

**Health and Safety Plan**  
for  
**Soil Investigation**  
and  
**Well Maintenance**  
**Site 1 (OU 1), Site 3 (OU 10)**  
and  
**Site 5 (OU 4)**

**Naval Air Station Joint Reserve Base**  
**Willow Grove, Pennsylvania**



**Engineering Field Activity Northeast**  
**Naval Facilities Engineering Command**  
**Contract Number N62472-94-03-D-0057**  
**Contract Task Order 003**

September 2005



TETRA TECH NUS, INC.

**HEALTH AND SAFETY PLAN  
FOR  
SOIL INVESTIGATION  
AND WELL MAINTENANCE  
SITE 1 (OU 1), SITE 3 (OU 10)  
AND  
SITE 5 (OU 4)  
NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB)  
WILLOW GROVE, PENNSYLVANIA**

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

**Submitted to:**

**Engineering Field Activity Northeast  
Environmental Branch, Code EV4  
Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop No. 82  
Lester, Pennsylvania 19113-2090**

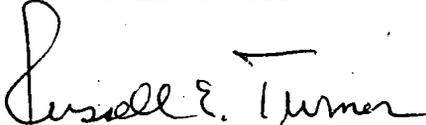
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**CONTRACT NUMBER N62472-03-D-0057  
CONTRACT TASK ORDER 003**

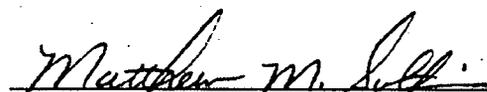
**September 2005**

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## 1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide health and safety practices and procedures for TetraTech NUS, Inc. (TiNUS) and subcontractor personnel to follow while engaged in environmental investigation activities at the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania. This HASP must be used in conjunction with the TiNUS Health and Safety Guidance Manual. Both of these documents must be present at the site during the performance of all site activities. The Guidance Manual provides detailed information pertaining to the HASP as well as applicable TiNUS Standard Operating Procedures (SOPs). This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 Code of Federal Regulations (CFR) 1910.120 [Occupational Safety and Health Administration's (OSHA's) Hazardous Waste Operations and Emergency Response Standard], OSHA's Construction Industry Standards, 29 CFR 1926; and NAS JRB Willow Grove procedures and protocol, as they may apply.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work at the site. The HASP will be modified if new information becomes available. All changes to the HASP will be made with the approval of the TiNUS Project Health and Safety Officer (PHSO) and the TiNUS Health and Safety Manager (HSM). Requests for modifications to the HASP will be directed to the PHSO, who will determine if the changes are necessary. The PHSO will notify the Project Manager (PM), who will notify affected personnel of changes.

### 1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

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

- The TiNUS PM is responsible for the overall direction of health and safety for this project.
- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
  - Providing information regarding site contaminants and physical hazards associated with the site.
  - Establishing air monitoring and decontamination procedures.

- Assigning personal protective equipment (PPE) based on task and potential hazards.
  - Determining emergency response procedures and emergency contacts.
  - Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
  - Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
- The TiNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the Work Plan, and enforces safety procedures as applicable that plan.
  - The SSO supports site activities by advising the FOL on aspects of health and safety onsite. These duties may include:
    - Coordinates health and safety activities with the FOL.
    - Selects, applies, inspects, and maintains PPE.
    - Establishes work zones and control points in areas of operation.
    - Implements air monitoring program for onsite activities.
    - Verifies training and medical clearance of onsite personnel status in relation to site activities.
    - Implements Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
    - Coordinates emergency services.
    - Provides site-specific training for onsite personnel.
    - Investigates accidents and injuries (see Attachment I - Illness/Injury Reporting Procedure and Form)
    - Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.
  - Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TiNUS HSM.

Note: In some cases one person may be designated responsibilities for more than one position. This will only be done as availability and credentials allow.

**1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS**

**Site Name:** NAS JRB **Address:** Willow Grove, PA  
**EFANE PM:** Ed Boyle **Phone Number:** (610)595-0567 ext. 175  
**Site Contact:** Paul Greco **Phone Number:** (215)443-6937

**Scheduled Activities:** Task 1 includes location layout, direct push technology drilling, soil sampling and surveying at Sites 1 and 5. Task 2 includes well maintenance/freeze protection at Site 3. Further details on these tasks are in Section 4 of this HASP.

Dates of scheduled activities: The activities for Task 1 mentioned above are scheduled for summer/fall 2005. Task 2 activities are on-going and will be performed on an as needed basis.

**Project Team:**

**TtNUS Management Personnel:**

Russell Turner

TBA

Lucinda Clark

Matthew M. Soltis, CIH, CSP

Clyde J. Snyder

TBA

**Discipline/Tasks Assigned:**

Project Manager

Field Operations Leader (FOL)

Project Engineer

Health and Safety Manager

Project Health and Safety Officer (PHSO)

Site Safety Officer (SSO)

**Non-TtNUS Personnel**

**Affiliation/Discipline/Tasks Assigned**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Hazard Assessment (for purpose of 29 CFR 1910.132) for HASP preparation has been conducted by:

Clyde J. Snyder

## 2.0 EMERGENCY ACTION PLAN

### 2.1 INTRODUCTION

This section is to direct and guide field personnel in the event of an emergency. All site activities are coordinated with the client contacts. In the event of an onsite emergency, personnel will evacuate to a safe place of refuge and notify the NAS JRB Willow Grove Emergency Coordinator who is the Fire Chief. The NAS JRB Willow Grove emergency staff will coordinate on-site activities. They are the only authorized emergency responders who provide service in emergency situations. TtNUS and subcontractor personnel will notify the NAS JRB Willow Grove Emergency Dispatcher and only provide initial or incipient measures. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured or ill person. The NAS JRB Willow Grove emergency response agencies listed in this plan are fully capable of providing the most effective response, and as such, are designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. The TtNUS Project Manager and HSM are to be notified in the event of an onsite incident. This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(I)(1)(ii).

TtNUS will, through necessary services, provide the following emergency action measures:

- Incipient stage fire-fighting support and prevention employing the use of 1 fire extinguisher.
- Incipient defensive spill control and containment measures and prevention to control a release.
- Removal of personnel from emergency situations
- Provide initial medical support for injuries or illnesses requiring basic first aid
- Provide site control and security measures as necessary

### 2.2 PRE-EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, emergencies resulting from physical, or fire hazards are the types of emergencies that could be encountered during site activities.

To minimize and eliminate the potential for these emergency situations, pre-emergency planning activities will include the following (which are the responsibility of the SSO and/or the FOL):

- Coordinating with local Emergency Response personnel to ensure that TtNUS emergency action activities are compatible with existing emergency response procedures. NAS JRB Willow Grove Fire

Protection and Emergency Services will be notified about scheduled events and activities. This is most imperative in situations where their services may be required.

- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:
  - Chemical inventory (of chemicals used onsite), with Material Safety Data Sheets (MSDSs).
  - Onsite personnel medical records (Medical Data Sheets).
  - A log book identifying personnel onsite each day.
  - Hospital route map with directions (these should also be placed in each site vehicle).
  - Emergency notification - phone numbers.

The TiNUS FOL will be responsible for the following tasks:

- Identifying a chain of command for emergency action determined by the FOL/SSO and complying with base requirements..
- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.
- Periodically reviewing procedures to ensure site workers are familiar with incidental response measures.
- Providing the necessary equipment to safely accomplish identified tasks during an emergency situation.

## **2.3 EMERGENCY RECOGNITION AND PREVENTION**

### **2.3.1 Recognition**

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. Visual observation is primarily relevant for physical hazards that may be associated with the proposed scope of work. Visual observation will also play a role in detecting minor spill hazards such as soil cuttings and IDW water. To adequately recognize chemical exposures, site personnel must have a clear knowledge of signs and symptoms of exposure associated with site contaminants. This information is provided in Table 6-1. Tasks to be performed at the site, potential hazards associated with those tasks, and the recommended control methods are discussed in detail in Sections 5.0 and 6.0. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate a situation predisposed to an emergency. The FOL and/or the SSO will be responsible for performing surveys of work areas before initiating site operations and periodically while operations are being conducted. Findings will be

documented by the FOL and/or the SSO in the Site Health and Safety logbook; however, site personnel will be responsible for reporting hazardous situations. Where potential hazards exist, TtNUS will initiate control measures (such as placing drums in bermed enclosures) to prevent adverse effects to human health and the environment.

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

### **2.3.2 Prevention**

TtNUS and subcontractor personnel will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. Daily site surveys of the work areas will also assist in the prevention of illness/injuries by identifying potential hazards and initiating appropriate control measures. The FOL or SSO will conduct these surveys at the beginning of each workday.

## **2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE**

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

In the event of an emergency requiring evacuation, personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the TtNUS FOL. Safe places of refuge will be identified before the commencement of site activities by the SSO and will be conveyed to personnel as part of the pre-activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the TtNUS FOL or the On-scene Incident Commander of the Emergency Response Team. The FOL or the SSO will perform a head count at this location to account for and to confirm the location of site personnel.

**TABLE 2-1**

**EMERGENCY REFERENCE  
NAS JRB Willow Grove, Pennsylvania**

| <b>CONTACT</b>  | <b>PHONE NUMBER</b>   |
|---|---|
| <b>EMERGENCY CENTER: POLICE, FIRE, AMBULANCE</b>        | <b>1911 (when using a Navy phone)<br/>or<br/>(215) 672-1600</b> |
| Fire Department, NAS JRB Willow Grove                   | (215) 672-1333  |
| Security, NAS JRB Willow Grove                          | (215) 672-6067 or 6068  |
| Abington Memorial Hospital Home Care and Hospice        | (215) 481-5800  |
| Pennsylvania Poison Control Center                      | (215) 922-5523  |
| Pennsylvania One Call (Underground Utility Locator)     | (800) 272-1000  |
| National Response Center                                | (800) 424-8802  |
| NAS JRB Willow Grove Base Contact – Paul Greco          | (215) 443-6937  |
| <b>EFANE PROJECT MANAGER – ED BOYLE</b>                 | <b>(610) 595-0567 ext. 175</b>                                  |
| TiNUS Project Manager –Russell Turner                   | (610) 491-9688  |
| Health and Safety Manager - Matthew M. Soltis, CIH, CSP | (412) 921-8912  |
| Project Health and Safety Officer – Clyde J. Snyder     | (412) 921-8904  |
|   |   |
|   |   |

Emergency response personnel will be immediately notified of unaccounted personnel. The SSO will document the names of personnel onsite (on a daily basis) in the site Health and Safety Logbook. This information will be used to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session before the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent on the location at which work is being performed and the circumstances under which an evacuation is required.

Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

## **2.5 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES**

- TtNUS personnel will work in close proximity at NAS JRB Willow Grove. As a result, hand signals, voice commands, and line-of-site communication will be sufficient to alert site personnel of an emergency.

**If the emergency involves exposures to chemicals, follow the steps provided in Figure 2-2.**

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

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

## **2.6 EMERGENCY CONTACTS**

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

## **2.7 EMERGENCY ROUTE TO HOSPITAL**

Abington Memorial Hospital Home Care and Hospice  
2510 Maryland Road, Willow Grove, PA, 19090

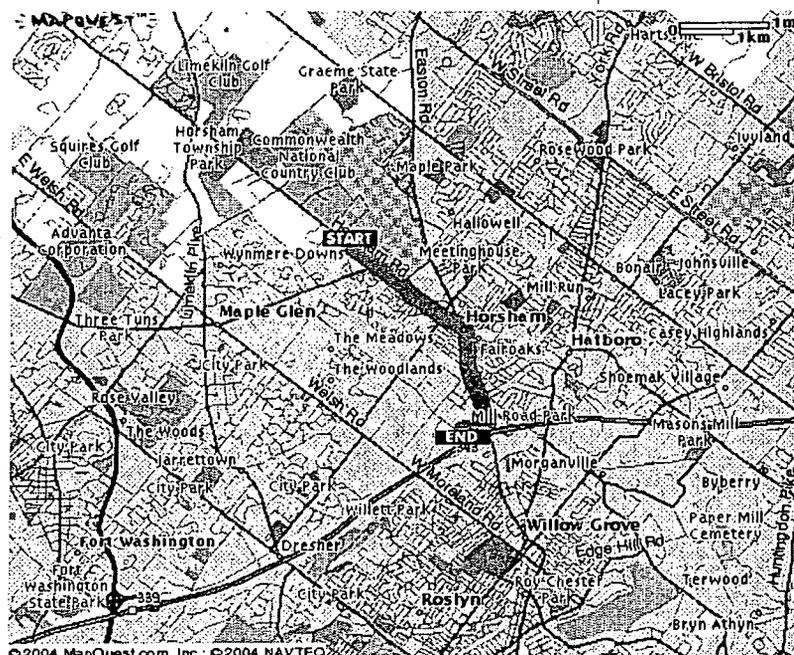
**Directions to Hospital:**

1. Start out going southeast on Horsham Road/PA-463 toward 9<sup>th</sup> Street (1.52 miles).
2. Turn slight right onto Easton Road/PA-611 (1.28 miles).
3. Turn right onto Maryland Road (0.29 miles).

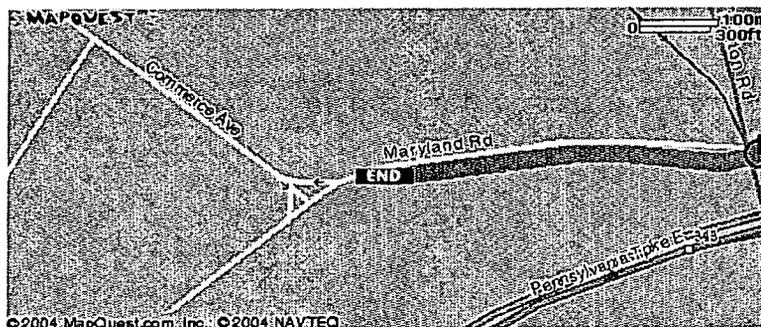
**Figure 2-1**

**Route Map from NAS JRB Willow Grove to Abington Memorial Hospital**

**FULL ROUTE**



**DESTINATION**



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

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

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

## **2.9 INJURY/ILLNESS REPORTING**

If TtNUS and/or subcontractor personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting the information obtained at the time of the incident. Also, as soon as possible the EFANE Contact and NAS JRB Willow Grove contact must be informed of any incident or accident that requires medical attention. Notify TtNUS Health and Safety Manager, Human Resources Manager, Project Manager and Project Health and Safety Officer of the injury or illness.

Pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets (found in Attachment II) filed onsite. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

## **2.10 PPE AND EMERGENCY EQUIPMENT**

PPE normally available for the project will also be available for use in case of an emergency or spill incident. A first-aid kit, eye wash units (or bottles of disposable eyewash solution), and fire extinguishers (strategically placed) will be maintained on-site and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office or each site vehicle. First-aid will only be administered by personnel holding current certification. At least one first aid kit supplied with equipment to protect against bloodborne pathogens should be available on-site if personnel are certified to administer first-aid.

## FIGURE 2-2 EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of exposure situations. In the event personnel are exposed to hazardous substances or agents:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, 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 possible without delaying the process, call the medical facility and advise them that a patient is being transported to their facility. If the exposed person is a TtNUS or subcontractor employee, advise the medical facility that the patient(s) is/are being sent and that they can anticipate a call from the Work Care physician. Work Care will contact the medical facility and request specific testing which may be appropriate. The care of the involved worker will be monitored by Work Care physicians. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call Work Care at 1-800-455-6155 and enter Extension 109 then provide the following information:
  - Any known information about the nature of the exposure.
  - 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 exposed TtNUS employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - FAX appropriate MSDS to Work Care at (714) 456-2154.
- Contact Corporate Health and Safety Manager (Matt Soltis) and Corporate Human Resources Manager (Marilyn Duffy) at 1-800-245-2730 within 24 hours.

As environmental data is gathered and the exposure scenario becomes more clearly defined, this information should be forwarded to Work Care.

Work Care will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each involved worker'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. This generalized summary will be accompanied by a personalized letter describing the findings/results. A copy of the personal letter will be filed in the continuing medical file maintained by Work Care.

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

Name: \_\_\_\_\_ Date of Exposure: \_\_\_\_\_  
Social Security No.: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_  
Client Contact: \_\_\_\_\_ Phone No.: \_\_\_\_\_  
Company Name: \_\_\_\_\_

**I. Exposing Agent**

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

Characteristics (if the name is not known)

Solid          Liquid          Gas          Fume          Mist          Vapor

**II. Dose Determinants**

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

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

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

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

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

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

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

**Immediately With Exposure:**

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

Chest Tightness / Pressure  
Nausea / Vomiting  
Dizziness  
Weakness

**Delayed Symptoms:**

Weakness  
Nausea / Vomiting  
Shortness of Breath  
Cough

Loss of Appetite  
Abdominal Pain  
Headache  
Numbness / Tingling

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

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

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

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

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

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

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

## 3.0 SITE BACKGROUND

### 3.1 SITE HISTORY AND LOCATION

NAS JRB Willow Grove, Pennsylvania is located in Horsham Township, Montgomery County in southeastern Pennsylvania, approximately 20 miles north of the city of Philadelphia. NAS JRB Willow Grove occupies approximately 1,000 acres of 1,200 acres the Department of Defense (DOD) maintains at the Air Station. The Willow Grove Air Reserve Station (ARS) occupies approximately 200 acres of land in the northeastern section of the Air Station and shares common facilities with the NAS JRB. The Air Station is comprised of flat to slightly rolling terrain and is generally bounded by State Route 611 to the east, State Route 463 to the southwest, and Keith Valley Road to the north.

The primary mission of NAS JRB Willow Grove is to provide support for operations involving aviation training activities and to train Navy Reservists. NAS JRB Willow Grove supports DOD tenants such as the Marine Reserve, Pennsylvania Air National Guard and the Army Reserve and shares facilities/services with the Air Force Reserve. The base provides facilities, services, materials, and training in direct support of all assigned units. These units include anti-submarine warfare squadrons, a helicopter squadron, a fleet logistic support squadron, and other DOD units.

#### 3.1.1 Site 1(OU 1) – Privet Road Compound

The Privet Road Compound is a fenced area that is approximately one half of an acre in size located north of the Base Bowling Alley, adjacent to Privet Road and the Air Reserve and Pennsylvania Air National Guard facilities. The compound was constructed to serve as a transfer station for wastes after closure of the Ninth Street Landfill in 1967. The compound operated between 1967 and 1975 and was used as an open disposal area where appreciable quantities of waste were burned and buried. The compound was also used to store several Polychlorinated Biphenyl (PCB)-containing electrical transformers. Use of the site as a transfer station and for transformer storage resulted in the contamination of soil.

The Privet Road Compound lies within a heavily developed section of NAS JRB Willow Grove. Most of the area where wastes were formerly handled is covered by gravel, a bowling alley or a parking lot. The remainder of the site consists of largely mowed turf grass, with a small area of occasionally mowed weeds. Additional site information can be found in the Remedial Investigation Report for Site 1 – Privet Road Compound (Tetra Tech NUS, 2002).

### **3.1.2 Site 3 (OU 10) – Ninth Street Landfill**

The Ninth Street Landfill is located immediately north of Ninth Street along the western boundary of NAS JRB Willow Grove. The landfill was used as an alternate disposal area following the phase-out of the Antenna Field Landfill in 1960. The landfill was operational from 1960 until its official closure in 1967. Wastes reportedly disposed in the landfill include TCE, paint wastes, asbestos, PCB fluids, general refuse, metal scrap, sewage sludge and industrial pretreatment plant sludge. Wastes were dumped in trenches, burned and buried. Subsequent to the landfill's closure, a salvage yard was established over a large portion of the landfill for the handling of empty drums, discarded equipment and transformers containing PCBs.

The Ninth Street Landfill is located in an undeveloped area between Ninth Street and Dawes Road. The ground surface is well vegetated with a mixture of grass and woody vegetation. The ground surface slopes north toward a wetland area, intermittent stream and stormwater retention pond located approximately 200 feet from the northern limit of waste disposal. Surface recreational facilities including a pavilion, playground and baseball diamond are located within or immediately adjacent to the site. Additional site information can be found in the Phase II Remedial Investigation Report for NAS JRB Willow Grove.

### **3.1.3 Site 5 (OU 4)– Fire Training Area**

The Fire Training Area is located in the south-central portion of NAS JRB, approximately midway between Runway 10/28 and State Route 463. The site is located immediately to the south of Taxiway Juliet and covers an irregularly shaped area of approximately 1.25 acres. The training area was used from 1942 to 1975 for large-scale firefighting exercises, which included the disposal and burning of flammable liquid wastes generated by the Naval Air Station. Wastes including solvents, paint chemicals, xylenes, toluene and various petroleum compounds were consumed at the rate of at least 4,000 gallons per year in these firefighting exercises. The area was also reportedly used for the drum storage of these flammable materials during the periods between burning exercises.

The Fire Training Area is primarily covered by grasses, with some woody and brushy vegetation present within the southern portion of the area. The burn area is located in the south-central portion of the site. Two small ponds are immediately south of the former burning area. Additional site information can be found in the Remedial Investigation Report for Site 5 – Fire Training Area .

## 4.0 SCOPE OF WORK

### 4.1 SITE 1 AND SITE 5

The objective of this study is to collect soil samples from two locations at Site 1 and six locations at Site 5. Drilling will be performed using direct push technology. Soil will be screened for headspace and a sample will be collected every two feet. Two samples per location will be submitted for analysis. Samples will be chosen based on headspace readings, visual or olfactory senses and total depth. Samples will be collected discreetly using a hermetically sealed sample vial (EnCore™). The samples will be sent to a Navy certified analytical laboratory to be analyzed for VOCs.

TtNUS will conduct utility clearance prior to drilling according to the requirements outlined in the TtNUS Utility Locating and Excavation Clearance SOP found in Attachment III of this HASP. TtNUS will notify Pennsylvania One Call of the planned investigation. Utility clearance at Site 1 and Site 5 will be performed by NAS JRB Willow Grove Civil Works Division but will remain the responsibility of TtNUS to assure that proper clearance has been obtained.. Actual intrusive activities will be limited to approximately 20 feet below ground surface (i.e. at the bedrock interface).

Specific tasks to be conducted include, but are not necessarily limited to, the following:

- Mobilization/demobilization activities
- Soil Boring using direct push technology
- Soil sampling
- Survey new locations
- Decontamination of sampling equipment
- Investigative-derived waste (IDW) management

If new tasks are to be performed at the site, Table 5-1 and this section will be modified accordingly by the PHSO. These activities represent a summarization of the tasks as they apply to the scope and application of this HASP. If additional tasks are determined to be necessary, this HASP will be amended and a hazard evaluation of the additional tasks will be performed.

#### 4.2 SITE 3

Tasks for well maintenance/freeze protection for monitoring wells at Site 3 include installing pressure valves (plugs), pumping off water above the pressure valves, and additional maintenance required to ensure monitoring wells are protected from damage during cold temperatures.

## 5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of the site-specific HASP that identifies the tasks that are to be performed as part of the scope of work. This table will be modified and incorporated into this document as new or additional tasks are performed at the site. Table 5-1 identifies the anticipated hazards, recommended control measures, air-monitoring recommendations, required PPE, and decontamination measures for each site task are discussed in detail.

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

The TtNUS Health and Safety Guidance Manual accompanies this table and HASP. The guidance manual further explains supporting programs as required by 29 CFR 1910.120. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many TtNUS SOPs are also provided in the Guidance Manual.

Safe Work Permits issued for exclusion zone activities (See Section 10.10 and Attachment IV) will use elements defined in Table 5-1 as its primary reference. The FOL and/or the SSO completing the Safe Work Permit will add additional site-specific information. In situations in which the Safe Work Permit is more conservative than the direction provided in Table 5-1 due to the incorporation of site-specific elements, the Safe Work Permit will be followed.

### 5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1 general safe work practices should be followed when conducting work involving known and unknown site hazards. 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. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.
- 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.
- Be aware of the location of the nearest telephone and the emergency telephone numbers. See Section 2.0, Table 2-1.
- Rehearse unfamiliar operations prior to implementation.
- 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.
- Observe coworkers for signs of toxic exposure and heat stress. Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.
- Work areas must be kept free of ground clutter.

## 5.2 DRILLING/SOIL BORING SAFE WORK PRACTICES

The following safe work practices will be followed when working around DPT and/or drilling operations. Drilling and sampling at Sites 1 and 5. This HASP will be modified to provide specific safe work practices associated with the type of drilling that is to be performed and given updated analytical data regarding site contaminants.

### 5.2.1 Before Boring/Drilling

- Identify underground utilities and buried structures before intrusive operations are performed. Use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment III.

- All heavy equipment (DPT/drill rigs) will be inspected by a Competent Person (the SSO or designee), prior to the acceptance of the equipment at the site and prior to the use of the equipment. Repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment V. Inspection frequencies will be once every 10-day shift or following repairs.
- The driller's helper will establish an equipment staging and lay down area 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 stacked equipment.
- Potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.
- One employee will be designated by the driller as the individual with primary responsibility for immediate activation of emergency stop devices in the event of an emergency.
- Prior to engaging boring/drilling equipment, the equipment operator will ensure all workers are clear of moving parts and will verbally alert all workers in the vicinity of moving equipment.

#### 5.2.2 During Boring/Drilling

- Minimize contact to the extent possible with contaminated tooling and environmental media.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the DPT/drill rig equal to the height of the mast plus five feet to remove these activities from within physical hazard boundaries or a minimum of 10 feet.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT/drill rig.
- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should 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.

**5.2.3 After Boring/Drilling**

- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.
- Motorized equipment will be fueled prior to the commencement of the day's activities. During fueling operations all equipment will be shut down and bonded to the fuel provider.
- When not in use all DPT/ drill rigs will be shut down, and emergency brakes set. Drill rigs will have their wheels chocked to assist in controlling movement.
- Areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAS JRB Willow Grove  
Site 1 (OU 1), Site 3 (OU 10)  
and Site 5 (OU 4)**

| Tasks/Operation/ Locations  | Anticipated Hazards   | Recommended Control Measures   | Hazard Monitoring - Type and Action Levels   | Personal Protective Equipment<br><i>(Items in italics are deemed optional as conditions of the FOL or SSO dictate.)</i>  | Decontamination Procedures   |
|---|---|--|--|--|--|
| <p>Soil borings</p> <p>This task will be accomplished using Direct Push Technology.</p> | <p><b>Chemical hazards:</b></p> <p>1) Potential contaminants of concern include VOCs, SVOCs, and PCB's. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern.</p> <p>2) Transfer of contamination into clean areas or onto persons.</p> <p><b>Physical hazards:</b></p> <p>3) Equipment hazards (pinch/compressions points)</p> <p>4) Noise in excess of 85 dBA</p> <p>5) Energized systems (contact with underground or overhead utilities)</p> <p>6) Cuts and Lacerations</p> <p>7) Lifting (strain/muscle pulls)</p> <p>8) Slips, trips, and falls</p> <p>9) Vehicular and foot traffic</p> <p>10) Ambient temperature extremes (heat/cold stress)</p> <p><b>Natural hazards:</b></p> <p>11) Insect/animal bites and stings, poisonous plants, etc.</p> <p>12) Inclement weather</p> | <p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected. Use good work and hygiene practices, safe work procedures, minimize hand to mouth contact.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site. Wrap all portable equipment to be transported across clean areas of the site to the central decontamination pad.</p> <p>3) Ensure that all equipment is inspected in accordance with federal safety and transportation guidelines, Occupational Safety and Health Administration (OSHA) (1926.600, .601, .602), and manufacturer's design using the checklist provided in Attachment V.</p> <ul style="list-style-type: none"> <li>- Equipment will be operated by knowledgeable persons</li> <li>- Establish safety zones and routes of approach</li> <li>- Only personnel directly supporting the DPT operations will remain within 10 ft safety zone from the point of operation.</li> <li>- Establish hand signals before beginning drilling.</li> <li>- The operator will be at the controls while tools are operating unless all personnel are clear of the equipment.</li> <li>- Use a long-handled shovel or equivalent to clear away drill cuttings from the hole and rotating equipment. <b>Never</b> use hands or feet for this purpose.</li> <li>- Use only manufacturer-approved equipment in conjunction with site equipment</li> <li>- Keep work areas clear of clutter.</li> <li>- Secure all loose articles to avoid possible entanglement.</li> <li>- Equip all heavy equipment with movement warning systems.</li> <li>- Personnel working in equipment traffic areas are to wear high visibility reflective vests.</li> <li>- Instruct personnel in the location and operations of the emergency shutoff device(s). Test this device initially (and then periodically) to ensure its operational status.</li> </ul> <p>5) Obtain all utility clearances before excavation. Identify and mark the locations of all underground utilities before investigations. Obtain written permit clearance before all subsurface investigations. Follow the guidelines established in Attachment II (Utility Locating and Excavation Clearance.)</p> <ul style="list-style-type: none"> <li>- Keep DPT mast, or other projecting devices at least 20 ft from overhead power lines.</li> </ul> <p>4) Hearing protection will be used during activities when noise levels are between 87 and 93 dBA.</p> <p>5) Any hand augering activities will proceed only when a clearance permit is obtained from NASJRB Willow Grove. If the field crew questions the validity of the permit, operations will cease and the TOM and PHSO will be notified. A decision will then be made on how to proceed. If operations are to proceed it will be in accordance with the Utility Locating and Excavation Clearance SOP in Attachment III of this HASP. All utility clearances will be obtained, in writing, and locations identified and marked prior to activities. Overhead utilities will also be identified. <b>The Utility Clearance Form found in Attachment III of this HASP must be filled out for all intrusive activities.</b></p> <p>6) Cuts and Lacerations – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations</p> <ul style="list-style-type: none"> <li>- Select and secure the most favorable route to sampling locations.</li> <li>- Previewing pathways - Where possible, remove or demarcate the physical hazards.</li> <li>- Inspect all cutting equipment to be used to clear access routes for defects.</li> <li>- 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 on your knee.</li> <li>- 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.</li> </ul> <p>7) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>8) Preview work locations for unstable/uneven terrain.</p> <p>9) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when working in or along traffic thoroughfares.</p> <p>10) Wear appropriate clothing for weather conditions. Acceptable shelter and liquids for field crews.</p> <p>11) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Relative to the time of the year this operation is conducted, certain natural hazards may have little bearing.</p> <p>12) Suspend or terminate operations until directed otherwise by SSO. (See Section 6.3.4 of this HASP)</p> | <p>A direct reading Flameionization Detector (FID), will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> <li>- Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 1 PPM in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area.</li> <li>- Work may only resume if airborne readings in worker breathing zone return to background. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection.</li> </ul> <p>Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides.</p> | <p>Level D - (Minimum Requirements)</p> <p><b>Subsurface Soils - Borings</b></p> <p><b>Screening and Sampling Staff</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>- Surgical style gloves (<i>double-layered if necessary</i>)</li> <li>- Hard hat (when overhead hazard exists)</li> <li>- <i>Tyvek® coveralls; Impermeable garments if the potential exists for soiling or saturating.</i></li> <li>- Hearing protection for high noise areas</li> <li>- <i>Reflective vest for traffic areas</i></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. Protective levels may require modification should this activity be required to be conducted within a controlled zone due to an on-going operation.</p> | <p>Personnel Decontamination will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>- Equipment drop</li> <li>- Soap/water wash and rinse of gloves, as applicable</li> <li>- Soap/water wash and rinse of the outer splash suit, as applicable</li> <li>- Disposable PPE will be removed and bagged.</li> </ul> <p><b>Sampling Equipment Decontamination</b></p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.</p> |

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAS JRB Willow Grove  
Site 1 (OU 1), Site 3 (OU 10)  
and Site 5 (OU 4)**

| Tasks/Operation/<br>Locations   | Anticipated Hazards   | Recommended Control Measures  | Hazard Monitoring - Type and Action Levels   | Personal Protective Equipment<br><i>(Items in italics are deemed optional as conditions<br/>or the FOL or SSO dictate.)</i>   | Decontamination Procedures   |
|---------------------------------|---|---|--|---|--|
| Surveying                       | <p><b>Physical hazards:</b></p> <ol style="list-style-type: none"> <li>1) Slip, trips, and falls</li> <li>2) Biological hazards (Insect/animal bites and stings)</li> <li>3) Vehicular and foot traffic</li> <li>4) Ambient temperature extremes</li> <li>5) Severe weather conditions (lightning, high winds, and thunder storms)</li> <li>6) Cuts and Lacerations</li> </ol>  | <ol style="list-style-type: none"> <li>1) Preview work locations for unstable/uneven terrain.</li> <li>2) Avoid nesting areas, use repellents (Do NOT use repellents during sampling activities). Report potential hazards to the SSO.</li> <li>3) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when working in or along traffic thoroughfares.</li> <li>4) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews.</li> <li>5) Suspend or terminate operations until directed otherwise by SSO. (See Section 6.3.4 of this HASP)</li> <li>6) Cuts and Lacerations – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations               <ul style="list-style-type: none"> <li>- Select and secure the most favorable route to sampling locations.</li> <li>- Previewing pathways - Where possible, remove or demarcate the physical hazards.</li> <li>- Inspect all cutting equipment to be used to clear access routes for defects.</li> <li>- 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 on your knee.</li> <li>- 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.</li> </ul> </li> </ol>   | Not required   | <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>- Safety glasses</li> <li>- <i>Hard hat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i></li> </ul> | Wash hands and face prior to break and food consumption or any hand to mouth activities. |
| Mobilization/<br>Demobilization | <p><b>Chemical hazards:</b></p> <ol style="list-style-type: none"> <li>1) Potential contaminants of concern include VOCs, SVOCs, and PCB's. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern.</li> </ol> <p><b>Physical hazards:</b></p> <ol style="list-style-type: none"> <li>1) Lifting (muscle strains and pulls)</li> <li>2) Pinches and compressions</li> <li>3) Slip, trips, and falls</li> <li>4) Moving machinery</li> <li>5) Vehicular and foot traffic</li> <li>6) Cuts and Lacerations</li> </ol> | <ol style="list-style-type: none"> <li>1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</li> <li>2) Use pinch bars or other equipment to keep hands from point of operation or other associated pinch points.</li> <li>3) Preview work locations for unstable/uneven terrain. Barricade all ground openings from access closer than two feet from the edge.</li> <li>4) All equipment will be               <ul style="list-style-type: none"> <li>- Inspected in accordance with OSHA, and manufacturers design.</li> <li>- Operated by a knowledgeable ground crew.</li> </ul> </li> <li>5) Establish safe zones of approach and movement.</li> <li>6) Cuts and Lacerations – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations               <ul style="list-style-type: none"> <li>- Select and secure the most favorable route to sampling locations.</li> <li>- Previewing pathways - Where possible, remove or demarcate the physical hazards.</li> <li>- Inspect all cutting equipment to be used to clear access routes for defects.</li> <li>- 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 on your knee.</li> <li>- 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.</li> </ul> </li> </ol> | <p>Not required</p> <p><b>Excessive chemical contaminant concentrations impacting field crews during this task is not anticipated.</b></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>- Safety glasses</li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hearing protection for high noise areas, or as directed by the Site Safety Officer.</i></li> </ul>                 | Wash hands and face prior to break and food consumption or any hand to mouth activities. |

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAS JRB Willow Grove  
Site 1 (OU 1), Site 3 (OU 10)  
and Site 5 (OU 4)**

| Tasks/Operation/<br>Locations | Anticipated Hazards   | Recommended Control Measures  | Hazard Monitoring - Type and Action Levels  | Personal Protective Equipment<br><i>(Items in italics are deemed optional as conditions<br/>or the FOL or SSO dictate.)</i>  | Decontamination Procedures  |
|-------------------------------|---|---|---|--|---|
| Soil sampling,                | <p><b>Chemical hazards:</b></p> <p>1) Potential contaminants of concern include VOCs, SVOCs, and PCB's. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern.</p> <p>2) Transfer of contamination into clean areas</p> <p><b>Physical hazards:</b></p> <p>3) Noise in excess of 85 dBA<br/>4) Lifting (strain/muscle pulls)<br/>5) Slips, trips, and falls<br/>6) Ambient temperature extremes (heat/cold stress)<br/>7) Vehicular and foot traffic<br/>8) Cuts and Lacerations</p> <p><b>Natural hazards:</b></p> <p>9) Insect/animal bites and stings, poisonous plants, etc.<br/>10) Inclement weather</p> | <p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. See decontamination of heavy and sampling equipment for direction in this task.</p> <p>3) When sampling at an operating DPT, drill rig use hearing protection. The use of hearing protection outside of 25 feet from the DPT rig should be incorporated under the following condition:</p> <p style="padding-left: 20px;">If you have to raise your voice to talk to someone who is within 2 feet of your location, you may be approaching excessive noise levels (80-85dBA) and hearing protection should be worn until the noise source may be positively quantified.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Preview work locations for unstable/uneven terrain.</p> <ul style="list-style-type: none"> <li>- Ruts, roots, and other tripping hazards should be eliminated from around the rotating apparatus to minimize trips and falls when approaching the rotating tooling.</li> <li>- Use multiple persons and small loads to pack sampling resources to remote locations.</li> </ul> <p>6) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews.</p> <p>7) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> <li>- Establish safe zones of approach (i.e. Mast or Boom + 5 feet). See Section 10 of the HASP for specific safety zones and established clearance recommendations.</li> <li>- When sampling along roadways, use signs to indicate men working as well flag persons, as necessary. Personnel working in and around any established traffic patterns should wear high visibility vests to increase visual recognition.</li> </ul> <p>8) Cuts and Lacerations – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations</p> <ul style="list-style-type: none"> <li>- Select and secure the most favorable route to sampling locations.</li> <li>- Previewing pathways - Where possible, remove or demarcate the physical hazards.</li> <li>- Inspect all cutting equipment to be used to clear access routes for defects.</li> <li>- 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 on your knee.</li> <li>- 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.</li> </ul> <p>9) Avoid nesting areas, use repellents approved by the FOL. Report potential hazards to the SSO.</p> <p>10) Suspend or terminate operations until directed otherwise by the SSO. (See Section 6.3.4 of this HASP)</p> | <p>A direct reading Flameionization Detector (FID), will be used to screen samples and to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> <li>- Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 1 PPM in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area.</li> <li>- Work may only resume if airborne readings in worker breathing zone return to background. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection.</li> </ul> <p>Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides</p> | <p>Level D protection will be utilized for the following sampling activities.</p> <p>Surface, subsurface soils, surface water, groundwater and sediments.</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>- Safety glasses</li> <li>- Surgical style gloves (<i>double-layered if necessary</i>)</li> <li>- <i>Reflective vest for high traffic areas</i></li> <li>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i></li> <li>- <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i></li> <li>- <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</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 outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>- Equipment drop</li> <li>- Soap/water wash and rinse of outer boots and gloves, as applicable</li> <li>- Soap/water wash and rinse of the tyvek splash suit, as applicable</li> <li>- Disposable PPE will be removed and bagged.</li> </ul> <p>Sampling soils, the following provisions will apply</p> <ul style="list-style-type: none"> <li>- Upon completion of the sampling dedicated trowels, hand augers, shovels, etc. will be bagged for transport back to the central decontamination area.</li> <li>- PPE (gloves) will be removed and also bagged for disposal.</li> <li>- Handi-Wipes or similar product will be used to clean hands prior to moving to the next location.</li> </ul> <p><b>Equipment Decontamination</b></p> <p>All equipment used in remote sampling locations will be brought back to the central decontamination area for decontamination and re-use or decontamination and gross removal of contamination prior to disposal.</p> <p><b>Note:</b> Field screening instruments will be wrapped to minimize the necessary decontamination except for wiping down parts which are necessary to expose to the external environment. The equipment reference above is largely directed at hand tools.</p> <p>Decontamination of equipment (sampling and hand tools) will proceed as indicated in the Sampling and Analysis Plan and/or Work Plan.</p> |

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAS JRB Willow Grove  
Site 1 (OU 1), Site 3 (OU 10)  
and Site 5 (OU 4)**

| Tasks/Operation/ Locations                           | Anticipated Hazards   | Recommended Control Measures  | Hazard Monitoring - Type and Action Levels  | Personal Protective Equipment<br><i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i>   | Decontamination Procedures   |
|--|---|---|---|---|--|
| IDW Management and moving IDW drums to storage areas | <p><b>Chemical hazards:</b></p> <p>1) Potential contaminants of concern include VOCs, SVOCs, and PCB's. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern.</p> <p>2) Transfer of contamination into clean areas.</p> <p><b>Physical hazards</b></p> <p>3) Noise<br/>4) Lifting (muscle strains and pulls)<br/>5) Pinches and compressions<br/>6) Slip, trips, and falls<br/>7) Natural hazards (insect/animal bites and stings)<br/>8) Vehicular (highway) traffic<br/>9) Ambient temperature extremes (heat stress)</p> | <p>1) Employ real-time monitoring instrumentation, action levels, and identify PPE to control exposures to potentially contaminated media (e.g. air, water, soils) if leaks or spills are observed.</p> <p>2) Decontaminate all equipment and supplies, if they become contaminated, between locations and prior to leaving the site.</p> <p>3) When working near heavy equipment, use hearing protection.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Use pinch bars or other equipment to keep hands from the point of operation.</p> <p>6) Preview work locations for unstable/uneven terrain.</p> <p>7) Avoid nesting areas, employ repellents. Report potential hazards to the SSO.</p> <p>8) Traffic and equipment considerations are to include the following:<br/>- Establish safe zones of approach.<br/>- Secure all loose articles to avoid possible entanglement.<br/>- All equipment shall be equipped with movement warning systems.</p> <p>9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding cold/heat stress concerns is provided in section 4 of the Tetra Tech NUS Health and Safety Guidance Manual.</p> | <p><b>It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard.</b></p> <p>A direct reading Flameionization Detector (FID), will be used to screen drums if leaks or spills occur to detect the presence of any potential volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> <li>- Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 1 PPM in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area.</li> <li>- Work may only resume if airborne readings in worker breathing zone return to background. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection.</li> </ul> <p>Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides</p> | <p>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> <li>- Standard field attire (long sleeve shirt; long pants)</li> <li>- <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i></li> <li>- Cotton/leather work gloves with surgical style inner gloves</li> <li>- Safety shoes (steel toe/shank)</li> <li>- Safety glasses</li> <li>- Hardhat (when overhead hazards exists, or identified as a operation requirement)</li> <li>- Reflective vest for high traffic areas</li> <li>- Hearing protection for high noise areas, or as directed on an operation by operation scenario.</li> </ul> | <p><b>Personnel Decontamination</b> will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable) if a leak or spill occurs. The decon function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> <li>- Equipment drop</li> <li>- Soap/water wash and rinse of outer boots and gloves, as applicable</li> <li>- Soap/water wash and rinse of the outer splash suit, as applicable</li> <li>- Disposable PPE will be removed and bagged.</li> </ul> |

**TABLE 5-1  
TASKS/HAZARDS/CONTROL MEASURES  
NAS JRB Willow Grove  
Site 1 (OU 1), Site 3 (OU 10)  
and Site 5 (OU 4)**

| Tasks/Operation/ Locations                      | Anticipated Hazards  | Recommended Control Measures  | Hazard Monitoring - Type and Action Levels  | Personal Protective Equipment<br><i>(Items in italics are deemed optional as conditions of the FOL or SSO dictate.)</i>   | Decontamination Procedures  |
|---|--|---|---|---|---|
| Decontamination of sampling and heavy equipment | <p><b>Chemical hazards:</b></p> <p>1) Potential contaminants of concern include VOCs, SVOCs, and PCB's. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern.</p> <p>However, based on the analytical results from these previous site investigations, none of the contaminants listed above are likely to present a significant exposure potential to site workers involved in decontamination activities. However given the disposal practices and the scope of work, including investigation of anomalies, the potential exists for encountering other chemicals or contaminants that were not previously identified.</p> <p>Refer to individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities.</p> <p>- Decontamination fluids - Liquinox (detergent), isopropanol, methanol, etc.</p> <p><b>Physical hazards:</b></p> <p>2) Lifting (muscle strains and pulls)</p> <p>3) Pinches and compressions</p> <p>4) Noise</p> <p>5) Flying Projectiles</p> | <p>1) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids.</p> <ul style="list-style-type: none"> <li>- Have a means by which the eyes and/or skin may be flushed (i.e., portable camp shower, emergency eyewash, etc.) readily accessible.</li> <li>- Obtain manufacturer's MSDS for any decontamination solvents used on-site. Users of solvents must review the MSDS and have ready access to it on-site. Maintain a Chemical Inventory and a file of MSDSs for all hazardous chemicals brought to the site. Users must observe MSDS requirements with regard to chemical use, storage, spill response, PPE, and other aspects.</li> </ul> <p>Use of solvents will be restricted to outdoor locations (i.e., this activity is restricted from inside a building or other small or poorly-ventilated space).</p> <p>2) Use multiple persons where necessary for lifting and handling heavy pieces of equipment for decontamination purposes.</p> <p>3) Place or stack equipment securely during decontamination and air drying to prevent unstable items from falling.</p> <p>4) Steam/pressure washer operators will wear hearing protection. Other personnel will be restricted from the area (i.e., no closer than 20 feet) to minimize their potentials to exposure to noise, overspray, and flying projectiles.</p> <p>5) Wear appropriate protection (splash shield to protect pressure washer operator). Place shields around the area when this potential exists to protect others within the area.</p> | <p>1) Use visual observation and real-time monitoring instrumentation to ensure all equipment and/or areas which have been cleaned and dried are properly cleaned of potentially contaminated medias (e.g., air, water, soils).</p> <p><b>Elevated airborne concentrations impacting field crews or downwind receptors are not anticipated for this task.</b></p> | <p><b>For Drill Rig:</b><br/>This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D (Minimum requirements) -</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Safety shoes or boots (Steel toe)</li> <li>- Nitrile outer gloves</li> <li>- Safety glasses underneath a splash shield</li> <li>- PVC Rain suits or PE or PVC coated Tyvek as protection from splash as required</li> <li>- Chemical resistant boot covers</li> <li>- Hearing protection (plugs or muffs)</li> </ul> <p><b>For sampling equipment including trowels, macro samplers, bailers, etc.:</b></p> <p>Observe MSDS requirements, but not less than Level D Minimum requirements -</p> <ul style="list-style-type: none"> <li>- Standard field attire (sleeved shirt; long pants)</li> <li>- Safety shoes or boots (Steel toe)</li> <li>- Nitrile outer gloves.</li> <li>- Safety glasses</li> </ul> <p>In the event of overspray of chemical decontamination fluids employ PVC rain suits or PE or PVC coated Tyvek as necessary.</p> <p>Respiratory protection is not anticipated for these activities.</p> <p><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>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none"> <li>- Remove and dispose of any disposable PPE (Tyvek coveralls, outer gloves, etc.)</li> <li>- Soap/water wash and rinse of reusable PPE items (e.g., splash suit, boots).</li> <li>- Wash hands and face; leave contamination reduction zone</li> </ul> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>The FOL or the SSO will be responsible for evaluating equipment arriving at and leaving the site. No equipment will be authorized access or exit without this authorization.</p> <p>Evaluation will consist of</p> <ul style="list-style-type: none"> <li>- Visual inspection</li> <li>- Scanning equipment with monitoring instruments</li> </ul> |
| Well Maintenance                                | <p><b>Physical hazards:</b></p> <p>1) Lifting (muscle strains and pulls)</p> <p>2) Pinches and compressions</p> <p>3) Slip, trips, and falls</p> <p>4) Moving machinery</p> <p>5) Vehicular and foot traffic</p> <p>6) Installation and maintenance of Well Pressure Plugs</p>   | <p>1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>2) Use pinch bars or other equipment to keep hands from point of operation or other associated pinch points.</p> <p>3) Preview work locations for unstable/uneven terrain. Barricade all ground openings from access closer than two feet from the edge.</p> <p>4) All equipment will be</p> <ul style="list-style-type: none"> <li>- Inspected in accordance with OSHA, and manufacturers design.</li> <li>- Operated by a knowledgeable ground crew.</li> </ul> <p>5) Establish safe zones of approach and movement</p> <p>6) Install plugs and pressurize to 15lbs. compressed air.</p> <ul style="list-style-type: none"> <li>- Do not place face over well opening</li> <li>- Follow cylinder safety procedures in Attachment VI</li> </ul>   | <p>Not required</p> <p>Excessive chemical contaminant concentrations impacting field crews during this task is not anticipated.</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>- Safety glasses</li> <li>- Hardhat (when overhead hazards exists, or identified as a operation requirement)</li> <li>- Reflective vest for high traffic areas</li> <li>- Hearing protection for high noise areas, or as directed by the Site Safety Officer.</li> </ul>  | <p>Not required</p>   |

## 6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards anticipated to be present during the activities to be conducted. Table 6-1 provides information related to chemical constituents that have been identified by analysis or are suspected to be present at the site based on historical data. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in the table.

### 6.1 CHEMICAL HAZARDS

The potential health hazards associated with the soil boring and sampling at NAS JRB Willow Grove include ingestion, and dermal contact of various contaminants that may be present in shallow soils. Given the nature of the tasks to be completed, however, chemical exposures are not anticipated via inhalation. Based on prior activities at the site, the types of contaminants anticipated include low levels of VOC, SVOC and PCB's soil contaminants. The following have been identified as the primary classes of hazards for these contaminants:

- Volatile Organic Compounds (VOCs), from petroleum products (BETX).
- Semivolatile Organic Compounds (SVOCs), including Total Petroleum Hydrocarbons (TPHs), such as diesel.
- PCB's Polychlorinated Biphenyl's from storage of (PCB)-containing electrical transformers.

Table 6-1 provides information on the toxicological, chemical, and physical properties of these substances. It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (soil sampling, etc.). Exposure to these compounds is most likely to occur through ingestion and contact of contaminated soil or water. For this reason, PPE and basic hygiene practices (washing face and hands before leaving site) will be extremely important.

**TABLE 6-1  
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA**

| Substance  | CAS No.  | Air Monitoring/Sampling Information   |   | Exposure Limits   | Warning Property/Rating  | Physical Properties   | Health Hazard Information  |
|--|--|---|---|---|--|---|--|
| Aroclor-1260 (Polychlorinated Biphenyl, PCB) It should be noted that this substance is representative of the more common isomers Aroclor - 1242, 1254, which may be encountered. | 11096-82-5<br>53469-21-9 (42%)<br>11097-69-1 (54%) | Substance is not volatile (VP=0.00006 mmHg), I.P. is unknown however is anticipated to be elevated, therefore, PID is not anticipated to detect substance.<br><br>Substance is non combustible and as a result will not be detected by FID. | Air sample using a particulate filter, Florisil sorbent tube with glass fiber filter; hexane desorption; gas chromatography-electron capture detector. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #5503 (PCBs). | OSHA; ACGIH: 0.5 mg/m <sup>3</sup> (skin)<br><br>NIOSH: 0.001 mg/m <sup>3</sup><br><br>IDLH: 5 mg/m <sup>3</sup>      | Inadequate - However due to the low volatility it is assumed unless agitated this substance does not present a volatile vapor or gas respiratory threat. For dusty conditions where this material may cling to particulates, use a HEPA filter.<br><br>APRs are approved for escape only when concentrations exceed the exposure limits. Concentrations greater than the exposure limits require PAPR or supplied air respirators.<br><br><b>Recommended glove:</b> Butyl rubber >24 hrs; Neoprene rubber >24.00 hrs; Silver shield or Viton (for pure product). | <b>Boiling Pt:</b> distillation range 689- 734°F; 365- 390°C<br><b>Melting Pt:</b> -2 to 50°F; -19 to 10°C<br><b>Solubility:</b> Insoluble<br><b>Flash Pt:</b> Not applicable<br><b>LEL/LFL:</b> Not applicable<br><b>UEL/UFL:</b> Not applicable<br>Nonflammable liquid, however, exposure to fire results in black soot containing PCBs, dibenzofurans, & chlorinated dibenzo-p-dioxins<br><b>Vapor Density:</b> Not available<br><b>Vapor Pressure:</b> 0.00006 - 0.001 mmHg<br><b>Specific Gravity:</b> 1.566 @ 60°F; 15.5°C<br><b>Incompatibilities:</b> Strong oxidizers<br><b>Appearance and Odor:</b> Colorless to pale yellow, viscous liquid or solid (Aroclor 54 below 50°F) with a mild, hydrocarbon odor | This substance is irritating to the eyes and skin. Chronic effects of overexposure may include potential to cause liver damage, chloracne, and reproductive effects. Recognized as possessing carcinogenic properties by NIOSH, and NTP. |
| Waste Oils<br><br>All information is based on mineral oil  | N.E.<br>8012-95-1 for mineral oil                  | Varies between fractions however waste oils tend to be less volatile. The FID tends to handle the longer chained aliphatic hydrocarbons more efficiently than its PID counterpart and would be selected as the instrument of choice.        | Sampling and analytical protocol shall be in accordance with NIOSH Method #5026 is the recommended method for mineral oil mist.   | ACGIH; NIOSH: 5 mg/m <sup>3</sup> (Oil mists); 10 mg/m <sup>3</sup> STEL<br><br>OSHA: 5 mg/m <sup>3</sup> (Oil mists) | Non-volatile substance, therefore no respiratory protection is required. In an aerosol form dust and mist respirator would be considered acceptable for up to 500 mg/m <sup>3</sup> .<br><br><b>Recommended gloves:</b> Any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances, and will be acceptable).   | <b>Boiling Pt:</b> 680°F; 360°C<br><b>Melting Pt:</b> Not available<br><b>Solubility:</b> Insoluble<br><b>Flash Pt:</b> 275-500°F; 135-260°C depends on the distillation fraction<br><b>LEL/LFL:</b> Not available<br><b>UEL/UFL:</b> Not available<br><b>Vapor Density:</b> Not available<br><b>Vapor Pressure:</b> <0.5 mmHg<br><b>Specific Gravity:</b> 0.90<br><b>Incompatibilities:</b> None reported<br><b>Appearance and odor:</b> Colorless, oily, with an odor of burned lubricating oil.  | Minor irritation to the eyes, skin, and respiratory system.  |

**TAB 6-1**  
**CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA**

| Substance    | CAS No.  | Air Monitoring/Sampling Information   |  | Exposure Limits   | Warning Property Rating  | Physical Properties  | Health Hazard Information   |
|--------------|----------|---|--|---|--|--|---|
| Benzene      | 71-43-2  | PID: I.P 9.24 eV, 100% response with PID and 10.2 eV lamp.<br><br>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<br>ACGIH: 10 ppm<br>NIOSH: 0.1 ppm<br>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.<br><br>Recommended gloves:<br>Butyl/neoprene blend - >8.00 hrs;<br>Silver shield as a liner - >8.00 hrs;<br>Viton - >8.00 hrs | Boiling Pt: 176°F; 80°C<br>Melting Pt: 42°F; 5.5°C<br>Solubility: 0.07%<br>Flash Pt: 12°F; -11°C<br>LEL/LFL: 1.3%<br>UEL/UFL: 7.9%<br>Vapor Density: 2.77<br>Vapor Pressure: 75 mmHg<br>Specific Gravity: 0.88<br>Incompatibilities: Strong oxidizers, fluorides, perchlorates, and acids<br>Appearance and Odor: Colorless to a light yellow liquid with an aromatic odor | Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. CNS effects include giddiness, lightheadedness, headaches, staggered gait, fatigue, and lassitude and depression. Additional effects may include nausea. Long duration exposures may result in respiratory collapse. Regulated as an OSHA carcinogen. May cause damage to the blood forming organs and may cause a form of cancer called leukemia.   |
| Ethylbenzene | 100-41-4 | PID: I.P 8.76, High response with PID and 10.2 eV lamp.<br><br>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<br><br>OSHA: 100 ppm<br><br>IDLH: 800 ppm  | Adequate - Can use air-purifying respirator with organic vapor cartridge up to 1,000 ppm.<br><br>Recommended gloves:<br>Neoprene or nitrile w/ silver shield when potential for saturation; Teflon >3.00 hrs   | Boiling Pt: 277°F; 136°C<br>Melting Pt: -139°F; -95°C<br>Solubility: 0.01%<br>Flash Pt: 55°F; 13°C<br>LEL/LFL: 1.0%<br>UEL/UFL: 6.7%<br>Vapor Density: 3.66<br>Vapor Pressure: 10 mmHg @ 79°F; 26°C.<br>Specific Gravity: 0.87<br>Incompatibilities: Strong oxidizers<br>Appearance and odor: Colorless liquid with an aromatic odor. Odor Threshold of 0.092-0.60.        | Regulated primarily because of its potential to irritate the eyes and respiratory system. In addition, effects of overexposure may include headaches, narcotic effects, CNS changes (i.e., coordination impairment, impaired reflexes, tremoring) difficulty in breathing, possible chemical pneumonia, and potentially respiratory failure or coma.  |
| Toluene      | 108-88-3 | PID: I.P 8.82 eV, High response with PID and 10.2 eV lamp.<br><br>FID: 110% response with FID.                | Air sample using charcoal tube; carbon disulfide desorption. Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1500.                         | OSHA: 200 ppm<br>300 ppm (Ceiling)<br><br>ACGIH: 50 ppm (skin)<br><br>NIOSH: 100 ppm<br>150 ppm STEL<br><br>IDLH: 500 ppm | Adequate - Odor threshold 1.6 ppm is considered good. Can use air-purifying respirator with organic vapor cartridge up to 1,000 ppm.<br><br>Recommended gloves: Teflon >15.00 hrs; Viton >16.00 hrs; silver shield >6.00 hrs; supported nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection); PV alcohol >25.00 hrs                            | Boiling Pt: 232°F; 111°C<br>Melting Pt: -139°F; -95°C<br>Solubility: 0.05% (61°F; 16°C)<br>Flash Pt: 40°F; 4°C<br>LEL/LFL: 1.2%<br>UEL/UFL: 7.1%<br>Vapor Density: 3.14<br>Vapor Pressure: 20 mmHg @ 65°F; 18°C<br>Specific Gravity: 0.87<br>Incompatibilities: Strong oxidizers<br>Appearance and odor: Colorless liquid with a sweet pungent aromatic odor.              | Overexposure to this substance may result in mild to moderate irritation at all points of contact, and CNS changes including euphoria, confusion, nervousness, and possibly paresthesia characterized by an abnormal burning sensation, pricking, or numbness. At 200-500 ppm exposure has resulted in headaches, nausea, eye irritation, loss of appetite, bad taste, impair coordination, fatigue, and weariness. Chronically, toluene overexposure may result in dermatitis, liver, and kidney damage. |

6-3

CTO 003

Revision 0  
 September 2005

**TABLE 6-1  
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA**

| Substance                           | CAS No.   | Air Monitoring/Sampling Information   | Exposure Limits  | Warning Property Rating  | Physical Properties   | Health Hazard Information  |   |
|-------------------------------------|-----------|---|--|--|---|--|---|
| Xylene<br>All isomers<br>o-, m-, p- | 1330-20-7 | PID: I.P. 8.56 eV,<br>High response with<br>PID and 10.2 eV<br>lamp.<br><br>FID: 110% response<br>with FID. | Air sample using<br>charcoal tube;<br>carbon disulfide<br>desorption;<br>GC/FID detection.<br>Sampling and<br>analytical protocol<br>shall proceed in<br>accordance with<br>OSHA 07, or<br>NIOSH Method<br>1500. | ACGIH, & NIOSH:<br>100 ppm,<br>150 ppm STEL<br><br>OSHA:<br>100 ppm<br><br>IDLH: 900 ppm | Adequate - Odor thresholds for the<br>following isomers: 0.6 m-; 5.4 p-; 20<br>o- ppm. Can use air-purifying<br>respirator with organic vapor<br>cartridge up to 1,000 ppm<br>concentrations.<br><br>Recommended gloves:<br>PV Alcohol >12.67 hrs; Viton >8.00<br>hrs; CPE >1.00 hr; Butyl 0.87 hrs;<br>Nitrile is acceptable for limited<br>operations and contact (>0.20 hrs) | Boiling Pt: 269-281°F; 132-138°C<br>Melting Pt: -130/-54m/56p°F;<br>-25o/-48m/13p °C<br>Solubility: 0.02 %<br>Flash Pt: 81-90°F; 27-32°C<br>LEL/LFL: 0.9%<br>UEL/UFL: 7.0%<br>Vapor Density: 3.66<br>Vapor Pressure: 7-9 mmHg @ 70°F;<br>21°C<br>Specific Gravity: 0.86-0.88<br>Incompatibilities: Strong oxidizers and strong<br>acids<br>Appearance and odor: Colorless liquid with an<br>aromatic odor. | Effects may of overexposure<br>include irritation at all points of<br>contact, CNS changes (i.e.<br>dizziness, excitement,<br>drowsiness, incoherent,<br>staggering gait), difficulty in<br>breathing, pulmonary edema,<br>and possibly respiratory<br>failure.<br><br>Chronic effects may include<br>dermatitis and cornea<br>vacuolization. |

## 6.2 PHYSICAL HAZARDS

The physical hazards that may be present during the performance of site activities are summarized below:

- Slips, trips, and falls
- Energized systems (contact with underground or overhead utilities)
- Lifting (strain/muscle pulls)
- Noise exceeding 85 decibels (dBAs)
- Ambient temperature extremes (heat or cold stress)
- Eye and foot hazards
- Flying projectiles
- Pinches and compressions
- Contact with sharp objects (glass, metal, etc.)
- Vehicular and foot traffic

These physical hazards are discussed in Table 5-1 as applicable to each site task. Furthermore, many of these hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual. Specific discussion on some of these hazards are presented below.

### 6.2.1 Energized Systems (Contact with Underground or Overhead Utilities)

Underground utilities such as pressurized lines, water lines, telephone lines, buried utility lines, and high voltage power lines are known to be present throughout the facility. Clearance of underground and overhead utilities for each sample location will be the responsibility of the NAS JRB Willow Grove Civil Works Division. All work must be consistent with the SOP For Utility Locating and Excavation Clearance (See Attachment III of this HASP).

#### **Pennsylvania One Call**

In Pennsylvania the law requires you to call Pennsylvania One-Call at least three but no more than 10 business days before you dig (even with a shovel). Pennsylvania One-Call is a free utility locating service for homeowners and contractors throughout Pennsylvania. Within three business days of your call, the location of underground utilities will be marked. Call 1-800-272-1000 before you dig.

- TtNUS personnel will mark subsurface investigation points using white paint, pin flags, or wooden hubs or stakes.

- Drawings with the locations and request for utility clearance will be submitted to NASJRB Willow Grove Civil Works Division who will conduct the utility clearance and issue the permit.
- Ana and all utilities marked within 3' of a subsurface point will require the point to be relocated or field personnel to dig by hand until past the utility.

### 6.2.2 Ambient Temperature Extremes

Overexposure to high or low ambient temperatures (heat or cold stress) may exist during performance of this work depending on the project schedule. Work performed when ambient temperatures exceed 70°F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additionally, work load and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. Work performed when ambient temperatures are below 40°F may result in varying levels of cold stress (tremors, frostbite, wind burn, etc.) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additional information such as Work-Rest Regimens and personnel monitoring may be found in Section 4.0 of the Health and Safety Guidance Manual. The SSO will recommend additional heat or cold stress control measures as they are deemed necessary per American Conference of Governmental Industrial Hygienists (ACGIH) guidelines.

## 6.3 NATURAL HAZARDS

### 6.3.1 Insect/Animal Bites and Stings, Poisonous Plants, etc.

Contact with poisonous plants and bites or stings from poisonous insects are other natural hazards that must be considered. All site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful because severe illness and death may result from allergic reactions. As with a medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SSO must be notified.

#### Ticks

During warm months (spring through early fall), tick-borne Lyme Disease may pose a potential health hazard. The longer a disease-carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots) as well as performing frequent body checks will prevent long-term attachment. Site first aid kits should be equipped with medical forceps and

rubbing alcohol to assist in tick removal. If the evidence of the problem is persistent personnel will be required to tape pant legs to boots to deny entry, as well as, use insect repellent (Permanone) on shoe or boots, pant legs, pants to shirt seams to control access. If conditions of heat stress are not prevalent, the use of Tyvek with taped pant legs may be recommended as the light color of the coveralls makes detection easier. For information regarding tick removal procedures and symptoms of exposure consult Section 4.0 of the Health and Safety Guidance Manual.

### **West Nile Virus**

West Nile Virus (WNV) can spread to people and animals through the bite of an infected mosquito. Mosquitoes acquire the virus from infected birds. Infected mosquitoes then transmit the West Nile virus to humans and animals when biting (or taking a blood-meal). West Nile encephalitis is NOT transmitted from person-to-person. There is no evidence that a person can get the virus from handling live or dead infected birds. However, avoid bare-handed contact when handling any dead animals, including dead birds. Ticks have not been implicated as vectors of West Nile-like virus.

Prior to the detection of the virus in New York City, the virus, which can cause the brain infection encephalitis, WNV was found only in Africa, Eastern Europe and West Asia. Mild infections are common and include fever, headache, and body aches, often with skin rash and swollen lymph glands. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions, paralysis and, rarely, death (especially in the elderly and very young). The incubation period of West Nile encephalitis is usually 3 to 12 days. There is no specific therapy or vaccine against West Nile encephalitis. The vast majority of people who are bitten by an infected mosquito will develop only mild symptoms, if any.

### **Precautions**

- 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 to exposed skin according to manufacturer instruction. 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 Inclement Weather**

The majority of the project tasks will be performed outdoors. As a result, inclement weather may be encountered. If adverse weather (e.g., electrical storms, hurricanes, etc.) conditions arise, the FOL and/or SSO will temporarily suspend or terminate activities until hazardous conditions cease.

## 7.0 HAZARD MONITORING

Direct reading instruments will be used at the site to detect and evaluate the presence of some of the 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 hazards and tasks of an identified operation. Additionally Section 1.0, the Health and Safety Guidance Manual contains detailed information regarding direct reading instrumentation, the operators manual should be included with the instrument and is your best source of information on the instrument as well as the calibration procedures for that instrument.

### 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 Flame Ionization Detector

To accurately monitor for substances that may present an exposure potential to site personnel, a Flame Ionization Detector [FID] will be used. A FID tends to handle the longer chained aliphatic hydrocarbons more efficiently than its FID counterpart and would be selected as the instrument of choice. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during site activities. The FID has been selected because it is capable of detecting the organic vapors of concern. This instrument will not detect PCB's.

Before starting field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from areas of potential contamination. These readings, influencing conditions (weather, temperature, humidity, etc.), 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 in which hazard monitoring will be performed as well as the action levels that will initiate the use of elevated levels of protection. The SSO may decide to increase these frequencies based on instrument responses and site observations. The frequency in which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

## 7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TiNUS Equipment Manager or supplying vendor. Operational checks and field calibration will be performed on instruments each day before 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 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 SOP (copies of which are provided with the instrument). All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that 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
- Relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Relevant comments or remarks

## 7.3 DOCUMENTING INSTRUMENT READINGS

The SSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SSO is also responsible for ensuring that all instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. **This includes the requirement for documenting instrument readings that indicate no elevated readings above noted daily background levels (i.e., no-exposure readings).** At a minimum, the SSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used (e.g., FID, LEL/O<sub>2</sub> meter, etc.)
- Personnel present at the area where the reading was noted

- Other conditions that are considered relevant to the SHSO (such as weather conditions, possible instrument interferences, etc.)

#### **7.4 CYLINDER SAFETY**

If the FID is used, it requires refilling onsite from a hydrogen cylinder. Because hydrogen is a flammable gas, certain precautions must be observed when refilling the FID. See Attachment VI of this HASP.



## 8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

### 8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

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

#### 8.1.1 Requirements for TtNUS and Subcontractor Personnel

All TtNUS and subcontractor personnel must complete 40 hours of introductory hazardous waste site training before working at the Privet Road Compound and Fire Training Area at NASJRB Willow Grove. Additionally, personnel who have had introductory training more than 12 months before site work must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel.

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

TtNUS will conduct a pre-activities training session before 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 will be held to discuss the operations completed and problems encountered. This activity will be supported through the use of Safe Work Permits (See Section 10.10).

**Figure 8-1**

**Training Letter**

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

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

Month, day, year

Mr. Russell Turner  
Project Manager  
Tetra Tech NUS, Inc.  
600 Clark Avenue, Suite 3  
King of Prussia, PA 19406-1433

Subject: HAZWOPER Training for NAS JRB Willow Grove, Pennsylvania

Dear Mr. Turner:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 1926.

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

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

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

Sincerely,

(Name and Title of Company Officer)

## 8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to site personnel who will perform work on this project. Site-specific training will also be provided to other personnel [U.S. Department of Defense (DoD), Environmental Protection Agency (EPA), etc.] who may enter the site to perform functions that may or may not be directly related to site operations. Site-specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present onsite
- Use of PPE
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the HASP
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of the contents of relevant MSDSs
- Review of Safe Work Permits

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

## 8.3 MEDICAL SURVEILLANCE

### 8.3.1 Medical Surveillance Requirements for TtNUS Personnel

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

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



### **8.3.2 Medical Surveillance Requirements for Subcontractors**

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

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

### **8.3.3 Requirements for All Field Personnel**

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

### **8.4 SUBCONTRACTOR EXCEPTIONS**

Subcontractors who will not enter the exclusion zone during operation and whose activities involve no potential for exposure to site contaminants will not be required to meet the requirements for training/medical surveillance other than site-specific training as stipulated in Section 8.2. Exemptions must be approved by the TtNUS HSM.

Figure 8-3

Subcontractor Medical Approval Form

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

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

**Part A**

The above-named individual has:

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

- qualified to perform work at the NAS JRB Willow Grove work site
- not qualified to perform work at the NAS JRB Willow Grove work site

and,

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

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

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

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

**Part B**

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

and have determined the following information:

Figure 8-3

Subcontractor Medical Approval Form (continued)

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

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

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

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

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

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

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

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

- may  
 may not

perform his/her assigned task.

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

Address \_\_\_\_\_

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

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

\_\_\_\_\_

Address

**Figure 8-4**

**Medical Surveillance Letter**

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

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

Month, day, year

Mr. Russell Turner  
Project Manager  
Tetra Tech NUS, Inc.  
600 Clark Avenue, Suite 3  
King of Prussia, PA 19406-1433

Subject: Medical Surveillance for NAS JRB Willow Grove, Pennsylvania

Dear Mr. Turner:

As an officer of XYZ Corporation, I hereby state that the persons listed below participated 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, titled "Hazardous Waste Operations and Emergency Response." I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared by a licensed physician to perform hazardous waste site work and to wear positive- and negative-pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working at the NAS JRB Willow Grove, Pennsylvania site.

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

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

Sincerely,

(Name and Title of Company Officer)

## **9.0 SPILL CONTAINMENT PROGRAM**

### **9.1 SCOPE AND APPLICATION**

It is anticipated that quantities of bulk potentially hazardous materials (greater than 55 gallons) will not be handled during site activities conducted as part of the scope of work. Significant quantities of waste water (decontamination, purge, and development) and Investigative-Derived Waste (IDW) will not be generated as part of site activities. It is not anticipated that spillage of these materials would constitute a significant danger to human health or the environment. Disposable PPE and other nonreusable items and other unwanted items generated during investigation activities will be disposed of as municipal waste.

### **9.2 POTENTIAL SPILL AREAS**

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

- Areas used for central staging of resources
- Areas used for central staging of IDW materials
- Areas where heavy equipment is used
- Decontamination area

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

### **9.3 LEAK AND SPILL DETECTION**

To establish an early detection of potential spills or leaks, periodic inspections by the SSO will be conducted during working hours to visually determine that containers are not leaking.

### **9.4 PERSONNEL TRAINING AND SPILL PREVENTION**

All personnel will be instructed on the procedures for spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and/or the SSO will serve as the Spill Response Coordinator for this operation, if necessary.

## 9.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the types of equipment that may be maintained at the staging area for the purpose of supporting this Spill Prevention/Containment Program.

- Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry);
- Drums (55-gallon U.S. DOT 17-E or 17-H; UN1A2)
- Shovels, rakes, and brooms
- Labels

## 9.6 SPILL CONTROL PLAN

This section describes the procedures the TtNUS field crewmembers will use when detecting a spill or leak.

- 1) Notify the SSO or FOL immediately.
- 2) Take immediate actions to stop the leak or spill by plugging or patching the drum or raising the leak to the highest point. Spread the absorbent material in the area of the spill covering completely.
- 3) Transfer the material to a new container, and collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment or disposal options.
- 4) All spills on permeable surfaces (soils) will be recontainerized with 2 inches of top cover and await test results for treatment or disposal options.

It is not anticipated that a spill will occur that the field crews cannot handle. Should this occur, however, the FOL or SSO will notify the NAS JRB Willow Grove Emergency Coordinator who will notify the appropriate emergency response agencies.

## 10.0 SITE CONTROL

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

### 10.1 EXCLUSION ZONE

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

#### 10.1.1 Exclusion Zone Clearance

Before the initiation of site activities, utility locations will be identified following the guidance provided in the TtNUS SOP For Utility Locating and Excavation Clearance (see Attachment III). The positions of identified utilities will be field located and staked to minimize the potential for damage during intrusive activities. Sample locations can be located to avoid buried utilities. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Table 2-1 will be notified.

- DPT Operations. Height of the mast + 5 feet or 25 feet whichever is greater.
- 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.

- Groundwater, sediment, and surface water sampling. The exclusion zone for this activity will be set at 10 feet surrounding the monitoring well or sampling location.

- IDW area will be delineated. Only authorized personnel should be allowed access.

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

## **10.2 CONTAMINATION REDUCTION ZONE**

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

## **10.3 SUPPORT ZONE**

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

## **10.4 SITE VISITORS**

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

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (PADEP, EPA, OSHA, etc.)
- NAS JRB Willow Grove personnel
- Other authorized visitors

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

Upon gaining access to the site, site visitors wishing to observe operations in progress will be escorted by a TtNUS representative (arranged for by the FOL) and shall be required to meet the minimum requirements discussed below:

- All site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), the entity which they represent, and the purpose of the visit.
- All site visitors will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training (40 hours of HAZWOPER training) and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items, they will be permitted to enter the operational zone. All visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. Visitors not meeting the requirements stipulated in this plan will not be permitted to enter the site operational zones during planned activities. Incidences of unauthorized site visitation will cause the termination of onsite activities until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from the FOL, SSO, or on-site security personnel.

#### **10.5 SITE SECURITY**

Site security will be accomplished using existing NAS JRB Willow Grove security resources and procedures, supplemented by TtNUS or subcontractor personnel, if necessary. TtNUS will retain control over active operational areas. The first line of security will take place at the base boundaries restricting the general public. The second line of security will take place at the work site referring interested parties to the FOL. The FOL will serve as a focal point for site personnel and will serve as the final line of security and the primary enforcement contact.

#### **10.6 SITE MAPS**

Once the areas of contamination, access routes, utilities, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. These maps will show

utility locations, potential points of contact with the public, roadways, and other significant characteristics that may impact site operations and safety. Site maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

#### **10.7 BUDDY SYSTEM**

Personnel engaged in onsite activities will practice the "buddy system" to ensure the safety during this operation.

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

TtNUS and subcontractor personnel will provide MSDSs for chemicals brought onsite. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances before an actual use or application of the substances onsite. A chemical inventory of chemicals used onsite will be developed using Section 5.0 of the Health and Safety Guidance Manual. The MSDSs will then be maintained in a central location and will be available for anyone to review on request.

#### **10.9 COMMUNICATION**

As TtNUS personnel may not be working in close proximity to each other at NAS JRB Willow Grove a combination of communication methods will be used. Two-way radios, cellular and conventional telephone, hand signals, voice commands, and line of site will provide be utilized when most appropriate. All radio frequency transmitting devices, including cell phones and two way radios, must be approved by NAS JRB Willow Grove Radio Shop. All units cleared for Hazards of Electromagnetic Radiation to Ordinance (HERO) will be labeled as safe. Only these devices will be permitted in the Privet Road Compound and Fire Training Area.

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

#### **10.10 SAFE WORK PERMITS**

All exclusion zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task-by-task basis. An example of the Safe Work Permit to be used is illustrated in Figure 10-1. The daily meetings conducted during their generation will further support these

work permits. This effort will ensure site-specific considerations and changing conditions are incorporated into the planning effort.

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

The FOL and/or the SSO will be responsible for completing the Safe Work Permit and issuing them to the appropriate parties. Site personnel at the end of each designated period will turn in the permit(s) used for that day to the SSO. All permits will be maintained as part of the permanent project files attesting to safety and health measures used for a given task at a given time and place. Problems encountered with the protective measures required should be documented on the permit and brought to the attention of the SSO.

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**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 include \_\_\_\_\_  
 \_\_\_\_\_

**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 |
|--------------------------|-------------------|-----------------|-------------------|
| _____                    | _____             | _____           | _____             |
| _____                    | _____             | _____           | _____             |
| _____                    | _____             | _____           | _____             |

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

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

**VII. Additional Safety Equipment/Procedures**

|                                  |  |                                    |  |
|----------------------------------|--|------------------------------------|--|
| Hard-hat.....                    | <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 - _____).....         | <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"/> 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, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

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

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

## 11.0 CONFINED SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces.**

**A confined space is defined as a space that has one or more of the following characteristics:**

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

**A Permit-Required Confined Space is a space that has one or more of the following characteristics:**

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

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

## 12.0 MATERIALS AND DOCUMENTATION

The TiNUS 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
- MSDSs for chemicals brought onsite, including decon solutions, fuels, lime, 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 in which 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 onsite, including decontamination solutions, sample preservations, fuel, etc. This list should be posted in a central area.

**Mat rial Safety Data Sheets (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 onsite. 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.

**Sit 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 phone communications points and in each site vehicle.

**Medical Data Sheets/Cards (maintained)** - Medical Data Sheets will be completed by onsite personnel and filed in a central location. The Medical Data Sheet will accompany an 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 carry with them.

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

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

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

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

## 13.0 GLOSSARY

|                   |   |
|-------------------|---|
| ACGIH             | American Conference of Governmental Industrial Hygienists |
| APR               | Air Purifying Respirator                                  |
| BETX              | Benzene, Ethylbenzene, Toluene, Xylene                    |
| BGS               | Below Ground Surface                                      |
| C Degrees         | Centigrade  |
| CFR               | Code of Federal Regulations                               |
| CIH               | Certified Industrial Hygienist                            |
| CNS               | Central Nervous System                                    |
| CRZ               | Contamination Reduction Zone                              |
| CSP               | Certified Safety Professional                             |
| dBA               | Decibel   |
| DOD               | Department of Defense                                     |
| DOT               | Department of Transportation                              |
| DPT               | Direct Push Technology                                    |
| EPA               | Environmental Protection Agency                           |
| eV                | electron Volts  |
| F Degrees         | Fahrenheit  |
| FID               | Flame Ionization Detector                                 |
| FOL               | Field Operations Leader                                   |
| GC                | Gas Chromatograph   |
| HASP              | Health and Safety Plan                                    |
| HAZWOPER          | Hazardous Waste Operations and Emergency Response         |
| HEPA              | High Efficiency Particulate Air                           |
| HSM               | Health and Safety Manager                                 |
| IARC              | International Agency for Research on Cancer               |
| IAS               | Initial Assessment Study                                  |
| IDW               | Investigative Derived Waste                               |
| IP                | Ionization Potential                                      |
| LEL               | Lower Explosive Limit                                     |
| LFL               | Lower Flammable Limit                                     |
| mg/m <sup>3</sup> | Milligrams per cubic meter                                |
| mmHg              | millimeters mercury                                       |
| MSDS              | Material Safety Data Sheet                                |
| msl               | mean sea level  |
| NAS JRB           | Naval Air Station Joint Reserve Base                      |

|       |  |
|-------|--|
| NIOSH | National Institute of Occupational Safety and Health                     |
| OSHA  | Occupational Safety and Health Administration (U.S. Department of Labor) |
| PA    | Pennsylvania   |
| PHSO  | Project Health and Safety Officer  |
| PPE   | Personal Protective Equipment  |
| PPM   | Parts per Million  |
| PVC   | Polyvinyl Chloride   |
| RCRA  | Resource Conservation and Recovery Act                                   |
| SAR   | Supplied Air Respirator  |
| SI    | Site Investigation   |
| SCBA  | Self Contained Breathing Apparatus                                       |
| SOP   | Standard Operating Procedure   |
| SSO   | Site Safety Officer  |
| STEL  | Short Term Exposure Limit  |
| SVOC  | Semivolatile Organic Compound  |
| TAL   | Target Analyte List  |
| TCL   | Target Compound List   |
| TPH   | Total Petroleum Hydrocarbons   |
| TINUS | Tetra Tech NUS, Inc.   |
| UEL   | Upper Explosive Limit  |
| UFL   | Upper Flammable Limit  |
| VOC   | Volatile Organic Compound  |

# **ATTACHMENT I**

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

## **TETRA TECHNUS, INC.**

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

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

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

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

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

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

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

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

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

---

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

**WHAT IS COVERED:**

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



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

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

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

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

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

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

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

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

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

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

Information Regarding Injured or Ill Employee

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

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

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

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

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

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

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

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

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

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

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**  
**MEDICAL DATA SHEET**

**MEDICAL DATA SHEET**

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

Project \_\_\_\_\_

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

Address \_\_\_\_\_

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

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

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

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

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

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

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

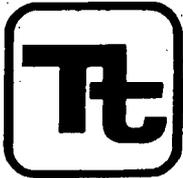
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**ATTACHMENT III**

---

**UTILITY LOCATING  
AND  
EXCAVATION CLEARANCE**



TETRA TECH NUS, INC.

# STANDARD OPERATING PROCEDURES

|                |                                |          |         |
|----------------|--------------------------------|----------|---------|
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| Effective Date | 12/03                          | Revision | 2       |
| Applicability  | Tetra Tech NUS, Inc.           |          |         |
| Prepared       | Health & Safety                |          |         |
| Approved       | D. Senovich <i>[Signature]</i> |          |         |

Subject  
UTILITY LOCATING AND EXCAVATION CLEARANCE

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## 1.0 PURPOSE

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

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

## 2.0 SCOPE

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

## 3.0 GLOSSARY

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

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

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

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

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

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

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#### 4.0 RESPONSIBILITIES

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

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

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

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

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

#### 5.0 PROCEDURES

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

##### 5.1 Buried Utilities

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

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

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

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

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

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

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## 5.2 Overhead Power Lines

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

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

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

## 6.0 UNDERGROUND LOCATING TECHNIQUES

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

### 6.1 Geophysical Methods

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

#### **Electromagnetic Induction**

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

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

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

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## Magnetics

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

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

## Ground Penetrating Radar

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

### 6.2 Passive Detection Surveys

#### Acoustic Surveys

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

#### Thermal Imaging

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

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

### 6.3 Intrusive Detection Surveys

#### Vacuum Excavation

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

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

### Hand Excavation

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

### Tile Probe Surveys

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

## 7.0 INTRUSIVE ACTIVITIES SUMMARY

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

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

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

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

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

**8.0 REFERENCES**

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

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



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

**ONE-CALL SYSTEMS INTERNATIONAL  
CONDENSED DIRECTORY**

- |  |  |   |
|--|--|---|
| <b>Alabama</b><br>Alabama One-Call<br>1-800-292-8525   | <b>Iowa</b><br>Iowa One-Call<br>1-800-292-8989   | <b>New Jersey</b><br>New Jersey One Call<br>1-800-272-1000  |
| <b>Alaska</b><br>Locate Call Center of Alaska, Inc.<br>1-800-478-3121  | <b>Kansas</b><br>Kansas One-Call System, Inc.<br>1-800-344-7233  | <b>New Mexico</b><br>New Mexico One Call System, Inc.<br>1-800-321-2537<br>Las Cruces- Dona Ana Blue Stakes<br>1-888-526-0400         |
| <b>Arizona</b><br>Arizona Blue Stake<br>1-800-782-5348   | <b>Kentucky</b><br>Kentucky Underground Protection Inc.<br>1-800-752-6007  | <b>New York</b><br>Dig Safely New York<br>1-800-882-7962<br>New York City- Long Island One Call Center<br>1-800-272-4480              |
| <b>Arkansas</b><br>Arkansas One Call System, Inc.<br>1-800-482-8998  | <b>Louisiana</b><br>Louisiana One Call System, Inc.<br>1-800-272-3020  | <b>North Carolina</b><br>The North Carolina One-Call Center, Inc.<br>1-800-632-4948   |
| <b>California</b><br>Underground Service Alert North<br>1-800-227-2600<br>Underground Service Alert of Southern California<br>1-800-227-2600   | <b>Maine</b><br>Dig Safe System, Inc.<br>1-888-344-7233  | <b>North Dakota</b><br>North Dakota One-Call<br>1-800-785-0555  |
| <b>Colorado</b><br>Utility Notification Center of Colorado<br>1-800-922-1987   | <b>Maryland</b><br>Miss Utility<br>1-800-257-7777<br>Miss Utility of Delmarva<br>1-800-282-8555                          | <b>Ohio</b><br>Ohio Utilities Protection Service<br>1-800-362-2764<br>Oil & Gas Producers Underground Protect'n Svc<br>1-800-925-0988 |
| <b>Connecticut</b><br>Call Before You Dig<br>1-800-922-4456  | <b>Massachusetts</b><br>Dig Safe System, Inc.<br>1-888-344-7233  | <b>Oklahoma</b><br>Call Okla<br>1-800-522-6543  |
| <b>Delaware</b><br>Miss Utility of Delmarva<br>1-800-282-8555  | <b>Michigan</b><br>Miss Dig System, Inc.<br>1-800-482-7171   | <b>Oregon</b><br>Oregon Utility Notification Center/One Call Concepts<br>1-800-332-2344   |
| <b>Florida</b><br>Sunshine State One-Call of Florida, Inc.<br>1-800-432-4770   | <b>Minnesota</b><br>Gopher State One Call<br>1-800-252-1168  | <b>Pennsylvania</b><br>Pennsylvania One Call System, Inc.<br>1-800-242-1776   |
| <b>Georgia</b><br>Underground Protection Center, Inc.<br>1-800-282-7411  | <b>Mississippi</b><br>Mississippi One-Call System, Inc<br>1-800-227-6477   | <b>Rhode Island</b><br>Dig Safe System, Inc.<br>1-888-344-7233  |
| <b>Hawaii</b><br>Underground Service Alert North<br>1-800-227-2600   | <b>Missouri</b><br>Missouri One-Call System, Inc.<br>1-800-344-7483  | <b>South Carolina</b><br>Palmetto Utility Protection Service Inc.<br>1-888-721-7877   |
| <b>Idaho</b><br>Dig Line Inc.<br>1-800-342-1585<br>Kootenai County One-Call<br>1-800-428-4950<br>Shoshone - Benawah One-Call<br>1-800-398-3285 | <b>Montana</b><br>Utilities Underground Protection Center<br>1-800-424-5555<br>Montana One Call Center<br>1-800-551-8344 | <b>South Dakota</b><br>South Dakota One Call<br>1-800-781-7474  |
| <b>Illinois</b><br>JULIE, Inc.<br>1-800-892-0123<br>Digger (Chicago Utility Alert Network)<br>312-744-7000                                     | <b>Nebraska</b><br>Diggers Hotline of Nebraska<br>1-800-331-5666   | <b>Tennessee</b><br>Tennessee One-Call System, Inc.<br>1-800-351-1111   |
| <b>Indiana</b><br>Indiana Underground Plant Protection Service<br>1-800-382-5544   | <b>Nevada</b><br>Underground Service Alert North<br>1-800-227-2600   |   |
|  | <b>New Hampshire</b><br>Dig Safe System, Inc.<br>1-888-344-7233  |   |

|   |                      |                             |
|---|----------------------|-----------------------------|
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**ATTACHMENT 1 (Continued)**

**Texas**

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

**Utah**

Blue Stakes of Utah  
1-800-662-4111

**Vermont**

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

**Virginia**

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

**Washington**

Utilities Underground Location Center  
1-800-424-5555  
Northwest Utility Notification Center  
1-800-553-4344  
Inland Empire Utility Coordinating  
Council  
509-466-8000

**West Virginia**

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

**Wisconsin**

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

**Wyoming**

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

**District of Columbia**

Miss Utility  
1-800-257-7777

**Alberta**

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

**British Columbia**

BC One Call  
1-800-474-6886

**Ontario**

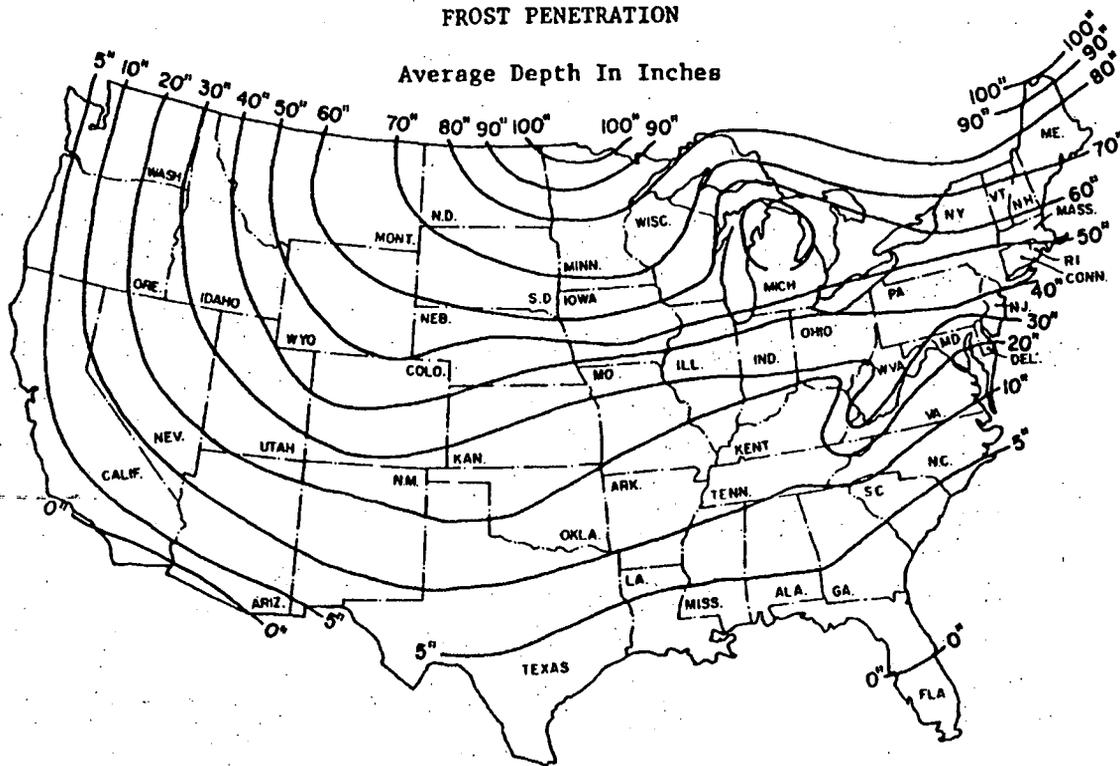
Ontario One-Call System  
1-800-400-2255

**Quebec**

Info-Excavation  
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

**ATTACHMENT 3  
UTILITY CLEARANCE FORM**

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

1. **Underground Utilities** Circle One
- a) Review of existing maps? yes no N/A
  - b) Interview local personnel? yes no N/A
  - c) Site visit and inspection? yes no N/A
  - d) Excavation areas marked in the field? yes no N/A
  - e) Utilities located in the field? yes no N/A
  - f) Located utilities marked/added to site maps? yes no N/A
  - g) Client contact notified yes no N/A  
 Name \_\_\_\_\_ Telephone: \_\_\_\_\_ Date: \_\_\_\_\_
  - g) State One-Call agency called? yes no N/A  
 Caller: \_\_\_\_\_  
 Ticket Number: \_\_\_\_\_ Date: \_\_\_\_\_
  - h) Geophysical survey performed? yes no N/A  
 Survey performed by: \_\_\_\_\_  
 Method: \_\_\_\_\_ Date: \_\_\_\_\_
  - i) Hand excavation performed (with concurrent use of utility  
 detection device)? yes no N/A  
 Completed by: \_\_\_\_\_  
 Total depth: \_\_\_\_\_ feet Date: \_\_\_\_\_
  - j) Trench/excavation probed? yes no N/A  
 Probing completed by: \_\_\_\_\_  
 Depth/frequency: \_\_\_\_\_ Date: \_\_\_\_\_
2. **Overhead Utilities** Present Absent
- a) Determination of nominal voltage yes no N/A
  - b) Marked on site maps yes no N/A
  - c) Necessary to lockout/insulate/re-route yes no N/A
  - d) Document procedures used to lockout/insulate/re-route yes no N/A
  - e) Minimum acceptable clearance (SOP Section 5.2): \_\_\_\_\_

3. Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Approval: \_\_\_\_\_ Date: \_\_\_\_\_  
 Site Manager/Field Operations Leader c: PM/Project File  
Program File

|   |                  |                         |
|---|------------------|-------------------------|
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**ATTACHMENT 4  
OSHA LETTER OF INTERPRETATION**

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

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

Dear Mr. Caldwell:

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

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

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

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

**Answer**

Background

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

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

Paragraph (b)(3) provides:

|   |                  |                         |
|---|------------------|-------------------------|
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#### ATTACHMENT 4 (Continued)

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

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

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

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

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

#### Non-conductive hand tools are permitted

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

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

|  |                  |                         |
|--|------------------|-------------------------|
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**ATTACHMENT 4 (Continued)**

Hydro-vacuum excavation

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

Other technologies

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

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

Sincerely,

Russell B. Swanson, Director  
Directorate of Construction

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

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

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**SAFE WORK PERMIT FOR  
WELL MAINTENANCE  
NAS JRB, WILLOW GROVE**

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

**I. Work limited to the following (description, area, equipment used):** Well maintenance and repair

**II. Primary Hazards:** Potential hazards associated with this task include: lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic, insect/animal bites, stings, poisonous plants 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** **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>None expected during this task</u>             |                   |                 |                   |
| <b>Primary Route(s) of Exposure/Hazard:</b> _____ |                   |                 |                   |

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

**VII. Additional Safety Equipment/Procedures**

|   |   |
|---|---|
| Hard-hat..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                     | Hearing Protection (Plugs/Muffs)..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No               | Safety belt/harness..... <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      | Radio/Cellular Phone..... <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                | Barricades..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                       |
| Splash suits/coveralls..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No       | Gloves (Type -Cotton)..... <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 checked="" 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 checked="" 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 checked="" type="checkbox"/> No        | Other..... <input type="checkbox"/> Yes <input type="checkbox"/> No                                       |
| Modifications/Exceptions: _____   |   |

**VIII. Site Preparation**

|  | Yes                      | No                       | NA                                  |
|--|--------------------------|--------------------------|-------------------------------------|
| Utility Locating and Excavation Clearance completed.....                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place..... | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Physical Hazards Identified and Isolated (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:** Installation and maintenance of Well Pressure Plugs. Install plugs and pressurize to 15lbs. compressed air. Do not place face over well opening and follow cylinder safety procedures in Attachment VI of the HASP.

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

**SAFE WORK PERMIT  
DECONTAMINATION  
NAS JRB WILLOW GROVE  
SITES 1, 3 and 5**

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

I. Work limited to the following (description, area, equipment used): Decontamination at Sites 1, 3 and 5

II. Primary Hazards: Potential hazards associated with this task include; chemical, lifting, noise flying projectiles, struck by, slips, trips, falls 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

Site contaminants include:  
VOC's, SVOC's and PCB's.

Hazard Monitoring

FID or PID with at least  
a 10.6 eV lamp

Action Level(s)

Any sustained readings  
above 5 PPM  
in worker breathing zone

Response Measures

Suspend site activities  
report to an unaffected  
area.

Primary Route(s) of Exposure/Hazard: Inhalation of vapors and dust

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

VII. Additional Safety Equipment/Procedures

Hard-hat.....  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: \_\_\_\_\_

Hearing Protection (Plugs/Muffs).....  Yes  No  
Safety belt/harness.....  Yes  No  
Radio/Cellular Phone.....  Yes  No  
Barricades .....  Yes  No  
Gloves (Type -nitrile outer & inner) ..  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

|   | 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: \_\_\_\_\_

# SAFE WORK PERMIT FOR DPT DRILLING OPERATIONS NAS JRB, WILLOW GROVE

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

- I. **Work limited to the following (description, area, equipment used):** Soil boring using DPT.
- II. **Primary Hazards:** Potential hazards associated with this task include; chemical, lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic; insect/animal bites, stings, poisonous plants and inclement weather, noise.

- 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  |
|---|-------------------|--|--|
| Site contaminants include:<br><u>VOC's, SVOC's and PCB's.</u> | <u>FID</u>        | <u>Any sustained readings above PPM in worker breathing zone</u> | <u>Suspend site activities report to an unaffected area.</u> |
| Primary Route(s) of Exposure/Hazard: <u>None anticipated</u>  |                   |  |  |

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

- VII. **Additional Safety Equipment/Procedures**
- |   |   |
|---|---|
| Hard-hat..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                     | Hearing Protection (Plugs/Muffs)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No               | Safety belt/harness..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No              |
| Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      | Radio/Cellular Phone..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No             |
| Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                | Barricades..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                       |
| Splash suits/coveralls..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No       | Gloves (Type - Surgical Type )..... <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 checked="" 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No     |
| First Aid Kit..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                | Fire Extinguisher..... <input checked="" 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: \_\_\_\_\_

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

- X. **Special instructions, precautions:** Cylinder/Refilling Hazards; Inclement weather; Utility Strikes; Equipment Inspections

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

**SAFE WORK PERMIT FOR  
IDW MANAGEMENT  
NAS JRB, WILLOW GROVE**

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

I. Work limited to the following (description, area, equipment used): IDW Management at Sites 1, 3 and 5.

II. **Primary Hazards:** : Potential hazards associated with this task include: chemical, lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic, insect/animal bites, stings, poisonous plants and inclement weather.

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

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

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 |
|---------------------------------------|-------------------|-----------------|-------------------|
| <u>None expected during this task</u> | _____             | _____           | _____             |

Primary Route(s) of Exposure/Hazard: None

(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 checked="" 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 - Work )..... <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 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 checked="" type="checkbox"/> No       | Other..... <input type="checkbox"/> Yes <input type="checkbox"/> 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, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090*

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for this task. When/where possible use heavy equipment to move and place containers. When placing drums - Place the label and retention ring nut on the outside where it is readily visible. Place 4-drums to a pallet. Maintain a minimum distance of 4-feet between pallet rows. An IDW inventory shall be generated to provide the number of drums, contents, and volumes. This inventory should be provided to the facility contact

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

# SAFE WORK PERMIT FOR MOBILIZATION AND DEMOBILIZATION NAS JRB WILLOW GROVE

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

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

II. Primary Hazards: Potential hazards associated with this task include: lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic, insect/animal bites, stings, poisonous plants 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   | Hazard Monitoring | Action Level(s) | Response Measures |
|--|-------------------|-----------------|-------------------|
| <u>None anticipated given the nature of surveying activities and limited contact w/ media.</u> | _____             | _____           | _____             |

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.....                     | <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 checked="" 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 checked="" 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 checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            | Fire Extinguisher.....                | <input checked="" 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 when working near operating machinery and overhead hazards; Safety glasses when there is a potential for flying projectiles (hammering sawing); High visibility vest when working near traffic patterns; Hearing protection if you have to raise your voice to speak to someone within arms reach.

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: \_\_\_\_\_

**SAFE WORK PERMIT FOR  
SOIL SAMPLING  
NAS JRB, WILLOW GROVE**

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

I. Work limited to the following (description, area, equipment used): Surface and subsurface soil sampling

II. Primary Hazards: : Potential hazards associated with this task include: chemical, lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic, insect/animal bites, stings, poisonous plants and inclement weather, noise.

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                   |
|----------------------------------|-------------------|--------------------------------|-------------------------------------|
| Site contaminants include: _____ | FID _____         | Any sustained readings _____   | Suspend site activities _____       |
| VOC's, SVOC's and PCB's. _____   | _____             | above 1 PPM _____              | report to an unaffected area. _____ |
|                                  |                   | in worker breathing zone _____ |                                     |

Primary Route(s) of Exposure/Hazard: Inhalation of vapors, ingestion and contact

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

**VII. Additional Safety Equipment/Procedures**

|   |  |
|---|--|
| Hard-hat ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                      | Hearing Protection (Plugs/Muffs) ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses ..... <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No     | Safety belt/harness ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No              |
| Chemical/splash goggles ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No       | Radio/Cellular Phone ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No             |
| Splash Shield ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                 | Barricades ..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                       |
| Splash suits/coveralls ..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No        | Gloves (Type - Surgical ) ..... <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 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 checked="" 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 checked="" type="checkbox"/> No         | Other ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                                       |

Modifications/Exceptions: Hard hat when working near DPT Rig, use insect repellent and tape clothing in areas of suspected infestation.

**VIII. Site Preparation**

|   | Yes                      | No                       | NA                                  |
|---|--------------------------|--------------------------|-------------------------------------|
| Utility Locating and Excavation Clearance completed .....                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Physical Hazards Identified and Isolated (Splash and containment barriers) .....            | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" 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, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090*

X. Special instructions, precautions: Prevent Cuts, Lacerations employ geoprobe sampling kit

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

# SAFE WORK PERMIT FOR SURVEYING NAS JRB WILLOW GROVE

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

I. Work limited to the following (description, area, equipment used): Surveying (geographical) sampling locations, and site features.

II. Primary Hazards Potential hazards associated with this task include: lifting, pinch & compressions, slips, trips, falls, ambient temperature extremes, vehicular and foot traffic, insect/animal bites, stings, poisonous plants and inclement weather.

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

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

V. Protective equipment required  Level D  Level B   
 Level C  Level A   
 Respiratory equipment required Yes  Specify on the reverse  
 No

Modifications/Exceptions: Level D Minimum Requirements: Sleeved shirt and long pants and safety footwear.

VI. Chemicals of Concern Hazard Monitoring Action Level(s) Response Measures  
None anticipated given the nature of surveying activities and limited contact w/ potentially contaminated

media.

Primary-Route(s)-of-Exposure/Hazard: None-Anticipated

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

VII. Additional Safety Equipment/Procedures

|                                   |   |                                       |   |
|-----------------------------------|---|---------------------------------------|---|
| Hard-hat.....                     | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Hearing Protection (Plugs/Muffs)..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses .....              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Safety belt/harness.....              | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles.....      | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio/Cellular Phone.....             | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield.....                | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades.....                       | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls .....      | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Cotton ).....          | <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 checked="" type="checkbox"/> No |
| Steel toe work shoes or boots.... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical Resistant Boot Covers .....  | <input type="checkbox"/> Yes <input type="checkbox"/> No            |
| High Visibility vest.....         | <input type="checkbox"/> Yes <input type="checkbox"/> No            | Tape 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Other.....                            | <input type="checkbox"/> Yes <input type="checkbox"/> No            |

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

VIII. Site Preparation

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

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

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

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

**ATTACHMENT V**  
**EQUIPMENT INSPECTION**

## EQUIPMENT INSPECTION

**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., bulldozer, generator)

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

**Safety Guards:**

|   | Yes                      | No                       |
|---|--------------------------|--------------------------|
| - Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| - Hot pipes and surfaces exposed to accidental contact? _____   | <input type="checkbox"/> | <input type="checkbox"/> |
| - All emergency shut offs have been identified and communicated to the field crew? _____  | <input type="checkbox"/> | <input type="checkbox"/> |
| - Have emergency shutoffs been field tested? _____  | <input type="checkbox"/> | <input type="checkbox"/> |
| Results? _____  | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are any structural members bent, rusted, or otherwise show signs of damage? _____   | <input type="checkbox"/> | <input type="checkbox"/> |

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

**Portable Power Tools:**

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

**Cleanliness:**

- Overall condition (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? \_\_\_\_\_

**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? \_\_\_\_\_
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner? \_\_\_\_\_
- Is the operator 21 years of age or more? \_\_\_\_\_

**Identification:**

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

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

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

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

Approved for Use:     Yes             No

**ATTACHMENT VI**  
**CYLINDER SAFETY**

# TETRA TECH NUS

## COMPRESSED GAS CYLINDER SAFETY PROCEDURE

### OBJECTIVE

The objective of this procedure is to minimize the hazards and reduce the risk of injury from the handling, storage and use of compressed gases including:

- Span and Calibration gases
- Hydrogen
- Nitrogen
- Breathing Air

### PURPOSE

The purpose of this procedure is to establish the minimum safety requirements for the handling, use and storage of compressed gasses.

### RESPONSIBILITY

It is the responsibility of the Field Operations Leader (FOL)/ Site Safety Officer (SSO) to assure that all compressed gas cylinders are handled stored and used according to the procedures outlined in this document. Further, the FOL/SSO shall ensure that affected TtNUS personnel are trained in the safe handling procedures for compressed gases present at the site.

### REQUIREMENTS

OSHA requires:

**Each employer shall determine that compressed gas cylinders under his control are in a safe condition to the extent that this can be determined by visual inspection. Visual and other inspections shall be conducted as prescribed in the Hazardous Materials Regulations of the Department of Transportation (49 CFR parts 171-179 and 14 CFR part 103).**

*Each portable container shall be legibly marked with the name "Hydrogen" in accordance with "Marking Portable Compressed Gas Containers to Identify the Material Contained" ANSI Z48.1-1954, which is incorporated by reference as specified in Sec. 1910.6. Each manifolded hydrogen supply unit shall be legibly marked with the name Hydrogen or a legend such as "This unit contains hydrogen."*

*The hydrogen storage location shall be permanently placarded as follows: "HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES," or equivalent.*

The following items will assist Tetra Tech NUS, Inc. field personnel in using and maintaining compressed gas cylinders in a safe manner.

## Storage

| # | Yes | No | Description  |
|---|-----|----|--|
| 1 |     |    | Compressed hydrogen, breathing air, and nitrogen cylinders must be stored <b>outside</b> of buildings and away from doors, windows, electrical lines and building air intakes. |
| 2 |     |    | Compressed gas cylinders must be protected from adverse weather, heat, and any other type of adverse atmosphere.   |
| 3 |     |    | The storage area should be paved and easily accessible to delivery trucks and users.   |
| 4 |     |    | Cylinders must be secured and locked in an upright position with chains or straps and secured to a poll or post  |
| 5 |     |    | Cylinder storage areas must be designed to prevent flame and spark contact with the cylinders.   |
| 6 |     |    | Empty cylinders are to be stored separately from full cylinders, and tagged with surveyor tape.  |
| 7 |     |    | Warning signs must be posted prohibiting open flames within 50 feet of the cylinder.   |

## **Transporting**

When transporting cylinders they must be secured to prevent rolling or cylinder damage. Cylinders shall only be transported in a van or pick-up truck, and only when the valve cap is secured. Department of Transportation (DOT) regulations prohibit TtNUS personnel from transporting compressed gas cylinders on public highways at any time (Eg: transporting cylinders from the vendor location to the work site). Span gases are exempted from this requirement, as they are considered to be in consumer quantity and are not regulated by DOT when transporting the cylinder in a vehicle. Shipment by a common carrier is considered a hazardous shipment and is regulated.

When moving cylinders on the ground use a two-wheeled cart or other material handling equipment specifically designed for that purpose.

## Usage

| # | Yes | No | Description  |
|---|-----|----|--|
| 1 |     |    | A pressure-reducing regulator must be connected to the compressed gas cylinder before usage. The cylinder shut-off valve cannot be used to control the gas discharge rate. |
| 2 |     |    | A pressure relief device must be used with hazardous compressed gases and the pressure relief system must be designed to operate and vent safely.                          |
| 3 |     |    | Cylinders of hydrogen, breathing air and nitrogen must be secured during usage and located in a ventilated area.   |
| 4 |     |    | Operating procedures prohibit the use of oil and grease as lubricants with all system fittings.  |

## **References**

“Safe Handling of Compressed Gases in Containers”, Compressed Gas Association, Arlington, VA 22202.

Handbook of Compressed Gases, Compressed Gas Association, Arlington, VA 22202

Code of Federal Regulations, Title 29 Part 1910, Subpart H.– Hazardous Materials

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