AS/SVE Treatability Study Evaluation Report concluded that the overall KAG contamination in the previously-defined source water monitoring

well (FC-MW-06) had decreased since implementation of the AS/SVE system. However, groundwater from the perimeter well, FC-MW-22 (which replaced FC-MW-20 due to damage), showed an increase in concentrations of VOCs, PAHs, and lead following the treatability study (TtNUS, 2003).

The Flying Club MNA Report for February 2004 recommended that a Supplemental Site Assessment be performed following one additional groundwater monitoring event scheduled to take place in late May 2004 (TtNUS, 2004).

A Site Assessment was performed between July 2004 and January 2005. A direct-push technology (DPT) investigation was conducted to define the horizontal and vertical extent of contamination at the site. Soil and groundwater screening samples were also collected from selected soil borings for fixed-base laboratory analysis. Based on the results of this initial investigation and additional DPT locations, monitoring wells were installed at the site in September 2004. Soil and groundwater samples were collected during this event for off-site laboratory analysis. A second groundwater sampling event was conducted in January 2005. Aquifer properties were evaluated using data collected during the monitoring well elevation survey, tidal study, and static water level (SWL) measurements, along with referenced slug test data (conducted during the site assessment in 1994). The assessment uncovered areas of contamination within the site, however a single source was not identified.



## 4.0 SCOPE OF WORK

This section discusses the specific tasks that are to be conducted as part of this scope of work as identified by CTO 0383. These tasks are the only ones addressed by this HASP. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit the requested modifications to this document to the HSM.

Specific tasks to be conducted include the following:

- Mobilization/demobilization activities
- Soil borings and collection of groundwater screening samples using Direct Push Technology (DPT).
  - Approximately 69 soil borings will be installed on a 20-foot grid in three successive rows around Building A126. The borings will be advanced to the water table to an approximate depth of four feet below land surface (bls).
  - Groundwater screening samples will be collected from each of the soil borings and analyzed for Priority Pollutant List (PPL) VOCs including BTEX and MTBE, PAHs, by the mobile laboratory.
- Monitoring well Installation using Hollow Stem Auger (HSA)
  - Shallow (15 feet deep) monitoring wells will be installed to delineate any detected groundwater contamination. Groundwater samples will be collected from the newly installed monitoring wells and the existing wells at the Flying Club.
- Decontamination
- Geophysical Survey – Ground Penetrating Radar (GPR) and electromagnetic (EM) geophysical methods will be used to identify and mark any utilities.
- Geographic Survey - Monitoring wells will be surveyed by a Florida-licensed surveyor following installation.
- IDW Management

For more detailed description of the associated tasks, refer to the Supplemental Contamination Assessment Plan.



## 5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section is intended to assist project personnel in the recognition of hazards and recommended control measures necessary for each planned task to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which personal protective equipment (PPE) and decontamination procedures are to be used as well as appropriate air monitoring techniques and action levels. This table must be updated if the scope of work, contaminants of concern, or pertinent conditions change.

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

The following text provides a general description of the tasks to be conducted and are the basis for the hazard assessment.

### 5.1 MOBILIZATION/DEMOBILIZATION

This task includes, but not limited to, the following

- The procurement and shipping of equipment, and materials for the field investigation.
- Review of planning documents (i.e., HASP, Sampling and Analysis Plan, Work Plan, Quality Assurance Plan, etc.)
- Site Reconnaissance to include site characterization, site preparation, the layout of drilling/sampling locations, securing the necessary utility clearances and isolating physical hazards, where applicable.
- Secure, construct, or equip decontamination facilities to support the field activities.
- Secure, construct, or equip IDW storage facilities to support the field activities.
- Sign Installation – This activity will include the installation of signs around the facility. This activity will include mounting signs on existing posts, fences, and on newly installed posts.

**Physical Hazards** – The hazard types associated with this task are considered primarily to be Physical hazards – Lifting, strains/sprains, lacerations achieved during unpacking of equipment and during site preparation (i.e., cutting open boxes, lifting equipment, locating sample points). During sign post installation (some of the post holes will be hand dug others will be driven into the ground) strains, sprains, lifting hazards, and pinches and compressions.

**Chemical Hazards** - It is not anticipated that personnel will be exposed to chemical hazards (site contaminants) during this task. The FOL and/or the SHSO must establish the site-specific Hazard Communication Program to address potential hazards of chemicals brought on-site. Of primary concern is the concrete used to set fence posts. See Section 5.0 of the HSGM.

**Natural Hazards** – Installation of the signs may require personnel to enter areas that are possibly not maintained or are remote. Due to this fact, it is anticipated that natural hazards may be encountered. This includes potential insect/spider bites, snakes/snake bites, and potential alligator encounters.

## 5.2 MONITORING WELL INSTALLATION – HOLLOW STEM AUGER

Monitoring wells are to be installed using Hollow Stem Auger techniques. This method of drilling consists of advancing hollow rotating augers into the ground. Cuttings are brought to the surface by the rotating action of the auger. Advantages of this type of drilling include:

- Samples can be obtained while augers remain in the ground. Sampling requires the use of split-barrel or thin-wall tube samplers advanced through the hollow core of the auger.
- No drilling fluids are required.
- A well can be installed inside the auger stem and back-filled as the augers are withdrawn.

**Physical Hazards** – Physical hazards includes

- Entanglement within rotating equipment (augers); caught between pinches and compressions. These hazards are not only the most serious (entanglement) but also pinches/compressions are the most frequent type of injury cause in the drilling industry. Due to a recent fatality (within the last two years) that occurred when a worker wearing a hooded sweatshirt became entangled in rotating augers, several safe work practices have been incorporated into this activity. These include
  - All emergency stop devices will be tested initially and periodically thereafter. This will be accomplished during the equipment inspection and at random intervals.
  - One person on the drill crew will be designated as the Emergency Stop Device Operator.
  - Prior to the initiation of augers, the driller will announce they are about to start and will ensure all personnel are away from rotating apparatus.
  - The SHSO shall ensure that all personnel have
    - o Secured/removed all loose clothing and/or PPE articles
    - o Remove all jewelry or other articles that could snag a rotating auger.
    - o During the inspection the SHSO shall ensure that the augers and associated rotating equipment do not have obvious snag points.

- Energized Systems – Overhead and underground.
- Lifting Hazards – Auger flights (>100 lbs) bags of Portland Cement (>90 lbs). Again this is a very common hazard within the drilling industry.
- Pressurized systems – This hazard occurs when workers are in the proximity of unguarded pressurized systems. An incident of this nature (high pressure line came loose and struck a worker) occurred within the last couple of years resulting in a near fatality. Therefore, extra efforts will be employed to ensure fittings and connections are secure. Those fittings and connections near the operator or driller's helper that are not guarded will be secured by whatever means are necessary (i.e., pressurized line restraints). Pressurized hazards are also recognized while performing support functions such as decontamination. Pressurized water/heated pressurized water has accounted for burns and water lacerations.

Due to the severity and frequency [Incident (injury/illness) analysis] it is recommended that supervisory personnel (FOL and SHSO) should focus their attention conditions that could predispose personnel to these hazards.

- Traffic hazards – These sites are located within very active industrial areas. Field crews will have to contend with pedestrian and vehicular traffic. Diligent measures are required for constructing and isolating work zones and controlling facility traffic patterns (pedestrian and vehicular) away from the work zone.
- Noise – The operating level of a standard hollow stem auger drill rig varies between 86 and 89 dBA when drilling. Impact noise levels (while driving spoons) are significantly higher, thereby presenting an excessive impact noise hazard. In addition, associated with this task is the decontamination process using pressure washer/steam cleaners. These items typically operate at 94-97 dBA when engaged.
- Exposure to chemicals associated with well construction materials are also a concern. This includes sand, grout (containing Portland Cement), and Bentonite. Hazards associated with these chemicals include irritation of the eyes, alkali/chromium burns of contact points associated with wet cement, and respiratory irritation.

See Site specific Hazard Communication Program (Section 5.0 HSGM) for control measures facilitated through creating and maintaining and accurate chemical inventory, employee training, proper container labeling, and MSDS use.

### **5.2.1 Soil Borings Temporary Monitoring Well Installation – DPT**

Common physical hazards associated with DPT activities include the following:

- Pinch/compression Points – The potential exists during the soil boring using MacroCore Samplers to get fingers caught within pinch points during the hydraulic driving as well as between wrenches and hard surfaces when opening the samplers.
- Pressurized systems – This hazard is compounded due to the workers close proximity to pressurized hydraulic lines and systems on the DPT rigs. In addition, pressurized hazards exist as it pertains to the decontamination process. Those fittings and connections near the operator or drillers helper that are not guarded will be secured by whatever means are necessary (i.e., pressurized line restraints).
- Noise – The operating level of a standard DPT rig varies between 89 and 92 dBA presenting potential noise exposure concerns. During hammering the impact levels may reach higher levels.
- Cuts, pricks, and lacerations – This hazard is possible when cutting the acetate liners. To combat this hazard the Geoprobe Sampling Kit or similar equipment is required. This mechanism secures the acetate liner while cutting. In addition when transporting glassware for sample collection or testing may present a problem should the glassware become broken. To combat this hazard hard sided containers such as coolers will be used to transport glassware. This will prevent possible breakage as well as protect the individual from the glass shards should the glass become broken.

Chemical Hazards – Potential occupational chemical exposure during this activity would be anticipated under the following conditions.

- Contaminant exposure based on direct interaction with contaminated media. See Table 6-1 for potential health effect information for known or suspected site contaminants.

### **5.3 MONITORING WELL DEVELOPMENT/SAMPLING**

#### **5.3.1 Monitoring Well Development**

The development of the monitoring wells are intended to remove debris associated with installation and to condition the sand pack to facilitate contact with the surrounding aquifer. Monitoring well development is typically accomplished using surge blocks and pumps to force water in and out of the sand pack and formation and to remove this debris from the well. 1" inch Whale Pumps with 12-volt battery will be employed to remove specified water volumes as well as any debris.

See Section 5.3.3 for potential hazards.

#### **5.3.2 Permanent/Temporary Monitoring Well Sampling**

The monitoring wells will be sampled using low-flow purging and sampling techniques. Redi-Flo, bladder, or peristaltic pumps will be used to purge and to collect the samples. Field measurements of pH, temperature, specific conductance, and turbidity will be made during purging using a direct reading instrument. These measurements will be taken at the start of purging and every 5 to 15 minutes until the parameters have stabilized. The wells will be purged until a sufficient predetermined amount of water has been removed and the water quality measurements are acceptable and stable. All tubing used for sampling will be dedicated and disposed of after the sample has been collected.

See Section 5.3.3 for potential hazards.

#### **5.3.3 Water Level Measurements**

Water level measurements will be taken at the existing and newly installed monitoring wells during this field investigation. The water levels will be taken with an electric water level indicator using the top of the well casing as the reference point for determining water depths. Water levels will be conducted upon completion of the newly installed wells and prior to and through the course of purging and sampling.

**Physical Hazards** – The hazard types associated with the above tasks are similar in nature and therefore presented together. Physical hazards as it pertains to development, sampling, hydraulic conductivity testing

–

- Lifting, strains/sprains, associated with handling purge/development waters.

- Cuts, pricks, and lacerations – This hazard is possible when cutting sample tubing. In addition when transporting glassware for sample collection or testing may present a problem should the glassware become broken.
- Traffic hazards – These sites are located within very active industrial areas. Some of the investigation locations are in the middle of travel thoroughfares. Both foot and vehicular traffic hazards are considered prevalent during certain phases of executing this scope of work.
- Electrical hazards – Remote but possible when handling and using a 12-volt battery as a power sources to drive the pumps.

**Chemical Hazards** - Chemical exposure during this activity maybe facilitated through

- Direct contact - Splash - Contaminant exposure based on direct interaction with contaminated media through possible splash.
- Inhalation – When a field crew member opens the well, he or she may be exposed to vapors/gases coming out of the well and may also encounter excess pressure build up in the well head. To control exposure limit the proximity of the technician to the well head as well as the amount of time he or she remains there.
- Ingestion – Due to handling of equipment, sample media, and improper work hygiene could result in the ingestion of identified site contaminants.
- Sample preservatives/natural attenuation reagents/decontamination solutions – Certain chemicals will be brought on-site in support of this field investigation effort. These chemical hazard classes include corrosives, flammable, and oxidizers.

See Table 6-1 for potential health effect information due to chemical exposure. See also the Site Specific Hazard Communication Program for controlling hazards as it pertains to chemical substances brought on-site.

## 5.4 MULTI-MEDIA SAMPLING

### 5.4.1 Surface and Subsurface Soil Samples

Approximately 69 soil borings will be collected through the course of this investigation. Sample media will be screened continuously from the surface to the water table (approximately 4-feet bgs) using an FID. Sample selected for analysis will be a result of the FID screening.

**Physical Hazards** – The hazard types associated with the above tasks include

- Cuts and lacerations – This hazard is possible when cutting the acetate liners. Hazards of this nature can be prevented using Geoprobe Kits or similar devices to secure the liners while cutting.

## 5.5 GEOPHYSICAL / GEOGRAPHICAL SURVEYING

This activity is generally non-intrusive in nature. Vertical elevations and horizontal locations will be taken from the ground surface at well and selected soil sampling locations.

**Physical Hazards** associated with this task includes

- Traffic hazards – These sites are located within very active industrial areas. Some of the investigation locations are in the middle of travel thoroughfares. Both foot and vehicular traffic hazards are considered prevalent during certain phases of executing this scope of work.
- Trips and Falls – This hazard is considered due to uneven ground (curb sides, hill sides) and potentially slippery surfaces.

## 5.6 DECONTAMINATION

The equipment involved in the field activities for well installation and sampling will be decontaminated prior to, during, and after the completion of on-site activities.

### 5.6.1 Sampling Equipment

All non-dedicated sampling equipment (i.e. stainless-steel hand augers, trowels, bowls, MacroCore Samplers) will be decontaminated prior to the initiation of field sampling, between sample locations, and at the completion of the field activities. The following decontamination steps will be taken.

1. Remove heavy materials (soils, etc.)

2. Alconox or Liquinox detergent wash
3. Potable water rinse
4. Solvent rinse (Isopropanol)
5. DI water rinse
6. Air dry
7. Screen with FID to ensure all contaminants as well as decontamination solvents have been removed.

All dedicated sampling and PPE equipment will be rinse to remove gross contamination and then disposed of.

**Chemical Hazards** associated with this activity include:

- Exposure to contaminated media
- Exposure to decontamination solvents

## **5.7 INVESTIGATIVE DERIVED WASTE MANAGEMENT**

This task includes the containerization, labeling, staging, monitoring, and final deposition of investigative derived wastes. These are as follows:

Containerization – Materials generated including soils, purge and development waters, decontamination fluids shall be collected and containerized in 55-gallon drums and staged in a centralized location at the trailer yard.

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 once filling the container begins

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 (4 to a pallet) with lid retention ring bolt accessible on the outside as well as the label. Pallet rows will maintain a minimum of 4 feet between rows for access and monitoring for leaks. Containers will be separated according to media and site.

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

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

**Physical Hazards** associated with this Waste Management activity include

- Caught between pinches and compressions. This occurs primarily when moving containers to transport vehicles and when staging the drums on pallets. The prevalent hazard is recognized when moving the drums and hands get caught between drums.
- Lifting – Drums of water can weigh upwards of 475 lbs. Drums of wet soil can weigh up to 750 lbs.

For more detailed description of the associated tasks, refer to the Work Plan (WP) and/or the Quality Assurance Plan (QAP).

## **5.8 GENERAL SAFE WORK PRACTICES**

In addition to the task-specific safe work practices identified in Table 5-1 to be employed to minimize task specific hazards, the following general safe work practices will be employed. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Refrain from eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. This is especially critical between breaks and prior to lunch and associated hand to mouth activities.
- Avoid contact with potentially contaminated substances by walking around puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces.

- Be familiar with and adhere to all instructions provided within this site-specific HASP.
- Be aware of the location of the nearest telephone and all emergency telephone numbers. See Section 2.0, Table 2-1.
- Attend briefings on anticipated hazards, equipment requirements, Safe Work Permits, emergency procedures, and communication methods before going on site.
- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.
- Rehearse unfamiliar operations prior to implementation.
- Use the “buddy system”.
- Maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.
- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Health and Safety Officer (SHSO).
- Matches and lighters are restricted from entering in the Exclusion Zone or Contamination Reduction Zone. Smoking will only be permitted in specified areas at Site 4.
- 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.

## **5.9 DRILLING (HSA/DPT) SAFE WORK PRACTICES**

The following Safe Work Practices are to be followed when working in or around the HSA/DPT Drill Rig Operations.

### 5.9.1 Before Drilling

- Identify all underground utilities and buried structures before drilling. This service is provided by the Sunshine State One Call of Florida (1-800-432-4770). The typical sequence of events are as follows:
  1. A request is submitted to Sunshine State One Call of Florida (1-800-432-4770) for clearance of a location(s). Often times intersections, building numbers, or other location identifiers are provided. It is best to provide as much assistance as possible. Ensure that marks are on the ground using white paint or flagging. Sunshine State One Call of Florida then notifies members within this cooperative. This is sometimes where problems arise. Not all utilities are required to be members. Provisions to accommodate this shortfall are provided in the Tetra Tech NUS, Inc. Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.
  2. Typical timeline for marking and providing clearances is 48-hrs. A ticket or ticket number will be provided referring to your clearance. This will have a timeline, generally 14-days. Again problems sometime arise here because site personnel allow their tickets to expire, then accidentally encounter a utility. Tickets must be maintained valid by asking for a re-issue or extension, when necessary, prior to expiration.
  3. Another problem that occurs with time is that utility locations marked on the ground may not remain visible. The FOL is responsible for ensuring that utility locations/marks on the ground are maintained so they remain visible (repaint, pin flags, etc.), and to annotate maps with these locations so they may be incorporated into the GIS system.
  4. Lastly, once marks are placed on the ground and have been cleared, only limited leeway (2-feet) exists to stray from the planned and approved intrusive locations.
- All drill rigs will be inspected by the SHSO 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 for Drill Rigs provided in Attachment III. Inspection frequencies will be once every 10-day shift or following repairs.
- Check operation of the Kill Switch (initially, then periodically thereafter). See section 5.2 concerning these testing of the emergency stop devices and the other required precautions.
- Ensure that all machine guarding is in place and properly adjusted.
- Block the drill rig and use levelers to prevent movement of the drill.

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding operating equipment.
- The drillers helper 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 drill flights will be provided to avoid the collapse of stacked equipment.

### **5.9.2 During Drilling**

- Minimize contact to the extent possible with contaminated tooling and environmental media. All potentially contaminated tooling will be placed on polyethylene sheeting for storage and wrapped for transport to the centrally located equipment decontamination area
- An individual must be designated with the primary responsibility of operating the key switch mechanism. Also, the drill rig operator must verbally announce to all surrounding persons each time that he/she is about to activate the drilling mechanism.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the drill rig of the height of the mast plus five feet or 35-feet (for HSA rigs) (25-feet for DPT Rigs) whichever is greater. These distances have been determined to restrict activities from within suspected physical hazard boundaries. Because work will be performed in areas accessible to the general facility population, these boundaries must be strictly enforced by site personnel.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill rig.
- During maintenance, use only manufacturer provided/approved equipment (i.e. auger flight connectors, etc.)
- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should be used to move auger flights and other heavy tooling.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted at all times.

### **5.9.3 After Drilling**

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the FOL and/or the SHSO to determine 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 the days activities. During fueling operations all equipment will be shutdown and bonded to the fuel source.
- When not in use all drill rigs will be shutdown, and emergency brakes set and wheels will be chocked to prevent movement.
- 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 and the general population who may have access to these areas.

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**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAVAL AIR STATION KEY WEST – KEY WEST, FLORIDA  
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Task/ Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment (Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)	Decontamination Procedures
<p>Mobilization/Demobilization</p> <p>This activity includes:</p> <ul style="list-style-type: none"> <li>- Equipment Preparation and Inspection</li> <li>- Resource acquisition and unpacking of supplies</li> <li>- Site clearance and preparation – Utility clearances, etc.</li> <li>- Establish and construct access routes to sample/work locations, where applicable.</li> <li>- Construct decontamination and IDW operation and storage facilities, as applicable.</li> </ul>	<p><b>Chemical hazards:</b></p> <p>1) Exposure to identified site contaminants is not anticipated to occur during this task. However, potential exposure to chemicals brought on-site should be considered.</p> <p><b>Physical hazards:</b></p> <p>2) Lifting (strain/muscle pulls)</p> <p>3) Cuts</p> <p>4) Pinches and compressions/Struck by</p> <p>5) Slips, trips, and falls</p> <p>6) Heavy equipment hazards (swinging booms, hydraulic lines, etc.)</p> <p>7) Vehicular and foot traffic</p> <p><b>Natural hazards:</b></p> <p>8) Ambient temperature extremes (heat/cold stress)</p> <p>9) Insect and animal bites</p> <p>10) Inclement weather</p>	<p><b>Chemical hazards:</b></p> <p>1) The SSO will establish and maintain an on-site Hazard Communication Program (Section 5.0 TiNUS Health and Safety Guidance Manual) for all hazardous chemicals brought onto the site by Tetra Tech NUS and subcontractor personnel. This effort shall include:</p> <ul style="list-style-type: none"> <li>• Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS and the label) will be maintained in a centralized location and made available upon request.</li> <li>• MSDS's will be maintained in a central location, accessible to all personnel.</li> <li>• All containers will have labels specifying the following information: <ul style="list-style-type: none"> <li>Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List)</li> <li>Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.)</li> <li>Manufacturer's Name Address and Phone Number</li> </ul> </li> </ul> <p><b>Physical hazards:</b></p> <p>2) <b>Lifting Hazards</b> –The following provisions shall be instituted in order to minimize hazards of this nature: Use machinery or multiple personnel for heavy lifts, where possible. Use proper lifting techniques</p> <ul style="list-style-type: none"> <li>- Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are obtainable.</li> <li>- Keep the load as close to your body as possible.</li> <li>- Minimize turning and twisting when lifting or lifting.</li> <li>- Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive.</li> <li>- Plan your lifts</li> <li>- Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury.</li> </ul> <p>3) <b>Cuts</b>– To prevent cuts associated with unpacking or packing equipment and supplies, during initial site preparation activities (clearing access routes), the following provisions are required:</p> <ul style="list-style-type: none"> <li>- Always cut away from yourself and others.</li> <li>- Do not place items to be cut in your hand or against your body.</li> <li>- Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting instruments.</li> <li>- All hand tools (brush hooks, machetes, etc.) are used to gain access to sample locations, the following precautions are recommended: <ul style="list-style-type: none"> <li>- Ensure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus).</li> <li>- Ensure all cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade.</li> <li>- All hand tools (brush hooks, machetes, etc.) with cutting blades shall be provided with a sheath to protect individuals when not in use and when carrying these items over rough or slippery terrain.</li> <li>- All personnel will maintain a 10-foot perimeter or greater around persons clearing brush and access paths to sample and/or well locations.</li> </ul> </li> <li>4) <b>Pinches/Compressions/Struck By</b> - Do not modify tooling without manufacturer's expressed permission. <ul style="list-style-type: none"> <li>- Keep any machine guarding in place, avoid moving parts.</li> <li>- Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points.</li> <li>- Adjust machine guarding as necessary to minimize distance between guards and point of operation.</li> <li>- When staging equipment, Ensure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects.</li> </ul> </li> <li>5) <b>Preview work locations for unstable/uneven terrain.</b> <ul style="list-style-type: none"> <li>- Cover, guard and barricade all open pits, ditches, and floor opening as necessary.</li> <li>- Ruts, roots, tools, and other tripping hazards should be eliminated to minimize trips and falls.</li> <li>- Maintain a clutter free work area.</li> <li>- As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas.</li> </ul> </li> <li>6) <b>Heavy Equipment Hazards</b> - All equipment will be <ul style="list-style-type: none"> <li>- Inspected in accordance with OSHA and manufacturer's design.</li> <li>- All equipment inspection will be documented on a Equipment Inspection Checklist as provided in (See Attachment III).</li> <li>- Operated by knowledgeable operators and ground crew.</li> </ul> </li> <li>7) <b>Vehicular and Foot Traffic Hazards</b> - As part of site preparation activities and zone construction, when preparing traffic and equipment considerations are to include the following: <ul style="list-style-type: none"> <li>- Establish safe zones of approach (i.e. Boom or mast + 5 feet). 25/35-feet respectively for the DPT/HSA Rig.</li> <li>- The mast will be lowered when moving the rig.</li> <li>- Foot and vehicular traffic routes shall be well defined.</li> <li>- All self-propelled equipment with restricted vision moving backwards shall be equipped with back up warning systems.</li> <li>- The FOL and/or the SHSO as a precautionary measure to remove or demarcate physical hazards shall preview traffic routes (foot and vehicular) before the commitment of personnel and resources.</li> </ul> </li> </ul> <p><b>Natural hazards:</b></p> <p>8) <b>Ambient Temperature Extremes</b> - 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 TiNUS Health and Safety Guidance Manual.</p> <p>9) <b>Insect/Animal Bites and Stings</b> - To combat the potential impact of natural hazards, the following actions are recommended</p> <p>Snakes – The potential for encountering snakes is more likely near waters edge and along the bank where they sun themselves</p> <p>Items lying on the ground provide cover and nesting locations. Snake chaps or high leather boots should be worn in unimproved or unmaintained areas.</p> <ul style="list-style-type: none"> <li>- Keep hands and feet out of areas you cannot see.</li> </ul> <p>Alligators – may present a hazard along water ways in unmaintained/remote areas. They tend to be more aggressive during mating and nesting periods.</p> <ul style="list-style-type: none"> <li>- Buddy System – Always use two people when performing duties in areas where alligators may exist. One to serve as a watch while the other completes the task.</li> <li>- Nesting areas – These areas are usually marked by mounded areas of grasses and mud. A telltale characteristic of these nests is the noticeable slide marks leading from the mound into the water. Avoid these areas.</li> </ul> <p>Insects and spiders</p> <ul style="list-style-type: none"> <li>- Wear light colored clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control.</li> <li>- Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas.</li> <li>- Do not stick your hand anywhere where you can't see.</li> <li>- When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations.</li> <li>- Use repellents – Follow manufacturer's recommendations for use. Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. Repellants such as those containing DEET may be applied to the skin. In all cases follow the manufacturer's instructions.</li> </ul> <p>See Section 4.0 of the HSGM for more information concerning these natural hazards.</p> <p>10) <b>Inclement Weather</b> - Suspend or terminate operations until directed otherwise by SHSO. See Section 4.0 of the TiNUS Health and Safety Guidance Manual for additional information concerning natural hazards.</p>	<p>Visual observation of work practices by the FOL and/or the SHSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.).</p> <p>Monitoring for chemical hazards are not required during this activity.</p>	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> <li>- Standard field attire (Sleeved shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- <i>Snake chaps( for remote and unmaintained areas)</i></li> <li>- <i>Safety glasses (for moving through brush and when involved in activities that could result in flying projectiles such as hammering or chopping and clearing brush)</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hearing protection for high noise areas (At the direction of the FOL and/or the SHSO).</i></li> </ul> <p>As site conditions may change, the following provisions will be maintained during all on-site activities as prescribed in Section 2.0 of this HASP</p> <ul style="list-style-type: none"> <li>- Fire Extinguishers</li> <li>- First-aid kit</li> <li>- Emergency Contact List</li> <li>- Map to the Hospital</li> </ul> <p><b>Note:</b> <i>The FOL and/or the SHSO will determine the number of fire extinguishers and first-aid kits to be made available based on the number of operations to be conducted at any given time.</i></p>	<p>Not required.</p> <p>Good personal hygiene practices should be employed prior to breaks lunch or other period when hand to mouth contact occurs. This will minimize potential ingestion exposures.</p> <p>Site Preparation – A structured decontamination procedure is not required for this activity. However, as some site preparation activities may require personnel to enter unimproved areas (heavy underbrush wooded areas) personnel should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to assist in stopping the transfer of these insects into vehicles, homes, and offices.</p>

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAVAL AIR STATION KEY WEST – KEY WEST, FLORIDA  
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Task/ Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)</i>	Decontamination Procedures
<p>Monitoring Well Installation - HSA</p> <p>Soil Borings/Temporary Well Installation using DPT -</p>	<p><b>Chemical hazards:</b></p> <p>1) Previous analytical data identified various VOCs as contaminants of concern with benzene considered the primary contaminant related to potential occupational exposures.</p> <p>Additional VOCs may be encountered however they are not at concentrations that pose a significant exposure risk.</p> <p>Further information on these contaminants are provided in Section 6.1 and Table 6-1.</p> <p>2) Transfer of contamination into clean areas or onto persons.</p> <p><b>Physical hazards:</b></p> <p>3) Heavy equipment hazards (pinch/compressions points, rotating equipment, 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) Cuts and lacerations</p> <p>9) Vehicular and foot traffic Further information on these physical hazards, see Section 6.2 for further discussions.</p> <p><b>Natural hazards:</b></p> <p>10) Inclement weather</p> <p>11) Insect bites</p>	<p><b>Chemical hazards:</b></p> <p>1) Safe work practices and monitoring instruments will be employed as the first line of defense. As a general rule, avoiding contact with contaminated media (water, soils, etc.). In addition, good work hygiene practices including avoiding hand-to-mouth contact to the extent possible, washing hands and face or using hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities will restrict the most predominant route of exposure. As part of the evaluation method of these subsurface media, all samples will be scanned with a FID to determined potential source concentration.</p> <p>2) <b>Transfer of Contamination into Clean Areas or onto Persons</b> - Restrict the cross use of equipment and supplies between locations and activities without first going through a suitable decontamination. Work practices including establishing a rigid decontamination procedure will be employed for all equipment between locations and between clean and potentially dirty work. This provision along with dedicated sampling equipment will Ensure materials are not carried and deposited in unaffected areas.</p> <p><b>Physical hazards:</b></p> <p>3) <b>Heavy Equipment Hazards</b> - All equipment will be:  <ul style="list-style-type: none"> <li>- Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design, as applicable. All inspections will be documented using the Equipment Inspection Checklist (for Drill Rigs) found in (See Attachment III) of this HASP.</li> <li>- Operated and supported by knowledgeable operators and ground crew.</li> <li>- Used within safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 35-feet for HSA Rigs/25 feet for DPT rigs from the point of operation or the height of the mast plus 5-feet, whichever is greater. For DPT operations personnel will remain at least 25 feet from the point of operation or the height of the mast plus 5-feet, whichever is greater. See Section 10.1.1 of this HASP. This will be the area identified as the exclusion zone.</li> <li>- All equipment/vehicles with a restricted view moving backwards shall be equipped with back up alarms.</li> <li>- 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.</li> <li>- One person (usually the driller) will be designated as the Emergency Shut Off Device Operator.</li> <li>- Prior to engaging the augers, the driller will announce, loud enough for all to hear that he is engaging the augers. He or she will visually confirm that all personnel are removed from the rotating equipment then engage the augers.</li> <li>- Areas will be inspected prior to the movement of the HSA/DPT rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SHSO.</li> <li>- See additional safe work procedures for drilling in Section 5.9 of this HASP as well as in Section 4.0 of the HSGM.</li> </ul> </p> <p>4) <b>Noise in Excess of 85 dBA</b> - Hearing protection will be used during all subsurface activities using the HSA Drill Rig and DPT rig or when noise levels are &gt;85 dBA. (during operation). Previous accumulated data indicates an average 8 hour exposure working behind a HSA and DPT during operation is approximately 87-92 dBA.. Controlling this hazard shall be accomplished employing two separate approaches as follows:  <ul style="list-style-type: none"> <li>- Boundaries will be established to limit the affect of the noise hazard. The height of the mast + 5 feet or 35-feet for HSA Rigs/25 feet for DPT rigs whichever is greater will remove personnel far enough from the noise source as not to present a noise exposure concern.</li> <li>- Hearing protection</li> </ul> <p style="text-align: center;"><i>As a general rule of thumb - Excessive noise levels (&gt;85dBA) are being approached when you have to raise your voice to talk to someone within 2 feet of your location.</i></p> <p>5) <b>Energized Systems</b> - All drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II of this HASP. All utility clearances will be obtained in writing, and locations identified and marked, prior to activities. The state of Florida requires hand digging to 4 feet. The hand dug hole must at least represent the same diameter of the mechanized tooling that will be used. Utility clearance is being provided by NAS Key West and Sunshine State One Call of Florida, Inc..</p> <p>6) <b>Lifting Hazards</b> - Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Table 5-1 for mobilization/demobilization. Drill stems, auger flights, and well construction supplies are some of the common material that are handled and because of their weight will present a lifting strain hazard associated with this activity.</p> <p>7) <b>Slips, Trips, and Falls</b> - Preview work locations for unstable/uneven terrain.  <ul style="list-style-type: none"> <li>- Cover, guard and barricade all open pits, ditches, and floor opening as necessary.</li> <li>- Ruts, roots, tools, and other tripping hazards should be eliminated.</li> <li>- Maintain a clutter free work area.</li> <li>- As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas. This aspect is more important when working within populated areas where facility personnel may be encountered.</li> </ul> </p> <p>8) <b>Cuts</b> - To prevent cuts, the following provisions are required:  <ul style="list-style-type: none"> <li>- Obtain and use the knife and acetate tube retention tub recommended by Geoprobe (Geoprobe Sampling Kit) to prevent potential cuts and lacerations when accessing samples within MacroCore acetate liners. These items have been engineered to allow sample acquisition without putting the sampler at risk.</li> <li>- Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others.</li> <li>- Do not place items to be cut in your hand or against your body.</li> <li>- Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments.</li> <li>- Wear cut-resistant gloves (leather or heavy cotton)</li> </ul> </p> <p>9) <b>Vehicular and Foot Traffic Hazards</b> - Use traffic-warning signs, flag persons, and high visibility vests as determined by the SHSO when working along traffic thoroughfares. In addition, use physical barricades, when working within normal traffic flow patterns/traffic lanes.</p> <p><b>Natural hazards:</b></p> <p>10) <b>Inclement Weather</b> – To minimize hazards of this nature, the following provisions shall be employed:  <ul style="list-style-type: none"> <li>- Wear appropriate clothing for weather conditions.</li> <li>- Provide acceptable shelter and replacement liquids for field crews as relief from excessive ambient temperatures.</li> <li>- Under conditions of elevated levels of PPE, periods of acclimatization, excessive ambient temperature extremes, or if you believe someone is suffering from a heat/cold related disorder, it may be necessary to conduct heat/cold stress monitoring.</li> <li>- Electrical storms/high winds - Suspend or terminate operations until directed otherwise by SHSO.</li> </ul> <p>Follow the provisions as specified in Section 4.0 of the Tetra Tech NUS, Inc. Health and Safety Guidance Manual regarding the identification and evaluation of heat/cold stress related conditions.</p> </p> <p>11) <b>Insect bites/Snakes/Alligators.</b> See Multi-media sampling for protective measures. These hazards are not anticipated to be as predominant during this activity or in this area as it is a light industrial area that is regularly maintained.</p> </p>	<p>1) Monitoring shall be conducted to qualify and quantify estimated source concentrations of on-site contaminants in support of the prescribed worker protection levels. Monitoring shall be conducted using  <ul style="list-style-type: none"> <li>Flame Ionization Detector (FID)</li> <li>Draeger Benzene Tube 0.5/a</li> </ul> </p> <p>a) 5 ppm in the workers breathing zone sustained</p> <p>b) Use the Draeger tube to confirm/deny the readings are Benzene.</p> <p>If a positive detection for benzene is determined to exist – retreat upwind to an unaffected area and contact the PHSO.</p> <p>If a negative detection for benzene is determined to exist. follow the action level posted below for VOCs.</p> <p>VOCs Action Level –          &lt;25 ppm sustained in the workers breathing zone - continue to work; continue to monitor          &gt; 25 ppm sustained in the workers breathing zone – Temporarily suspend site activities, Contact PHSO</p> <p>Sustained airborne concentrations above these identified action levels will result in ceasing the operation until airborne concentrations recede to background levels.</p> <p>Failure of these concentrations to diminish will require an upgrade in the level of protection and a modification of this HASP. Contact the PHSO.</p> <p>Monitoring shall be conducted at the prescribed depths as indicated on the boring logs at the source (borehole) and drillers breathing zone. Monitoring shall also be conducted at the sampler's location to in the same prescribed frequency when handling samples.</p> <p>Noise monitoring maybe conducted at the discretion of the PHSO and/or the SHSO.</p> <p>Action Level - &gt;85 dBA Participation in the Project Hearing Conservation Program. Hearing protection is required for this operation.</p>	<p>All soil boring operations and monitoring well installation will be initiated in Level D protection, including the following articles:          Sampler/Oversight Personnel</p> <ul style="list-style-type: none"> <li>- Standard field dress (long pants, Sleeved shirts)</li> <li>- Steel toe safety shoes or work boots</li> <li>- Hard hat(when within 35-feet of the drill rig)</li> <li>- Safety Glasses(when within 35-feet of the drill rig or when sampling)</li> <li>- Nitrile surgeon style inner gloves for sampling</li> <li>- Hearing protection(when within 35-feet of an operating drill rig)</li> <li>- <i>Impermeable boot covers</i></li> <li>- <i>Reflective vest for traffic areas</i></li> </ul> <p><b>Driller and Driller Helper</b></p> <ul style="list-style-type: none"> <li>- Standard field attire including sleeved shirt and long pants</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Safety glasses</li> <li>- Nitrile inner and outer gloves or supported neoprene</li> <li>- Hearing protection</li> <li>- Hard hat</li> <li>- <i>Impermeable aprons are recommended for handling contaminated auger flights and drill stems against the body. The apron will prevent soiling and saturation of work clothes</i></li> <li>- <i>Impermeable boot covers</i></li> </ul> <p><b>Upgrades to Level C and B protection</b> are not anticipated.</p> <p><b>Note:</b> Use of respiratory protection will require the implementation of the Tetra Tech NUS, Inc. Respiratory Protection Program provided in the Health and safety Guidance Manual.</p> <p>As site conditions may change, the following equipment will be maintained during all on-site activities</p> <ul style="list-style-type: none"> <li>- Fire Extinguishers</li> <li>- First-aid Kit</li> </ul> <p><b>Note:</b> The Safe Work Permit(s) for this task (See Attachment IV of this HASP) 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><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, impermeable apron, as applicable</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. The sequential procedure is as follows:          Stage 1: Equipment drop          Decontamination personnel will clean hand tools as necessary.          Stage 2: Soap/water wash and rinse of outer boots as applicable and gloves          Stage 3: Soap/water wash and rinse of the impermeable apron, as applicable.          Stage 4: Disposable PPE will be removed and bagged.          Stage 5: Wash face and hands</p> <p>Note: For remote locations away from the centralized decontamination unit  <ul style="list-style-type: none"> <li>- Bag and/or wrap all disposable and reusable equipment, respectively for transport back to the decontamination unit.</li> <li>- Hygienic wipes may be used for cleaning hands and face</li> </ul> </p> <p><b>Equipment Decontamination</b> - All heavy and sampling equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer as prescribed in Table 5-1 for that task. 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. Vehicles will have their wheels/tires cleaned or sprayed off as applicable 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>The FOL or the SHSO 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>

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**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
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Task/Operation/Location	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 SHSO dictate.)</i>	Decontamination Procedures
<p>Multi-media sampling, including Monitoring Well Development using whale pumps and surge blocks Groundwater Sampling – Peristaltic pumps Subsurface soils – MacroCore samplers, disposable trowels. This activity will primarily be addressed under soil boring and monitoring well installation.</p> <p>Hazards are anticipated to be similar in all of these activities.</p>	<p><b>Chemical hazards:</b> Previous analytical data identified various VOCs as contaminants of concern with benzene considered the primary contaminant related to potential occupational exposures.  Additional VOCs may be encountered however they are not at concentrations that pose a significant exposure risk.  Further information on these contaminants are provided in Section 6.1 and Table 6-1.</p> <p>2) Transfer of contamination into clean areas.</p> <p><b>Physical hazards:</b> 3) Slip, trip, and fall hazards 4) Strain/muscle pulls from manual lifting 5) Cuts and Lacerations 6) Ambient temperature extremes (heat/cold stress)</p> <p><b>Natural hazards:</b> 7) Animal and insect bites and encounters 8) Inclement weather</p>	<p><b>Chemical hazards:</b> 1) Safe work practices will be employed as the first line of defense. As a general rule, avoiding contact with contaminated media (water, soils, etc.) will be employed as a universal control measure. In addition, good work hygiene practices including avoiding hand-to-mouth contact to the extent possible, washing hands and face or using hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities will restrict the most predominant route of exposure. As part of the evaluation method of these subsurface media, all samples will be scanned with a FID to determined potential source concentration. When sampling groundwater wells exposure potential is the greatest when opening a well that has been sealed and that gases have built up inside. The following practice should be employed - At arms length, open the well and step away. Let the well off gas for a few minutes, while you prepare your equipment (upwind). Any airborne concentrations present will recede and you can continue with your task.</p> <p>2) <b>Transfer of Contamination into Clean Areas</b> - 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. In addition, the bulk of sampling equipment (i.e., tubing, trowels are disposable therefore dedicated).</p> <p>3) <b>Slip, Trip, and Fall Hazards</b> – These hazards shall be minimized by adherence to the practices listed below. This includes - Maintain proper housekeeping in all work areas. - Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. - Cover, guard, barricade, and or place warning postings over/at holes or openings that personnel may fall or step into. - For traversing steep, slippery, or sloped terrain establish rope ladders to control ascent and descent to sampling areas or use alternative pathways. - Use multiple persons and pack small loads to remote locations.</p> <p>4) <b>Strain/Muscle Pulls from Manual Lifting</b> - Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques (See Lifting Mobilization/Demobilization, Table 5-1).</p> <p>5) <b>Cuts and Lacerations</b> – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations Select and secure the most favorable route to monitoring wells and sampling locations. Previewing pathways - Where possible, remove or demarcate the physical hazards. Inspect all cutting equipment to be used to clear access routes for defects. When cutting items - always use a sharp knife and always cut away from your body. Do not place items to be cut in your opposite hand or against your body. Carry all glassware and items that present a potential for cuts, lacerations, or impalement such as machetes or brush hooks in protective packaging or sheathed to avoid breakage or exposure in the event of a slip, trip, and/or fall. Obtain and use the knife and acetate tube retention tub recommended by Geoprobe (Geoprobe Sampling Kit) to prevent potential cuts and lacerations when accessing samples within MacroCore acetate liners. These items have been engineered to allow sample acquisition without putting the sampler at risk.</p> <p>6) <b>Ambient Temperature Extremes (Heat/Cold Stress)</b> - Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat/cold stress is provided in Section 4.0 of the Health and Safety Guidance Manual. Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma the following measures should be employed Wear a hat that shades the face, neck, and ears. Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot. Plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 A.M. and 4 P.M. and can damage your skin even on hazy days. Wear wrap-around sunglasses to protect the eyes and delicate skin around them.</p> <p>7) <b>Insect/Animal Bites and Stings</b> - This is not considered a predominant hazard as these sampling activities are to be conducted in well maintained areas. Insects and spiders - Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control. - Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas. - Do not stick your hand anywhere where you can't see. - When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations. - Use repellents – Follow manufacturer's recommendations for use. Permethrin should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. DEET and products containing DEET may be applied to the skin. - If you leave your workboots at the trailer or office over your break make sure you shake them out before sticking your feet in them. See Section 4.0 of the HSGM for more information concerning these natural hazards.</p> <p>8) Suspend or terminate operations during electrical storms. Return to work when directed by the FOL and/or the SHSO.</p>	<p>1) Monitoring shall be conducted to qualify and quantify estimated source concentrations of on-site contaminants in support of the prescribed worker protection levels. Monitoring shall be conducted using Flame Ionization Detector (FID) Draeger Benzene Tube 0.5/a</p> <p>c) 5 ppm in the workers breathing zone sustained d) Use the Draeger tube to confirm/deny the readings are Benzene.</p> <p>If a positive detection for benzene is determined to exist – retreat upwind to an unaffected area and contact the PHSO.</p> <p>If a negative detection for benzene is determined to exist, follow the action level posted below for VOCs.</p> <p>VOCs Action Level – &lt;25 ppm sustained in the workers breathing zone - continue to work; continue to monitor &gt; 25 ppm sustained in the workers breathing zone – Temporarily suspend site activities, Contact PHSO</p> <p>Sustained airborne concentrations above these identified action levels will result in ceasing the operation until airborne concentrations recede below acceptable levels.</p> <p>Failure of these concentrations to diminish will require an upgrade in the level of protection and therefore a modification of this HASP. Contact the PHSO.</p> <p>Monitoring shall be conducted at the prescribed depths as indicated on the boring logs at the source (borehole) and drillers breathing zone. Monitoring shall also be conducted at the sampler's location to in the same prescribed frequency when handling samples.</p> <p>Noise monitoring maybe conducted at the discretion of the PHSO and/or the SHSO.</p> <p>Action Level - &gt;85 dBA Participation in the Project Hearing Conservation Program. Hearing protection is required for this operation.</p>	<p>Level D protection will be utilized for the following sampling activities  Monitoring Well Development – Surge blocks and 1- inch whale pumps Groundwater Sampling – Peristaltic pumps Subsurface soils – MacroCore Samplers, disposable trowels.  Sampler/Oversight Personnel - Standard field dress (long pants, Sleeved shirts) - Steel toe safety shoes or work boots - Safety Glasses - Nitrile surgeon style inner gloves for sampling - <i>Hearing protection</i> (when within 25-feet of an operating direct push rig or 35-feet of a HSA Rig) - <i>Impermeable boot covers</i> - <i>Reflective vest for traffic areas</i></p> <p>Protective Measures as specified for drilling and soil boring will be employed for all subsurface soil sampling at the drill or DPT rig.</p> <p><b>Upgrades to Level C and B protection</b> are not anticipated.</p> <p><b>Note:</b> Use of respiratory protection will require the implementation of the Tetra Tech NUS, Inc. Respiratory Protection Program provided in the Health and safety Guidance Manual. This action will require this HASP to be modified for this elevated level of protection.</p> <p><b>Note:</b> 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><b>Personnel Decontamination</b> Upon completion of the sampling - Dedicated trowels, tubing, PPE will be rinsed and bagged for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location.</p> <p><b>Equipment Decontamination</b> Decontamination of equipment (sampling and hand tools) will proceed as indicated in Table 5-1 of this HASP and/or the Workplan.</p>

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**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
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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 the SSO Dictate.)</i>	Decontamination Procedures
<p>Surveying – Geographical and geophysical using GPR.</p> <p>The locations identified to be surveyed are largely within improved and well maintained areas. Therefore, the necessity to cut clear lines from vertical and horizontal control monuments is not anticipated. If this is not the case, information has been provided for cutting sight lines.</p>	<p><b>Chemical hazards:</b></p> <p>Significant exposure to site contaminants is not anticipated during this task.</p> <p><b>Physical hazards:</b></p> <p>1) Slips, trips, and falls</p> <p>2) Struck by</p> <p>3) Traffic hazards</p> <p><b>Natural hazards:</b></p> <p>4) Inclement weather</p> <p>5) Insect/animal bites or stings, poisonous plants, etc.</p>	<p><b>Physical hazards:</b></p> <p>1) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation, establish temporary means for traversing hazardous terrain (i.e., rope ladders, etc.) as necessary. A review of accident/injury statistics associated with land surveying identifies slips, trips, and falls as the number one injury, followed by cuts and lacerations, and animal/insect bites.</p> <p>2) If hand tools (brush hooks, machetes, etc.) are necessary to clear and carry lines and bench marks to the area of operation the following precautions are recommended:</p> <ul style="list-style-type: none"> <li>- Ensure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus.</li> <li>- Ensure all cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade.</li> <li>- All hand tools (brush hooks, machetes, etc.) with cutting blades shall be provided with a sheath to protect individuals, when not in use.</li> <li>- All personnel will maintain a 10-foot perimeter around persons clearing brush.</li> </ul> <p><b>Note:</b> It is not anticipated that trees &gt;2-inch girth will be required to be dropped as part of this operation or that significant amount of clearing will be required. Therefore the use of chainsaws and chippers is not anticipated.</p> <p>Note: Where possible it is recommended that heavy equipment (tractors and brush hogs or similar equipment) be used to clear grid lines and lines of site.</p> <p>3) Vehicular traffic hazards</p> <ul style="list-style-type: none"> <li>- Wear high visibility vests when working in traffic patterns.</li> <li>- Provide signage in areas where traffic patterns will be altered (Survey crew working; lane restriction, etc.).</li> </ul> <p><b>Natural hazards:</b></p> <p>4) Electrical storms or high winds - Suspend or terminate operations until directed otherwise by SHSO. Harmful effects of the Sun - Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma the following measures should be employed Wear a hat that shades the face, neck, and ears. Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot. To the extent possible, plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 A.M. and 4 P.M. and can damage your skin even on hazy days. Wear wrap-around sunglasses to protect the eyes and delicate skin around them.</p> <p>5) <b>Insect/Animal Bites and Stings</b> - This is not considered a predominant hazard as these activities are to be conducted in maintained areas.</p> <p>Insects and spiders</p> <ul style="list-style-type: none"> <li>- Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control.</li> <li>- Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas.</li> <li>- Use repellents – Follow manufacturer's recommendations for use. Permethrin should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. Products containing DEET may be applied to the skin.</li> <li>- Upon exiting the high brush and wooded areas perform a close body inspection to remove any ticks or other insects that have attached to your clothing or skin.</li> <li>- Do not stick your hand anywhere where you can't see.</li> <li>- When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations.</li> <li>- As this activity may take personnel into areas of heavier vegetation, surveyors should be cognizant of poison ivy, poison oak, and poison sumac in the area. See Section 6.3.4 of this HASP for descriptions of these plants. Protective measures to be used to minimize hazards of this nature Avoid direct contact through the use of Tyvek coveralls, clothing, or barrier creams Wash after contact with cool water and mild soap. Wash equipment contaminated with the oils of these plants to avoid cross contamination.</li> </ul> <p>See Section 4.0 of the TiNUS Health and Safety Guidance Manual for additional information concerning natural hazards.</p>	<p>Air monitoring is not required given the unlikelihood that airborne contaminants will be present. The potential for exposure to site contaminants during this activity is considered minimal.</p>	<p>Surveying activities shall be performed in Level D protection</p> <p>Level D Protection consists of the following:</p> <ul style="list-style-type: none"> <li>- Standard field dress including sleeved shirt and long pants</li> <li>- Shoes rugged lug sole for traction</li> <li>- Work gloves shall be worn when clearing brush.</li> <li>- <i>Safety glasses, hard hats (if working near machinery, overhead hazards, or clearing brush)</i></li> <li>- <i>Snake chaps for heavily wooded area where encounters are likely.</i></li> <li>- <i>Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks.</i></li> <li>- <i>Reflective or blaze orange vests should be worn when working along traffic thoroughfares.</i></li> </ul> <p><b>Note:</b> 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><b>Personnel Decontamination</b> - A structured decontamination is not required as the likelihood of encountering contaminated media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to stop the transfer of these insects into vehicles, homes, and offices. In addition, early detection shall provide for early removal.</p>

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**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
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Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment (Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)	Decontamination Procedures
<p>Decontamination of Heavy Equipment</p> <p>Decontamination of sampling equipment.</p> <p>It is anticipated that this activity will take place at a temporary centralized location. Gross contamination will be removed to the extent possible at the site. Contaminated tooling then will be wrapped in polyethylene sheeting for transport to the centralized location for a full decontamination and evaluation.</p>	<p><b>Chemical hazards:</b></p> <p>1) Previous analytical data identified various VOCs as contaminants of concern with benzene considered the primary contaminant related to potential occupational exposures</p> <p>Additional VOCs may be encountered however they are not at concentrations that pose a significant exposure risk.</p> <p>Further information on these contaminants are provided in Section 6.1 and Table 6-1.</p> <p>2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent)</p> <p><b>Physical hazards:</b></p> <p>3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Falling hazards 7) Slips, trips, and falls</p> <p><b>Natural hazards:</b></p> <p>8) Inclement weather</p>	<p>1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain and familiarize yourself with manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TtNUS Health and Safety Guidance Manual.</p> <p>3) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes.</p> <p>Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization.</p> <p>4) Wear hearing protection when operating the pressure washer and/or steam cleaner. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA.</p> <p>5) Use eye and face protective equipment when operating the pressure washer and/or steam cleaner, due to flying projectiles. All other personnel must be restricted from the area. In addition to minimize hazards (flying projectiles, water lacerations and burns) associated with this operation, the following controls will be implemented</p> <ul style="list-style-type: none"> <li>- A Fan Tip 25° or greater will be used on pressurized systems over 3,000 psi. This will reduce the possibility of water lacerations or punctures.</li> <li>- Do not point the wand at persons or place against any part of your body.</li> <li>- Thermostat control will be in place and operational to control the temperature levels of the water where applicable.</li> <li>- Visual evaluations of hoses and fittings for structural defects</li> <li>- Construct deflection screens as necessary to control overspray and to guard against dispersion of contaminants driven off by the spray.</li> </ul> <p>6) Ensure that wash and drying racks are of suitable construction to prevent heavier items such as auger flights and drill rods from falling and striking someone during the decontamination 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"> <li>- In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks.</li> <li>- Hoses should be gathered when not in use to eliminate potential tripping hazards.</li> </ul> <p>8) Suspend or terminate operations until directed otherwise by SHSO.</p>	<p>Use visual observation to ensure all equipment has been properly cleaned of contamination and solvents.</p>	<p><u>For Heavy Equipment</u></p> <p>This applies to pressure washing and/or steam cleaning operations and soap/water wash and rinse procedures.</p> <p>Level D Minimum requirements:</p> <ul style="list-style-type: none"> <li>- Hard hat with splash shield</li> <li>- Standard field attire (Long sleeve shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Chemical resistant boot covers</li> <li>- Nitrile outer gloves over nitrile inner gloves</li> <li>- Safety glasses underneath a splash shield</li> <li>- Hearing protection (plugs or muffs)</li> <li>- <i>Hooded PVC Rainsuits or PE or PVC coated Tyvek. Impermeable aprons may be used instead of coveralls if they offer adequate protection against overspray and back splash.</i></li> </ul> <p><b>For sampling equipment</b> (trowels, macrocore samplers, etc.), the following PPE is required</p> <p><b>Note:</b> Consult MSDS for PPE guidance. Otherwise, observe the following.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> <li>- Standard field attire (Long sleeve shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Nitrile outer gloves over nitrile inner gloves</li> <li>- Safety glasses</li> <li>- <i>Impermeable apron</i></li> </ul> <p><b>Note:</b> 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><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable).</p> <p>The sequential procedure is as follows:</p> <p>Stage 1: Equipment drop, remove outer protective wrapping; personnel will wash hand tools and pass hand equipment through as necessary.</p> <p>Stage 2: Soap/water wash and rinse of outer boots and gloves</p> <p>Stage 3: Soap/water wash and rinse of the outer splash suit or apron as applicable</p> <p>Stage 4: Disposable PPE will be removed and bagged.</p> <p>Stage 5: Wash face and hands</p> <p><b>Equipment Decontamination</b> - 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.</p> <p><b>Sampling Equipment Decontamination</b></p> <p>Sampling equipment will be decontaminated as per the requirements indicated within the 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 SHSO 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  
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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 the SHSO Dictate.)</i>	Decontamination Procedures
<p>IDW Management and Handling</p> <p>This activity includes the following tasks:</p> <ul style="list-style-type: none"> <li>- Containerization</li> <li>- Labeling</li> <li>- Staging</li> <li>- Monitoring</li> </ul> <p>of IDW generated in support of site activities.</p>	<p><b>Chemical hazards:</b></p> <p>1) Previous analytical data identified various VOCs as contaminants of concern with benzene considered the primary contaminant related to potential occupational exposures.</p> <p>Additional VOCs may be encountered however they are not at concentrations that pose a significant exposure risk.</p> <p>Limited contact with potential contaminant is likely during this activity and the primary concern is the potential for contact or inhalation of vapors contained within the headspace of drums that have been exposed to sunlight or heat.</p> <p><b>Physical hazards:</b></p> <ol style="list-style-type: none"> <li>1) Strains and sprains</li> <li>2) Back injuries</li> <li>3) Compressions</li> <li>4) Loading bulk transport containers</li> </ol>	<p><b>Chemical hazards:</b></p> <p>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 of this HASP).</p> <p><b>Physical hazards:</b></p> <p>1 &amp; 2) Strains and sprains (lifting hazards)/Back Injuries – The predominant hazard associated with this activity is the movement of full or partially full 55-gallon drums of soils and/or water. To minimize hazards of this nature the following provisions shall be incorporated as applicable:</p> <ul style="list-style-type: none"> <li>- Use machinery (preferred method) or multiple personnel for heavy lifts</li> <li>- Use proper lifting techniques               <ol style="list-style-type: none"> <li>a. 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.</li> <li>b. Minimize the horizontal distance to the center of the lift to your center of gravity.</li> <li>c. Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time.</li> <li>d. Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive.</li> <li>e. Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves.</li> <li>f. Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury.</li> </ol> </li> </ul> <p>In determining whether you can lift or move an item several factors must be considered, these are as follows:</p> <ul style="list-style-type: none"> <li>- Area available to maneuver the lift.</li> <li>- Area of the lift – Work place clutter, slippery surfaces, rough terrain</li> <li>- Overall physical condition</li> </ul> <p>3) Compressions – Another hazard frequently associated with this task is the compression of hands and fingers when placing the containers on pallets. This typically occurs when rolling and lowering the container in its place. To combat this hazard, the following provision shall be employed:</p> <p>Material handling devices shall be used for moving drums within the satellite storage area. This includes drum dollies with pneumatic tires, drum grapplers, etc. to handle drums of IDW. These pieces of equipment are engineered to allow placement of these containers while keeping hands from pinch/compression points.</p> <p><b>Reminder:</b> The drums you are attempting to move, lift and/or relocate may weigh on the average of 475 lbs. (for water) or 750 lbs. (for moist soils)</p> <p>Satellite Storage Area – Emphasis has been placed on the physical surroundings and how they can influence the potential hazards associated with material handling aspects of this task. To further reduce material handling hazards, support spill containment and control, and sampling when necessary, the IDW storage area should be structured as follows:</p> <ul style="list-style-type: none"> <li>- Maximum 4-drums to a pallet with retaining ring bolt and label on the outside for easy access/reference.</li> <li>- Maintain a minimum of 4-feet between each row of pallets. This is the minimum distance necessary to wheel drums on a drum dolly</li> <li>- If the site is not secured, the satellite storage area shall be fenced and signs placed indicating the following:               <ol style="list-style-type: none"> <li>a. Primary Point of Contact (Preferably someone at the Base, and make sure they know they been identified as the Primary Point of Contact).</li> <li>b. Phone Number</li> <li>c. Emergency Contact (If different from the Primary)</li> </ol> </li> <li>- Provide a Drum/Container Inventory to the Primary Point of Contact and to Emergency Services, if they deem it necessary. The inventory should contain:               <ol style="list-style-type: none"> <li>a. Each drum shall be assigned a unique identification number. This number shall be placed on the label and drum shell using a paint marker (Note: Do not paint the number on the lid as these have a tendency to get exchanged from time to time.)</li> <li>b. Types of waste materials (Subsurface soils, drill cuttings; purge/development waters, etc.)</li> <li>c. Volumes (Full or level associated with the container after completion of the project location)</li> <li>d. Where it was derived from (IDW should be separated by SWMU and media)</li> <li>e. Dates (For all filled containers and at the completion of work for that area or SWMU)</li> <li>f. Contact – For more information</li> </ol> </li> </ul>	<p>None Required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the activity associated with the task when the materials were generated such as soil boring or well installation.</p>	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> <li>- Standard field attire (Sleeved shirt; long pants)</li> <li>- Safety shoes (Steel toe/shank)</li> <li>- Leather or canvas work gloves</li> <li>- <i>Safety glasses (When utilizing cables or slings to move the containers)</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> </ul> <p>PPE changes may be made with the implementation of the Spill Containment Program. This represents the only anticipated modification to this level of protection.</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 those activities such as soil borings and/or well installation. The reference reflects the tasks conducted when the materials were generated.</p>

## 6.0 HAZARD ASSESSMENT

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

### 6.1 CHEMICAL HAZARDS

The potential health hazards associated with NAS Key West include inhalation, ingestion, and dermal contact of various volatile organic compounds (VOCs) that may be present in shallow and deep soils, and groundwater. Based on the site history and the most recent sampling efforts, the following have been identified as the primary contaminants of concern:

VOC	Concentration (reported as µg/L)
Benzene	710 ppb
Toluene	4 ppb
Ethylbenzene	145 ppb
Xylene	19 ppb
1-Methylnapthalene	46 ppb
2-Methylnapthalene	180 ppb
Napthalene	780 ppb
Lead	44.9 ppb

These contaminants are not anticipated to be present at airborne concentrations that would present an inhalation hazard to site workers. The following information represents general categories of contaminants that may be encountered.

**VOCs (Fuel constituents)** – These materials generally express symptoms including

- Irritating at all points of contact.
- May cause defatting of the skin and in some case dermatitis.
- Rare cases may result in photosensitization

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	
AVGas (Aviation Gasoline) Composition  Naphtha (petroleum), light alkylation; 64741-66-8 (>90%) Toluene; 108-88-3 (up to 10%) Benzene; 71-43-2 (up to 0.1%) Hexane; 110-54-3 (0-3%) 1,2,4-Trimethylbenzene; 95-63-6 (0-2%) Organic lead additives (up to 0.14%)	See component list	PID (10.6 eV Lamp Strength Correction factor = 0.6  FID = 150  LEL Meter = 0.85	Air sample using charcoal tube. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501.  See also OSHA CSI Method application	Manufacturer's Recommendation – 100 ppm (300 mg/m <sup>3</sup> ) for 8-Hour work day.  No regulatory or advisory limits have been set.	Petroleum odor threshold ~ 800 ppm Rating - Poor to Adequate  <b>Recommended Air Purifying cartridges:</b> Organic vapor  <b>Recommended gloves:</b> NitrilSolve 727 (>480 minutes) or Neporene 6780 (287 minutes)	<b>Characteristics vary by fuel blending, grade, and manufacturer (e.g., impurities and additives)</b>  <b>Boiling Pt: 158°F, ~70°C</b> <b>Melting Pt: -72° F; -58°C</b> <b>Molecular Weight: ~86-170</b> <b>Flash Pt: -50°F, -45°C</b> <b>LEL: 1.4%</b> <b>UEL: 7.6%</b> <b>Autoignition Temp.:824°F; 439°C</b> <b>Vapor Density: ~4</b> <b>Vapor Pressure: 5.5 to 7.0 psi</b> <b>SG: 0.71 @ 60° F; 15.6°C</b> <b>PH: ~7.0</b> <b>Solubility in water: Negligible (&lt;0.1%) @ 77°F; 25°C</b> <b>Viscosity: 0.6 cST@ 77°F; 25°C</b> <b>Appearance and Odor: Clear green liquid with gasoline hydrocarbon odor</b> <b>Avoid contact with heat, sparks and flame</b>	AVGas is irritating to the eyes, skin, respiratory tract, and CNS (This through direct contact or reaching concentrations >1000 ppm). <b>Direct contact</b> may result in mild irritation with a possible drying and defatting of the skin. <b>Ingestion</b> may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. <b>Inhalation</b> of vapors or mists of AVGas may result in headache, nausea, confusion, narcotic effect, and drowsiness. Acute exposures to extreme airborne concentration can result in death. Chronic inhalation of aviation gas vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers. Repeated exposures to the skin may cause skin cancer. This product does contain components which have demonstrated carcinogenic capabilities.
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. OSHA accepts the use of air-purifying respirators with organic vapor cartridge up to 10 ppm despite the inadequate warning properties providing cartridges are changed at the beginning of each shift.  <b>Recommended gloves:</b> Butyl/neoprene blend - >8.00 hrs; Silver shield as a liner - >8.00 hrs; Viton - >8.00 hrs	<b>Boiling Pt: 176°F; 80°C</b> <b>Melting Pt: 42°F; 5.5°C</b> <b>Solubility: 0.07%</b> <b>Flash Pt: 12°F; -11°C</b> <b>LEL/LFL: 1.3%</b> <b>UEL/UFL: 7.9%</b> <b>Vapor Density: 2.77</b> <b>Vapor Pressure: 75 mmHg</b> <b>Specific Gravity: 0.88</b> <b>Incompatibilities:</b> Strong oxidizers, fluorides, perchlorates, and acids <b>Appearance and Odor:</b> 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.

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**CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA  
NAVAL AIR STATION KEY WEST – KEY WEST, FLORIDA  
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Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Toluene	108-88-3	PID: I.P 8.82 eV, 100%.  FID: 110% response with FID.	Air sample using charcoal tube; carbon disulfide desorption. Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1500.  ACGIH: 50 ppm (skin)  NIOSH: 100 ppm 150 ppm STEL  IDLH: 500 ppm	OSHA: 200 ppm 300 ppm (Ceiling)  Adequate - Odor threshold 1.6 ppm is considered good. Can use air-purifying respirator with organic vapor cartridge up to 1,000 ppm.  <b>Recommended gloves:</b> Teflon >15.00 hrs; Viton >16.00 hrs; silver shield >6,00 hrs; supported nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection); PV alcohol >25.00 hrs	<b>Boiling Pt:</b> 232°F; 111°C <b>Melting Pt:</b> -139°F; -95°C <b>Solubility:</b> 0.05% (61°F;16°C) <b>Flash Pt:</b> 40°F; 4°C <b>LEL/LFL:</b> 1.2% <b>UEL/UFL:</b> 7.1% <b>Vapor Density:</b> 3.14 <b>Vapor Pressure:</b> 20 mmHg @ 65°F; 18°C <b>Specific Gravity:</b> 0.87 <b>Incompatibilities:</b> Strong oxidizers <b>Appearance and odor:</b> Colorless liquid with a sweet pungent aromatic odor.	Overexposure to this substance may result in mild to moderate irritation at all points of contact, and CNS changes including euphoria, confusion, nervousness, and possibly paresthesia characterized by an abnormal burning sensation, pricking, or numbness. At 200-500 ppm exposure has resulted in headaches, nausea, eye irritation, loss of appetite, bad taste, impair coordination, fatigue, and weariness. Chronically, toluene overexposure may result in dermatitis, liver, and kidney damage.
Ethylbenzene	100-41-4	PID: I.P 8.76, 116%  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 1,000 ppm.  Recommended gloves: Neoprene or nitrile w/ silver shield when potential for saturation; Teflon >3.00 hrs	<b>Boiling Pt:</b> 277°F; 136°C <b>Melting Pt:</b> -139°F; -95°C <b>Solubility:</b> 0.01% <b>Flash Pt:</b> 55°F; 13°C <b>LEL/LFL:</b> 1.0% <b>UEL/UFL:</b> 6.7% <b>Vapor Density:</b> 3.66 <b>Vapor Pressure:</b> 10 mmHg @ 79°F; 26°C <b>Specific Gravity:</b> 0.87 <b>Incompatibilities:</b> Strong oxidizers <b>Appearance and odor:</b> 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.
Xylene All isomers o-,m-, p-	1330-20-7	PID: I.P. 8.56 eV, 112%  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)	<b>Boiling Pt:</b> 269-281°F; 132-138°C <b>Melting Pt:</b> -130/-54m/56p°F; -25o/-48m/13p °C <b>Solubility:</b> 0.02 % <b>Flash Pt:</b> 81-90°F;27-32°C <b>LEL/LFL:</b> 0.9% <b>UEL/UFL:</b> 7.0% <b>Vapor Density:</b> 3.66 <b>Vapor Pressure:</b> 7-9 mmHg @ 70°F; 21°C <b>Specific Gravity:</b> 0.86-0.88 <b>Incompatibilities:</b> Strong oxidizers and strong acids <b>Appearance and odor:</b> 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.

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TABLE 6-1

**CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA  
 NAVAL AIR STATION KEY WEST – KEY WEST, FLORIDA  
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO3 or H2O2 desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m3  ACGIH: 0.05 mg/m3  NIOSH: 0.10 mg/m3  IDLH: 100 mg/m3 as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m3.  Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	<b>Boiling Pt: 3164°F; 1740°C</b> <b>Melting Pt: 621°F; 327°C</b> <b>Solubility: Insoluble</b> <b>Flash Pt: Not applicable</b> <b>(Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals)</b> <b>LEL/LFL: Not applicable</b> <b>UEL/UFL: Not applicable</b> <b>Vapor Density: Not available</b> <b>Vapor Pressure: 0 mmHg</b> <b>Specific Gravity: 11.34</b> <b>Incompatibilities: Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids</b> <b>Appearance and Odor:</b> <b>Metal: A heavy ductile, soft gray solid.</b>	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

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Inhalation of high concentrations (not anticipated in an outdoor environment) can result in CNS effects including dizziness, blurred vision, overexcitement, narcotic effects, and unconsciousness. Systemic effects through inhalation can also result in altered (erratic) heart beat and possible cardiac arrest.

The available analytical data as well as the fact that work will be performed in an open air environment does not indicate a likely potential for exposure to site personnel. However, based on the site history, the presence of BTEX and lead must be considered to be potentially present in media and appropriate work practices and air monitoring will be performed to prevent potential exposure to these contaminants.

It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (monitoring well installation, soil borings, sampling, etc.). Exposure to these compounds is most likely to occur through inhalation or dermal contact of contaminated soil or water, or through ingestion via hand-to-mouth contact during soil disturbance activities. For this reason, PPE and basic hygiene practices (e.g., washing face and hands before leaving site) will be extremely important. Inhalation exposure will be monitored using an FID. Given the nature of planned activities and that work will be conducted outside in the open air and reported previously low concentrations, it is highly unlikely that any appreciable airborne concentrations will be encountered.

Other sources of potential chemical exposure are decontamination fluids (e.g., Liquinox, isopropanol), and analytical preservatives. For any substances brought onto the site, the SHSO is responsible for instituting a site-specific Hazard Communication Program (see Section 5.0 of the TtNUS Health and Safety Guidance Manual) and for collecting the appropriate Material Safety Data Sheets (MSDS) from the chemical manufacturers/suppliers. The SHSO is also responsible for completing the Safe Work Permit for the decontamination task using the appropriate MSDS and for reviewing the contents of the MSDSs and Safe Work Permit with anyone who will use these substances.

## **6.2 PHYSICAL HAZARDS**

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

- Slips, trips, and falls
- Cuts (or other injuries associated with hand tool use)
- Lifting (strain/muscle pulls)
- Ambient temperature extremes (cold and heat stress)
- Pinches and compressions

- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.)
- Energized systems (contact with underground or overhead utilities)
- Vehicular and foot traffic
- Noise in excess of 85 dBA
- Flying projectiles

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

### **6.2.1 Slips, Trips, and Falls**

Conditions such as steep terrain and/or heavy vegetation may create an increased potential for slip, trip, and fall hazards.

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

### **6.2.2 Cuts or Other Injuries Associated with Hand Tool Use**

The clearing of brush and vegetation will be performed using hand tools that may include machetes, and brush axes. However, the use of hand tools has only briefly discussed. The control measures presented below will help minimize the potential for physical and cutting hazards.

- Wear leather or heavy cotton work gloves when using tools to protect against blisters, cuts, or other hand injuries.
- Wear eye protection (safety glasses with side shields) to protect the eyes from twigs, sticks, or flying debris.
- Clear the immediate cutting area of personnel (radius of the tool swing area).
- Wear long pants and long-sleeved shirts to protect against abrasions.
- Wear hard hats if work will involve areas with overhead hazards (e.g., overhanging branches).

- Wear sturdy work boots.
- Inspect hand tools [i.e., shovel handles (cracks, splinters, etc.), brush hook handles and blade attachment points, etc.)
- Ensure that hand tools are sharp to facilitate cutting action. This will avoid persons forcing the tool to cut and increasing potential hazards.
- Use the proper tool for the intended purpose. The proper tool is the acetate tube retention tub and recessed double bladed hand knife recommended by Geoprobe. This will avoid potential injury possibly created through improper cutting procedures.

### **6.2.3 Energized Systems (Contact with Underground or Overhead Utilities)**

Underground utilities such as pressurized lines, water, telephone, buried utility, and high voltage power lines may be present throughout the facility. Therefore, subsurface activities must be conducted following the requirements of the Tetra Tech NUS SOP for "Utility Locating and Excavation Clearance (HS-1.0)". A copy of this SOP is provided as Attachment II. Clearance of underground and overhead utilities for each location will be coordinated with the NAS Key West Public Works.

DPT and HSA operations will be conducted at a safe distance from overhead power lines as discussed in Attachment II (Minimum 20-feet). In certain cases, there may be a need to de-energize electrical cables using facility lockout/tagout procedures to ensure electrical hazards are eliminated. For this assistance from the Public Works Maintenance Division will be sought.

## **6.3 NATURAL HAZARDS**

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. As previously discussed, this area is well maintained and therefore hazards of this nature are not considered predominant hazards. It should be noted that activities in remote areas during sign installation may increase the potential to encounter snakes, insects - ticks, bees, mosquitoes, snakes, alligators, and poisonous vegetation.

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

### **6.3.1 Insect Bites and Stings**

Various insects and animals may be present and should be considered. For example, fire ants present a unique situation when working outdoors in the southern portion of the United States. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom

(formic acid) that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician. Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

Insect/animal bites and stings are difficult to control given the climate and environmental setting of NAS Key West. However, in an effort to minimize this hazard the following control measures will be implemented where possible.

- Commercially available bug sprays and repellents will be used whenever possible – Pesticides analytical screening includes chlordane, endrin, lindane, methoxychlor, toxaphene and heptachlor. Commercially available repellants may be used providing they don't contain substances which appear on the analytical list for pesticide analysis. Products such as Permanone should not be applied directly to the skin due to potential irritation. This product, when permitted for use, should be applied over clothing articles. Products such as DEET can be applied directly to the skin. In all cases follow the manufacturers instructions.
- Where possible, loose-fitting and light-colored clothing with long sleeves should be worn. This will also aid in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be secured to the work-boots using duct tape to prevent access by ticks. Mosquito nets are also recommended for use when commercially available repellents are not permitted.
- Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting heavily vegetated areas. Workers should perform a more detailed check of themselves when showering in the evening. Ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations. However, in many of the reported cases attachment has occurred on the back near the shoulders.
- The FOL/SHSO will preview access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to site personnel.

- The FOL/SHSO must determine if site personnel (through completion of Medical Data Sheets), suffer allergic reactions to bee and other insect stings and bites. Field crew members who are allergic to bites should have their emergency kit containing antihistamine and a preloaded syringe of epinephrine readily available.

Any allergies (insect bites, bee stings, etc.) must be reported on the Medical Data Sheet and to the SSO.

### **6.3.1.1 Tick and Mosquito Transmitted Illnesses and Diseases**

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

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

#### West Nile Virus (WNV)

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

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

Precautions include:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.
- Avoid standing water
- Wear long-sleeved shirts and long pants whenever you are outdoors.

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

### **6.3.2      Snakes of Florida**

The poisonous snakes found in Florida are the coral snake, cottonmouth or water moccasin, copperhead, and the pygmy, timber, and diamondback rattlesnakes. Initial efforts will be directed to avoid, where possible, nesting and territorial areas.

#### **Coral Snake**

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

#### **Cotton Mouth or Water Moccasin**

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

#### **Copperhead**

Copperhead is also a poisonous pit vipers. Its body has broad chestnut-red bands. Most copperheads are about 2 ½ feet long while the largest grow to about 4 feet. The copperhead bites people more often

than most rattlesnakes, partly because it is silent and smaller, and is not so quickly noticed. The bite is seldom fatal to adults. This reptile usually eats rodents and other small mammals by killing them with their poison and swallowing them whole. Sometimes the snake eats insects and frogs. The copperhead can be identified by the presence of a pit in front of and below each eye. The snake's nostril is in front of the pit.

### **Rattlesnake**

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

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

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

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

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

### **6.3.2.1 Snake Bite**

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

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

### **6.3.3 Alligators**

Alligators are indigenous to southeastern portion of the United States and may be present in ponds, swamps, drainage channels, and other wet areas. Alligators are fairly inactive in the winter months when the water temperatures are cool; their metabolism slows down and there is little need for food. The breeding season is mostly during April and May (but may begin as early as mid-February); male and female move around more during this time. Nests are constructed by the female during June and July. The female will build a nest of leaves and vegetation up to 6 feet across and several feet high. She lays and buries her eggs in the center of this mound, allowing the warmth of the pile to incubate the eggs. Females typically lay over 50 eggs and each egg is about 3 inches long. The eggs incubate for about 9 weeks, and the female will watch and defend the nest during this time. As the young hatch, they "peep" and the female will assist them by digging them out of the nest. Newborn alligators are about 9 inches long and will stay near the female for up to a year. The female will continue to protect the young during this period.

Alligators are very protective of their domain during courtship and nesting. Alligators can outrun humans for short distances.

Other indication of their presence includes slides (areas marked by entering and exiting the water) and areas of cleared access for purposes of sunning (internal thermal regulation).

### **Control Measures**

- Treat alligators with extreme caution. Never approach an alligator, either on land or in the water.
- If sampling involves entering areas where alligators may be present, use an "alligator-watch" as a lookout.
- Use a remote sampling device (such as a sample jar/vial on a long pole) to reach into surface water and along waters edge, **Never Use Your Hand.**
- When accessing sample locations always ensure you have left yourself a clear means of retreat. Obtain the sample as quickly as possible and immediately leave the area.

#### **6.3.4 Poisonous Plants**

Various plants which can cause allergic reactions may be encountered during field work. These include, poison ivy, poison oak, and poison sumac. Contact with these plants may occur when clearing vegetation for access to work areas, or as a result of movement through these plants. An irritating, allergic reaction can occur after direct contact with the plant or indirect contact through some piece of equipment or clothing article. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next.

Protective measures to control and minimize the effects of this hazard may include, but not be limited to, the following:

- Identify plants for field personnel.
  - Poison Ivy - Characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.
  - Poison Sumac - Characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with axillary clusters of white fruit: However, these white fruits and berries may exist only during pubescent stages.
  - Poison oak - Characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.

- Protective measures may include wearing disposable garments such as Tyvek when clearing brush. These may be carefully removed and disposed of along with any oils accumulated from the plants.
- Personal Hygiene - The oils obtained from the plants will only elicit an allergic response when the person's bare skin layer is contacted. This can be aggravated when skin pores are open (perspiring), or through breaks in the skin such as cuts, nicks, scratches, etc. This can also be accomplished when using excessively hot water for cleaning the skin, which also causes pores to open. Prior to break time, lunchtime, etc. personnel should wash with cool water and soap to remove as much of the oils as possible. In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to further prevent the oils from accessing and penetrating the skin.

These plants present an airborne sensitization hazard when burned. Burning is not anticipated to occur as part of this scope of work and therefore will not be addressed.

### **6.3.5 Inclement Weather and Temperature Extremes**

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

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

- Watch for signs of heat stress/exhaustion, See Table 6-2.
- Provide fluid replacement
- Provide adequate number of breaks within a cooler environment.

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

**TABLE 6-2  
HEAT STRAIN SYMPTOMS  
STOP WORK if Any Worker Demonstrates Any Of The Following**

Heart Rate	Sustained (several minutes) heart rate minus worker's age > than 180 beats per minute (bpm) measured at any time.
Body Core Temperature	> 101.3°F (38.5° C)
Recovery Heart Rate	> 110 bpm (Measured 1 minute after peak work effort)
Other symptoms	Sudden and sever fatigue, nausea, dizziness, or headache

**Individuals May Be At Greater Risk of Heat Stress If:**

Profuse sweating is sustained over hours
Weight loss over a shift is > 1.5% of beginning body weight
24-hour urinary sodium excretion is less than 50 nmoles

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



## 7.0 HAZARD MONITORING – TYPES AND ACTION LEVELS

Direct reading instruments will be used at the sites to evaluate the presence of detectable 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 and tasks of an identified operation.

### 7.1 INSTRUMENTS AND USE

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

#### 7.1.1 Photoionization (PID) / Flame Ionization Detector (FID)/Draeger Tube for Benzene 0.5/a

In order to accurately monitor for any substances which may present an exposure potential to site personnel, a PID or FID will be used. This instrument will be used to monitor potential source areas (boreholes, monitoring wells, etc.) and to screen the breathing zones of employees during site activities. Either of these instruments is suitable to detect the primary contaminants of concern however, FIDs tend to work better in humid environments which may be associated with atmospheric conditions in Florida.

The PID/FID will serve as the general screening instrument. If sustained readings greater than 5 ppm in the workers breathing zone are obtained, the sampler will monitor the readings with a 0.5/a Draeger Tube for Benzene to confirm/deny its presence. Based on the outcome the site workers will follow one of two action levels as specified in Table 5-1 and on the Safe Work Permits.

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

#### 7.1.2 Hazard Monitoring Frequency

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

## 7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the Tetra Tech NUS Equipment Manager and/or rental service employed. Operational checks and field calibration will be performed on the instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the FID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure. All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration activities. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

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





## **8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS**

### **8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING**

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

#### **8.1.1 Requirements For Tetra Tech NUS, Inc. and Subcontractor Personnel**

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.

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

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

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

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

### **8.3 MEDICAL SURVEILLANCE**

#### **8.3.1 Medical Surveillance Requirements for Tetra Tech NUS and Subcontractor Personnel**

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

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

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

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

#### **8.3.2 Requirements for 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 that is available in Attachment V of this HASP. This shall be provided to the SHSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

### **8.4 SUBCONTRACTOR EXCEPTION**

If through the execution of their contract elements the subcontractor will not enter the exclusion zone and there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from the

training and medical surveillance requirements with the exception of Section 8.2. Examples of subcontractors who may qualify as exempt from training and medical surveillance requirements may include surveyors who perform surveying activities in site perimeter areas or areas where there is no potential for exposure to site contaminants and support or restoration services. **Use of this Subcontractor Exception is strictly limited to the authority of the CLEAN Health and Safety Manager.**



## **9.0 SPILL PREVENTION AND CONTAINMENT PROGRAM**

### **9.1 SCOPE AND APPLICATION**

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

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

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

### **9.2 POTENTIAL SPILL AREAS**

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

- Resource deployment
- Waste transfer
- Central staging

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

### **9.3 CONTAINMENT AREAS**

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

### 9.3.1 IDW

- 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 4-feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management .
- Storage Tank – Polyethylene Construction – 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 or 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. Storage and dispensing will comply with the following requirements:

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

#### **9.4 MATERIALS HANDLING**

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

- A drum cart with pneumatic tires will be required, if drums are 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 or back-hoe will be provided to move IDW containers from the field location to the staging and satellite storage location. This piece of equipment will also be used in site clearance and restoration as deemed appropriate and necessary.

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

#### **9.5 LEAK AND SPILL DETECTION**

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

#### **9.6 PERSONNEL TRAINING AND SPILL PREVENTION**

Personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and/or the SHSO will serve as the Spill Response Coordinators for this operation, should the need arise. Personnel within the Project team will be designated as incident spill response team. These persons will ensure all of the necessary supplies are available to enable them to perform their function in support of the EAP.

#### **9.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT**

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

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)

- Extra Drums (55-gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Pumps (Gas or Electric necessary for transferring liquids from leaking containers)/tubing
- Shovels, rakes, and brooms
- Container labels
- Personal Protective Equipment
  - Nitrile outer gloves
  - Splash Shield
  - Impermeable over-boots
  - Rain suits

## **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 SHSO or FOL immediately upon detection of a leak or spill. Initiate incidental response measures, remove 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.
- Re-containerize 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 SHSO in accordance with the procedures specified in Section 2.0 of this HASP.

## 10.0 SITE OPERATIONS AND CONTROL

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

### 10.1 WORK ZONES

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.

#### 10.1.1 Exclusion Zone

An Exclusion Zone will be established at each sampling point/location. The purpose of the exclusion zone is to define an area where a more rigorous protocol for workers protection is employed to protect personnel from chemical and physical hazards associated with the tasks to be conducted. Exclusion zone size and dimensions will vary based on activities. Area dimensions will be influenced by the following considerations:

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

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

- HSA – Soil boring/Monitoring Well Installation. The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, or 35-feet, whichever is greater.
- DPT - Soil Boring/Temporary Well Installation. The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, or 25-feet whichever is greater. This distance will also apply when subsurface soil sampling from behind these type rigs.
- Monitoring well development, water level measurements, and sampling. The exclusion zone for this activity will be set at 10-feet surrounding the well head and discharge collection container.
- Clearing and grubbing. The exclusion zone for this activity will be set at 10-feet surrounding someone with a brush hook or machete.
- Decontamination operation. The exclusion zone for this activity will be set at 25 feet surrounding the gross contamination wash and rinse as well as 25-feet surrounding the heavy equipment decontamination area.
- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

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

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

#### **10.1.2 Contamination Reduction Zone**

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

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

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be washed of gross contamination, removed, separated, and bagged. Personnel will use hygienic wipes, such as Handy Wipes, as necessary for personnel decontamination until they can access the centralized decontamination unit. At the first available opportunity personnel will wash their face and hands. This is critical prior to breaks and lunch when contamination can be transferred to the mouth through hand to mouth contact.
- Muddy over-boots and gloves may be required to go through a gross contamination wash at the exclusion zone. These items will then be cleaned thoroughly at the centralized decontamination unit.
- Potentially contaminated tooling along with PPE will be wrapped, when necessary, for transport to the decontamination area. These items will be disposed of as general refuse.
- Upon completion of the assigned tasks the personnel will move through the central decontamination area to clean reusable PPE and field equipment. Based on ambient conditions medical evaluations may take place at the termination point of the decontamination line. These evaluations will include pulse rate, oral temperature, breathing rate to evaluate physiological demands on site personnel. As stated earlier, these evaluations will be based on ambient conditions and acclimation periods.

### **10.1.3 Support Zone**

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

## **10.2 SAFE WORK PERMITS**

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit is included in Figure 10-1. The daily meetings conducted by the FOL/SHSO will involve a review of the SWPs applicable to that day's planned activities with the task participants. The use of these permits will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Safe Work Permits will require the signatures of either the FOL or the SHSO. Personnel engaged in on-site

activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

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

**FIGURE 10-1  
SAFE WORK PERMIT**

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

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

**II. Primary Hazards:** Potential hazards associated with this task: \_\_\_\_\_

**III. Field Crew:** \_\_\_\_\_

**IV. On-site Inspection conducted**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS  
**Equipment Inspection required**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS

**V. Protective equipment required**  Level D  Level B   
 Level C  Level A   
 Modifications/Exceptions: \_\_\_\_\_

**Respiratory equipment required**  
 Yes  Specify on the reverse  
 No

VI. Chemicals of Concern Measures	Hazard Monitoring	Action Level(s)	Response
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**Primary Route(s) of Exposure/Hazard:** \_\_\_\_\_  
 (Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

**VII. Additional Safety Equipment/Procedures**

No	Hard-hat..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Safety Glasses ..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Chemical/splash goggles ..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Radio/Cellular Phone ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Splash Shield..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Splash suits/coveralls ..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type – Work ) ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Impermeable apron..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Steel toe work shoes or boots.... <input type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers .... <input type="checkbox"/> Yes <input type="checkbox"/>
No	High Visibility vest..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Tape up/use insect repellent ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	First Aid Kit ..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher ..... <input type="checkbox"/> Yes <input type="checkbox"/>
No	Safety Shower/Eyewash ..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Other..... <input type="checkbox"/> Yes <input type="checkbox"/>

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

**VIII. Site Preparation**

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

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

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

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

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

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

### **10.3 SITE MAP**

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

### **10.4 BUDDY SYSTEM**

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

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

Tetra Tech NUS and subcontractor personnel will provide MSDSs for chemicals brought 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 SHSO will be responsible for implementing a site-specific Hazard Communication Program (See Section 5.0 of the TtNUS Health and Safety Guidance Manual). This includes collection and reviewing the MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, addressing container labeling and personnel training issues, and other aspects of Hazard Communication.

Personnel are directed to review the applicable MSDS prior to use if they are unfamiliar with the potential hazards or recommended control measures of the materials they are using.

## **10.6 COMMUNICATION**

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

External communications will be accomplished utilizing telephones at predetermined and approved locations or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the FOL will determine and arrange for telephone communications, if it is determined a cellular means will not be used.

## **10.7 SITE VISITORS**

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

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

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

Once access to the base is obtained, personnel who require access to 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, site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated below.

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

- Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Southern Division Navy Personnel), and medical surveillance as stipulated in Section 8.3, of this document. In addition, to enter the sites operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

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

#### **10.8 SITE SECURITY**

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

Security at the work areas will be accomplished using field personnel. This is a multiple person operation, involving multiple operational zones. 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.

## 11.0 CONFINED SPACE ENTRY

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

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

A Permit-Required Confined Space is one that:

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

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



## 12.0 MATERIALS AND DOCUMENTATION

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

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

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

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

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

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

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

**Site Clearance (maintained)** - This list is found within the training section of the HASP (See Figure 8-2). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The lists indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

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

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

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

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

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

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

## 13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
AOC	Area of Concern
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
CTO	Contract Task Order
DOD	Department of Defense
DOT	Department of Transportation
DPT	Direct-Push Technology
eV	Electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSA	Hollow Stem Auger
HSM	Health and Safety Manager
IDW	Investigation-Derived Waste
MSDS	Material Safety Data Sheet
N/A	Not Available
NAS	Naval Air Station
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
PPE	Personal Protective Equipment
SAP	Sampling and Analysis Plan
SOPs	Standard Operating Procedures
SHSO	Site Health and Safety Officer
STEL	Short Term Exposure Limit
TOM	Task Order Manager
TPH	Total Petroleum Hydrocarbons
TiNUS	Tetra Tech NUS, Inc.
TWA	Time Weighted Average
VOCs	Volatile Organic Compounds



**ATTACHMENT I**

**INJURY/ILLNESS PROCEDURE  
AND REPORT FORM**



## TETRA TECHNUS, 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:

- Stop work as needed to ensure no further harm is done.
- 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. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an [Injury/Illness Report](#). You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at <https://go2.tetrattech.com> under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : [www.esis.com](http://www.esis.com). These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

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

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), 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 pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types 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 from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies 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.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

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

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

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

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

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

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

## 5.2 Overhead Power Lines

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

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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 TtNUS SOPs included in the References (Section 8.0).

**Electromagnetic Induction**

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

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

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

**Magnetics**

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

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

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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.

### **Tile Probe Surveys**

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

## **7.0 INTRUSIVE ACTIVITIES SUMMARY**

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

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

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

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the subsurface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.
4. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

## **8.0 REFERENCES**

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

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

<p><b>ALABAMA</b> Alabama Line Location (800) 292-8525 Tucson Blue Stake Center (800) 782-5348</p>	<p><b>Maine</b> Dig Safe – Maine (800) 225-4977</p>
<p><b>Alaska</b> Locate Call Center of Alaska Inc. (800) 478-3121</p>	<p><b>Maryland</b> Miss Utility (800) 257-777 Miss Utility of Delmarva (800) 282-8555</p>
<p><b>Arizona</b> Arizona Blue Stake Inc. (800) 782-5348</p>	<p><b>Massachusetts</b> Dig Safe – Massachusetts (800) 322-4844</p>
<p><b>Arkansas</b> Arkansas One Call System Inc. (800) 482-8998</p>	<p><b>Michigan</b> Miss Dig System (800) 482-7171</p>
<p><b>California</b> Underground Service Alert North (800) 227-2600 Underground Service Alert South (800) 227-2600</p>	<p><b>Minnesota</b> Gopher State One Call (800) 252-1166</p>
<p><b>Colorado</b> Utility Notification Center of Colorado (800) 922-1987</p>	<p><b>Mississippi</b> Mississippi One-Call System Inc. (800) 227-6477</p>
<p><b>Connecticut</b> Call Before You Dig (800) 922-4455</p>	<p><b>Missouri</b> Missouri One Call System Inc. (800) 344-7483</p>
<p><b>Delaware</b> Miss Utility of Delmarva (800) 282-8555</p>	<p><b>Montana</b> Utilities Underground Location Center (800) 424-5555 Montana One Call Center (800) 551-8344</p>
<p><b>District of Columbia</b> Miss Utility (800) 257-7777</p>	<p><b>Nebraska</b> Diggers Hotline of Nebraska (800) 331-5666</p>
<p><b>Florida</b> Call Sunshine (800) 432-4770</p>	<p><b>Nevada</b> Underground Service Alert North (800) 227-2600</p>
<p><b>Georgia</b> Utilities Protection Center Inc. (800) 282-7411</p>	<p><b>New Hampshire</b> Dig Safe – New Hampshire (800) 225-4977</p>
<p><b>Idaho</b> Palouse Empire Underground Coordinating Council (800) 882-1974 Utilities Underground Location Center (800) 424-5555 Kootenai Country Utility Coordinating Council (800) 428-4950 Shoshone County One Call (800) 398-3285 Dig Line (800) 342-1585 One Call Concepts (800) 626-4950</p>	<p><b>New Jersey</b> New Jersey One Call (800) 272-1000</p>
<p><b>Illinois</b> Julie Inc. (800) 892-0123 Digger (Chicago Utility Alert Network) (312) 744-7000</p>	<p><b>New Mexico</b> New Mexico One Call System Inc. (800) 321-ALERT Las Cruces-Dona Utility Council (505) 526-0400</p>
<p><b>Indiana</b> Indiana Underground Plant Protection Services (800) 382-5544</p>	<p><b>New York</b> Underground Facilities Protection Organization (800) 962-7962 New York City: Long Island One Call Center (800) 272-4480</p>
<p><b>Iowa</b> Underground Plant Location Service Inc. (800) 292-8989</p>	<p><b>North Carolina</b> The North Carolina One-Call Center Inc. (800) 632-4949</p>
<p><b>Kansas</b> Kansas One-Call Center (800) 344-7233</p>	<p><b>North Dakota</b> Utilities Underground Location Center (800) 795-0555</p>
<p><b>Kentucky</b> Kentucky Underground Protection Inc. (800) 752-6007</p>	<p><b>Ohio</b> Ohio Utilities Protection Service (800) 362-2764 Oil &amp; Gas Producers Underground Protection Service (800) 925-0988</p>
<p><b>Louisiana</b> Louisiana One Call (800) 272-3020</p>	<p><b>Oklahoma</b> Call Okie (800) 522-6543</p>

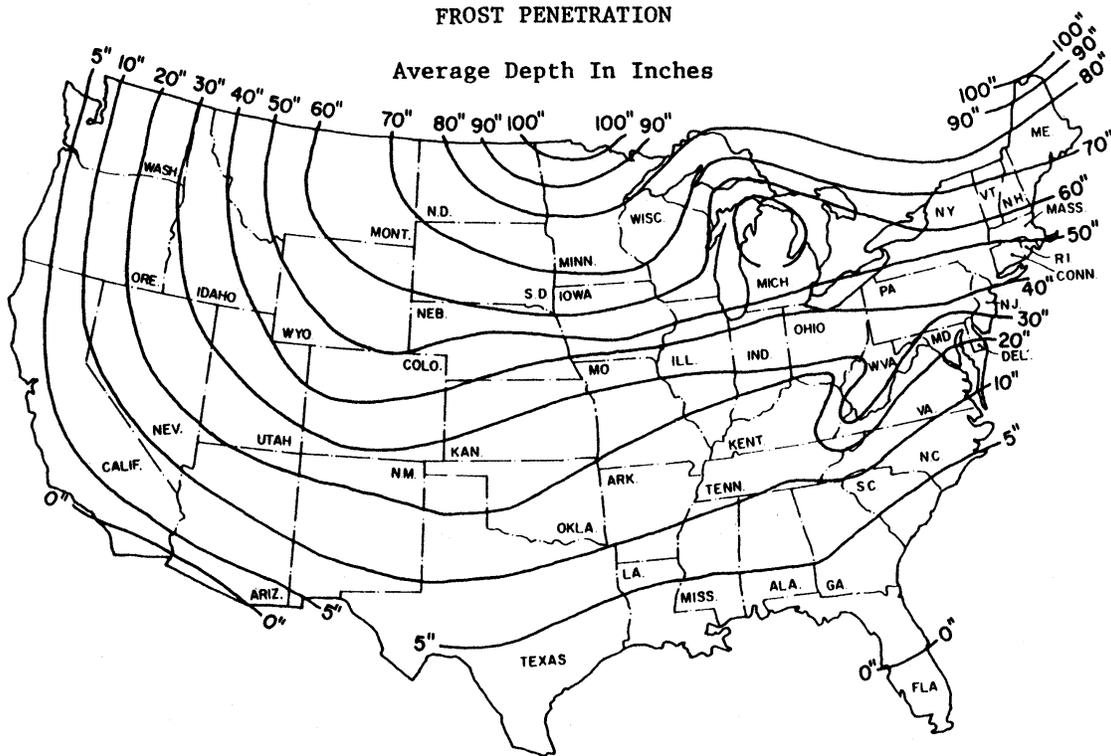
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<p><b>Oregon</b> Utilities Underground Location Center (800) 424-5555</p> <p>Douglas Utilities Coordinating Council (503) 673-6676</p> <p>Josephine Utilities Coordinating Council (503) 476-6676</p> <p>Rogue Basin Utility Coordinating Council (503) 779-6676</p> <p>Utilities Notification Center (800) 332-2344</p>
<p><b>Pennsylvania</b> Pennsylvania One Call System Inc. (800) 242-1776</p>
<p><b>Rhode Island</b> Dig Safe – Rhode Island (800) 225-4977</p>
<p><b>South Carolina</b> Palmetto Utility Protection Service Inc. (800) 922-0983</p>
<p><b>South Dakota</b> South Dakota One Call (800) 781-7474</p>
<p><b>Tennessee</b> Tennessee One-Call System (800) 351-1111</p>
<p><b>Texas</b> Texas One Call System (800) 245-4545</p> <p>Texas Excavation Safety System (800) 344-8377</p> <p>Lone Star Notification Center (800) 669-8344</p>
<p><b>Utah</b> Blue Stakes Location Center (800) 662-4111</p>
<p><b>Vermont</b> Dig Safe – Vermont (800) 225-4977</p>
<p><b>Virginia</b> Miss Utility of Virginia (800) 552-7001</p> <p>Miss Utility (800) 257-7777</p> <p>Miss Utility of Delmarva (800) 441-8355</p>
<p><b>Washington</b> Utilities Underground Location Center (800) 424-5555</p> <p>Grays Harbor &amp; Pacific County Utility Coordinating Council (206) 535-3550</p> <p>Utilities County of Cowlitz County (360) 425-2506</p> <p>Chelan-Douglas Utilities Coordinating Council (509) 663-6111</p> <p>Upper Yakima County Underground Utilities Council (800) 553-4344</p> <p>Inland Empire Utility Coordinating Council (509) 456-8000</p> <p>Palouse Empire Utilities Coordinating Council (800) 822-1974</p> <p>Utilities Notification Center (800) 332-2344</p>
<p><b>West Virginia</b> Miss Utility of West Virginia Inc. (800) 245-4848</p>
<p><b>Wisconsin</b> Diggers Hotline Inc. (800) 242-8511</p>

<p><b>Wyoming</b> West Park Utility Coordinating Council (307) 587-4800</p> <p>Call-In Dig-In Safety Council (800) 300-9811</p> <p>Fremont County Utility Coordinating Council (800) 489-8023</p> <p>Central Wyoming Utilities Coordinating Council (800) 759-8035</p> <p>Southwest Wyoming One Call (307) 362-8888</p> <p>Carbon County Utility Utility Coordinating Council (307) 324-6666</p> <p>Albany County Utility Coordinating Council (307) 742-3615</p> <p>Southeast Wyoming Utilities Coordinating Council (307) 638-6666</p> <p>Wyoming One-Call (800) 348-1030</p> <p>Utilities Underground Location Center (800) 454-5555</p> <p>Converse County Utility Coordination Council (800) 562-5561</p>
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**ATTACHMENT 2**

**FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION**



Courtesy U.S. Department Of Commerce

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**ATTACHMENT 3  
UTILITY CLEARANCE FORM**

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

1. **Underground Utilities** Circle One
- a) Review of existing maps? yes no N/A
  - b) Interview local personnel? yes no N/A
  - c) Site visit and inspection? yes no N/A
  - d) Excavation areas marked in the field? yes no N/A
  - e) Utilities located in the field? yes no N/A
  - f) Located utilities marked/added to site maps? yes no N/A
  - g) Client contact notified yes no N/A  
Name \_\_\_\_\_ Telephone: \_\_\_\_\_ Date: \_\_\_\_\_
  - g) State One-Call agency called? yes no N/A  
Caller: \_\_\_\_\_  
Ticket Number: \_\_\_\_\_ Date: \_\_\_\_\_
  - h) Geophysical survey performed? yes no N/A  
Survey performed by: \_\_\_\_\_  
Method: \_\_\_\_\_ Date: \_\_\_\_\_
  - i) Hand 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**



## EQUIPMENT INSPECTION FOR DRILL RIGS

**COMPANY:** \_\_\_\_\_ **UNIT NO.** \_\_\_\_\_

**FREQUENCY:** Inspect at the initiation of the project, after repairs, once every 10-day shift.

Inspection Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_ Equipment Type: \_\_\_\_\_  
 (e.g., **Drill Rigs** Hollow Stem, Mud Rotary, Direct Push)

	Good	Need Repair	N/A
Emergency Stop Devices (At points of operation)	π	π	π
Tires (Tread) or tracks	π	π	π
Hoses and belts	π	π	π
Cab, mirrors, safety glass	π	π	π
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	π	π	π
- Is the equipment equipped with audible back-up alarms and back-up lights?	π	π	π
Horn and gauges	π	π	π
Brake condition (dynamic, park, etc.)	π	π	π
Fire extinguisher (Type/Rating - _____)	π	π	π
Fluid Levels:			
- Engine oil	π	π	π
- Transmission fluid	π	π	π
- Brake fluid	π	π	π
- Cooling system fluid	π	π	π
- Windshield wipers	π	π	π
- Hydraulic oil	π	π	π
Oil leak/lube π	π	π	
Coupling devices and connectors	π	π	π
Exhaust system	π	π	π
Mast condition (Mast Height _____)	π	π	π
Access-ways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	π	π	π
Steering (standard and emergency)	π	π	π
Power cable and/or hoist cable	π	π	π
➤ Hooks			
- Safety Latch	π	π	π
- Wear in excess of 10% original dimension	π	π	π
- A bend or twist exceeding 10% from the plane of an unbent hook	π	π	π
- Increase in throat opening exceeding 15% from new condition	π	π	π
- Excessive nicks and/or gouges	π	π	π
➤ Wire Rope (Hoist Mechanism)			
- Reduction in Rope diameter (5/16 wire rope > 1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope > 1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope > 3/64 reduction nominal size-replace)	π	π	π
- Number of broken wires (12 randomly broken wires in one rope lay) (4 broken wires in one strand)	π	π	π
- Number of wire rope wraps left on the Running Drum at nominal use (≥3 required)	π	π	π
- Lead (primary) sheave is centered on the running drum	π	π	π
- Lubrication of wire rope (adequate?)	π	π	π

	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)	π	π	π
➤ Kinks, bends – Flattened to > 50% diameter	π	π	π
➤ Hemp/Fiber rope (Cathead/Split Spoon Hammer)			
- Minimum 3/4; maximum 1 inch rope diameter (Inspect for physical damage)	π	π	π
- Rope to hammer is securely fastened	π	π	π

**Safety Guards:**

	Yes	No
Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____	π	π
Hot pipes and surfaces exposed to accidental contact? _____	π	π
All emergency shut offs have been identified and communicated to the field crew? _____	π	π
Are any structural members bent, rusted, or otherwise show signs of damage? _____	π	π
Are fueling cans used with this equipment approved type safety cans? _____	π	π
Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? _____	π	π

**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? π π
- If so, has an 8-hour noise dosimetry test been performed? π π
- Results of noise dosimetry: \_\_\_\_\_
- Defects and repairs needed: \_\_\_\_\_
- General Safety Condition: \_\_\_\_\_
- Operator or mechanic signature: \_\_\_\_\_

Site Health and Safety Officer Signature: \_\_\_\_\_

Approved for Use: π Yes π No

**ATTACHMENT IV**  
**SAFE WORK PERMITS**



**SAFE WORK PERMIT  
MOBILIZATION AND DEMOBILIZATION  
NAVAL AIR STATION KEY WEST, FL**

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

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

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

**III. Field Crew:** \_\_\_\_\_

**IV. On-site Inspection conducted**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS  
**Equipment Inspection required**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS

**V. Protective equipment required**

Level D  Level B   
 Level C  Level A

**Respiratory equipment required**

Yes  Specify on the reverse  
 No

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

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

**Primary Route(s) of Exposure/Hazard:** NA

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

**VII. Additional Safety Equipment/Procedures**

Hard-hat .....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses .....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio/Cellular Phone .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash shield .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type – Work ) .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable apron .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Work/rest regimen .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe work shoes or boots ....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical resistant boot covers .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High visibility vest .....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape up/use insect repellent .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit .....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire extinguisher .....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash .....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other .....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: Various tasks performed as part of mobilization/demobilization require additional PPE. SSO will determine the need for additional PPE (hard hats, safety glasses, protective gloves, hearing protection, snake chaps, hearing protection, reflective vests, etc.).

**VIII. Site Preparation**

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

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

Yes  No  
*If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090*

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

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

**SAFE WORK PERMIT  
SOIL BORING AND MONITORING WELL INSTALLATION  
NAVAL AIR STATION KEY WEST, FL**

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

**I. Work limited to the following (description, area, equipment used):** Soil boring and monitoring well installation. Soil boring will generally be performed using DPT and monitoring wells will be installed using Hollow Stem Augering.

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

**III. Field Crew:** \_\_\_\_\_

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

**Equipment Inspection required**  Yes  No Initials of Inspector TtNUS

**V. Protective equipment required**

Level D  Level B   
Level C  Level A

**Respiratory equipment required**

Yes  Specify on the reverse  
No

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

**VI. Chemicals of Concern**

VOCs particularly  
Benzene

**Hazard Monitoring**

PID/FID  
Drager tubes for benzene  
(0.5a)

**Action Level(s)**

5 ppm (sustained) in worker  
breathing zones.  
+ detection for benzene  
- detection for benzene

**Response Measures**

Use Drager tube to  
determine if benzene.  
Retreat to safe area.  
Use 25 ppm action level  
for VOCs

**Primary Route(s) of Exposure/Hazard:** Inhalation, incidental ingestion, and contact with contaminants will be prevented through the use of PPE and safe work practices.

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

**VII. Additional Safety Equipment/Procedures**

Hard-hat .....  Yes  No  
Safety Glasses .....  Yes  No  
Chemical/splash goggles .....  Yes  No  
Splash shield .....  Yes  No  
Splash suits/coveralls .....  Yes  No  
Impermeable apron .....  Yes  No  
Steel toe work shoes or boots ....  Yes  No  
High visibility vest .....  Yes  No  
First Aid Kit .....  Yes  No  
Safety Shower/Eyewash .....  Yes  No

Hearing Protection (Plugs/Muffs) .....  Yes  No  
Safety belt/harness .....  Yes  No  
Radio/Cellular Phone .....  Yes  No  
Barricades .....  Yes  No  
Gloves (Type – nitrile/work ) .....  Yes  No  
Work/rest regimen .....  Yes  No  
Chemical resistant boot covers .....  Yes  No  
Tape up/use insect repellent .....  Yes  No  
Fire extinguisher .....  Yes  No  
Other .....  Yes  No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, reflective vests, etc.)

**VIII. Site Preparation**

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

**IX. Additional Permits required** (Hot work, confined space entry, excavation etc.) .....  Yes  No

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

**X. Special instructions, precautions:** Elevated PID/FID readings in worker breathing zones are unlikely based on available analytical data. Any positive detection for benzene will require that the PHSO be notified. If it is confirmed that benzene is not present and sustained VOC readings >25 ppm in worker breathing zones are noted, site activities are to be suspended. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily.

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

**SAFE WORK PERMIT  
MULTI MEDIA SAMPLING AND WELL DEVELOPMENT  
NAVAL AIR STATION KEY WEST, FL**

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

- I. **Work limited to the following (description, area, equipment used):** Multimedia sampling including soils, groundwater and IDW
- II. **Primary Hazards:** Potential hazards associated with this task: contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.
- III. **Field Crew:** \_\_\_\_\_
- IV. **On-site Inspection conducted**  Yes  No Initials of Inspector TtNUS  
**Equipment Inspection required**  Yes  No Initials of Inspector TtNUS

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

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
<u>VOCs particularly</u>	<u>PID/FID</u>	<u>5 ppm (sustained) in worker</u>	<u>Use Drager tube to</u>
<u>Benzene</u>	<u>Drager tubes for benzene</u>	<u>breathing zones.</u>	<u>determine if benzene.</u>
_____	<u>(0.5a)</u>	<u>+ detection for benzene</u>	<u>Retreat to safe area.</u>
_____	_____	<u>- detection for benzene</u>	<u>Use 25 ppm action level</u>
_____	_____	_____	<u>for VOCs</u>

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

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

- VII. **Additional Safety Equipment/Procedures**
- |                                    |   |  |   |
|------------------------------------|---|--|---|
| Hard-hat.....                      | <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/Cellular Phone .....             | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| Splash Shield .....                | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades.....                        | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| Splash Suits/Coveralls .....       | <input type="checkbox"/> Yes <input type="checkbox"/> No            | Gloves (Type – Nitrile) .....          | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Impermeable Apron.....             | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Work/rest regimen.....                 | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| Steel Toe Work Shoes or Boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical Resistant Boot Covers ....    | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| High Visibility Vest.....          | <input type="checkbox"/> Yes <input type="checkbox"/> No            | Tape/Insect Repellent .....            | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| First Aid Kit.....                 | <input type="checkbox"/> Yes <input type="checkbox"/> No            | Fire Extinguisher .....                | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| Safety Shower/Eyewash .....        | <input type="checkbox"/> Yes <input type="checkbox"/> No            | Other.....                             | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
- Modifications/Exceptions: Hard hat and hearing protection if sampling near operating equipment or when similar hazards are present.

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

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

- X. **Special instructions, precautions:** Elevated PID/FID readings in worker breathing zones are unlikely based on available analytical data. Any positive detection for benzene will require that the PHSO be notified. If it is confirmed that benzene is not present and sustained VOC readings >25 ppm in worker breathing zones are noted, site activities are to be suspended. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination.

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

**SAFE WORK PERMIT  
DECONTAMINATION  
NAVAL AIR STATION KEY WEST, FL**

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

- I. Work limited to the following (description, area, equipment used):** Decontamination of the sampling and heavy equipment
- II. Primary Hazards:** Potential hazards associated with this task: contact with site contaminants; transfer of contamination; heavy equipment hazards; noise; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather
- III. Field Crew:** \_\_\_\_\_
- IV. On-site Inspection conducted**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS  
**Equipment Inspection required**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS

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

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
<u>VOCs particularly</u>	<u>PID/FID</u>	<u>Positive readings</u>	<u>Repeat decon</u>
<u>Benzene</u>	_____	_____	_____

**Primary Route(s) of Exposure/Hazard:** Contact with the skin

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

- VII. Additional Safety Equipment/Procedures**
- |  |   |
|--|---|
| Hard-Hat ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                            | Hearing Protection (Plugs/Muffs) ..... <input type="checkbox"/> Yes <input type="checkbox"/> No   |
| Safety Glasses ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No           | Safety Belt/Harness ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No     |
| Chemical/Splash Goggles ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  | Radio/Cellular Phone ..... <input type="checkbox"/> Yes <input type="checkbox"/> No               |
| Splash Shield ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                       | Barricades ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No              |
| Splash Suits/Coveralls ..... <input type="checkbox"/> Yes <input type="checkbox"/> No              | Gloves (Type – Nitrile) ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Impermeable apron ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                   | Work/rest Regimen ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                  |
| Steel Toe Work Shoes or Boots. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical Resistant Boot Covers ..... <input type="checkbox"/> Yes <input type="checkbox"/> No     |
| High Visibility Vest ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No     | Tape/Insect Repellent ..... <input type="checkbox"/> Yes <input type="checkbox"/> No              |
| First Aid Kit ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                       | Fire Extinguisher ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                  |
| Safety Shower/Eyewash ..... <input type="checkbox"/> Yes <input type="checkbox"/> No               | Other ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                              |
- Modifications/Exceptions: When decontaminating heavy equipment the following PPE will be required in addition to those items identified above – hard hats, splash shields or goggles, hearing protection.

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

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

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

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

**SAFE WORK PERMIT  
GEOGRAPHIC / GEOPHYSICAL SURVEYING  
NAVAL AIR STATION KEY WEST, FL**

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

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

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

**III. Field Crew:** \_\_\_\_\_

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

**Equipment Inspection required**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS

**V. Protective equipment required**

Level D  Level B

Level C  Level A

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

**Respiratory equipment required**

Yes  Specify on the reverse

No

**VI. Chemicals of Concern**

None expected during this task

**Hazard Monitoring**

**Action Level(s)**

**Response Measures**

**Primary Route(s) of Exposure/Hazard:** \_\_\_\_\_

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

**VII. Additional Safety Equipment/Procedures**

Hard-hat .....  Yes  No

Safety Glasses .....  Yes  No

Chemical/splash goggles .....  Yes  No

Splash Shield .....  Yes  No

Splash suits/coveralls.....  Yes  No

Impermeable apron.....  Yes  No

Steel toe work shoes or boots....  Yes  No

High Visibility vest .....  Yes  No

First Aid Kit.....  Yes  No

Safety Shower/Eyewash .....  Yes  No

Modifications/Exceptions: Snake chaps in high brush areas

Hearing Protection (Plugs/Muffs) .....  Yes  No

Safety belt/harness .....  Yes  No

Radio/Cellular Phone .....  Yes  No

Barricades.....  Yes  No

Gloves (Type – Work ) .....  Yes  No

Work/rest regimen.....  Yes  No

Chemical Resistant Boot Covers ....  Yes  No

Tape up/use insect repellent .....  Yes  No

Fire Extinguisher .....  Yes  No

Other.....  Yes  No

**VIII. Site Preparation**

Utility Locating and Excavation Clearance completed.....  Yes  No  NA

Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place .....  Yes  No  NA

Physical Hazards Identified and Isolated (Splash and containment barriers).....  Yes  No  NA

Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc). .....  Yes  No  NA

**IX. Additional Permits required** (Hot work, confined space entry, excavation etc.).....  Yes  No

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

**X. Special instructions, precautions:** Use insect repellents and tape ankle seems if applicable hazards are present.

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

**SAFE WORK PERMIT  
IDW MANAGEMENT  
NAVAL AIR STATION KEY WEST, FL**

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

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

**II. Primary Hazards:** Potential hazards associated with this task: chemical exposure; transferring contamination; lifting; pinch and compressions; noise; slip, trip and fall, temperature extremes, and inclement weather

**III. Field Crew:** \_\_\_\_\_

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

**Equipment Inspection required**  Yes  No Initials of Inspector \_\_\_\_\_ TtNUS

**V. Protective equipment required**

Level D  Level B   
Level C  Level A

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

**Respiratory equipment required**

Yes  Specify on the reverse  
No

**VI. Chemicals of Concern**

VOCs particularly  
Benzene

**Hazard Monitoring**

PID/FID

**Action Level(s)**

Positive readings

**Response Measures**

Follow guidance provided for sampling procedures

**Primary Route(s) of Exposure/Hazard:** incidental ingestion, contact, inhalation of accumulated vapors within IDW drums that are opened.

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

**VII. Additional Safety Equipment/Procedures**

Hard-hat .....  Yes  No  
Safety Glasses .....  Yes  No  
Chemical/splash goggles .....  Yes  No  
Splash Shield .....  Yes  No  
Splash suits/coveralls.....  Yes  No  
Impermeable apron .....  Yes  No  
Steel toe work shoes or boots ....  Yes  No  
High Visibility vest .....  Yes  No  
First Aid Kit.....  Yes  No  
Safety Shower/Eyewash .....  Yes  No

Hearing Protection (Plugs/Muffs) .....  Yes  No  
Safety belt/harness .....  Yes  No  
Radio/Cellular Phone .....  Yes  No  
Barricades.....  Yes  No  
Gloves (Type – Work/nitrile ).....  Yes  No  
Work/rest regimen.....  Yes  No  
Chemical Resistant Boot Covers ....  Yes  No  
Tape up/use insect repellent .....  Yes  No  
Fire Extinguisher .....  Yes  No  
Other.....  Yes  No

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

**VIII. Site Preparation**

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

**IX. Additional Permits required** (Hot work, confined space entry, excavation etc.).....  Yes  No

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

**X. Special instructions, precautions:** Inspect drums used to store IDW prior to use. Cover IDW containers to prevent unauthorized entry and infiltration of precipitation. Use drum dollies and proper lifting practices and obtain assistance when handling heavy drums.

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

**ATTACHMENT V**  
**MEDICAL DATA SHEET**



## MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all onsite personnel and visitors who are cleared and will enter defined areas of operation. The medical data sheets will be kept in a central location during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project: NAS Key West; CTO 0383 – Boca Chica Flying Club

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

Address: \_\_\_\_\_

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

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

Telephone Numbers: Home: \_\_\_\_\_ Work: \_\_\_\_\_ Cell: \_\_\_\_\_

Address \_\_\_\_\_

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

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

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

Provide a Checklist of Previous Illnesses or Overexposure to Hazardous Chemicals Resulting in signs and symptoms of overexposure and/or the necessity for Medical Attention and/or First-aid: \_\_\_\_\_

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

Past Medical History/Review of Systems (Check if you have had positive history)

- |   |   |
|---|---|
| <input type="checkbox"/> Heart Conditions (Chest pains, angina, heart attacks)            | <input type="checkbox"/> Endocrine (Thyroid, diabetes)                      |
| <input type="checkbox"/> Gastrointestinal Conditions (Ulcers, liver, GI Bleeding)         | <input type="checkbox"/> Hematological (Clotting, anemia)                   |
| <input type="checkbox"/> Pulmonary (Difficulty in breathing, coughing, asthma, pneumonia) | <input type="checkbox"/> Cancer   |
| <input type="checkbox"/> Neurological [Headaches, dizziness, strokes (CVA, TIA)]          | <input type="checkbox"/> Muscular/Skeleton (Arthritis, Fractures, etc.)     |
| <input type="checkbox"/> Kidney/Urological Disorder (kidney stones, renal failure)        | <input type="checkbox"/> Other (Recent Illnesses, weight loss, fever, etc.) |

Comments: (Please explain positive indications): \_\_\_\_\_

Immunization History: Last Tetanus Shot or Booster (Date): \_\_\_\_\_ Pneumonia Vaccination (Date): \_\_\_\_\_

Flu Vaccination (Date): \_\_\_\_\_ Other: \_\_\_\_\_

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

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

