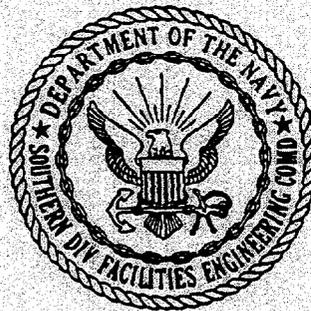


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HEALTH AND SAFETY PLAN FOR REMEDIAL INVESTIGATION/RESOURCE
CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION AND
HYDROGEOLOGICAL EVALUATION AT SITE 45 AND SITE 53 MCRD PARRIS ISLAND SC
3/5/2001
TETRA TECH NUS

Health and Safety Plan
for
**Remedial Investigation/
RCRA Facility Investigation**
and
Hydrogeological Evaluation

Marine Corps Recruit Depot
Parris Island, South Carolina



Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888
Contract Task Orders 0127 - 0150 - 0183

March 2001

HEALTH AND SAFETY PLAN

FOR

**REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION
AND HYDROGEOLOGICAL EVALUATION**

FOR

**SITE/SWMU 45 - SITE/SWMU 53
AND
RECRUIT TRAINING FACILITY**

FOR

**MARINE CORP. RECRUIT DEPOT
PARRIS ISLAND, S.C.
REVISION 0
MARCH, 2001**

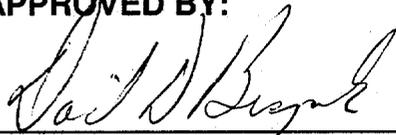
**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT**

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

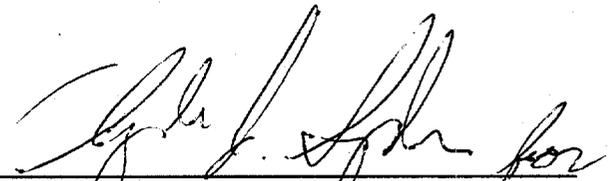
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDERS 0127 - 0150 - 0183**

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1.0 INTRODUCTION

The Health and Safety Plan (HASP) covers site activities that will be conducted at the Marine Corp Recruit Depot (MCRD) at Parris Island, S.C. as part of Contract Task Orders (CTO) 0127, 0150 & 0183. The CTOs directing this Investigation is part of an overall effort conducted under the Comprehensive Long-Term Environmental Action Navy (CLEAN III) administered through the U.S. Navy Southern Division Naval Facilities Engineering Command (NAVFAC) as defined under Contract Number N62467-94-D-0888. All onsite activities performed by the Tetra Tech NUS (TtNUS) subcontractors will comply with the provisions of this Health and Safety Plan.

This HASP must be present at the site during the performance of site activities. The need for these documents to be on-site is established in the Occupational Safety and Health Administration (OSHA) standard "Hazardous Waste Operations and Emergency Response" (HAZWOPER), 29 CFR 1910.120.

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 and site. The HASP will be modified if new information becomes available. All changes to the HASP will be made with the approval of the TtNUS Task Order Manager (TOM). The TOM will notify affected personnel of all changes. A Site Safety Follow-up Report must be completed to document all changes to the HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS employees engaged in onsite activities. These persons will be the primary point of contact for any questions regarding safety and health procedures and the selected control measures.

- The TtNUS TOM is responsible for the overall direction and implementation of this HASP. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- 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.
 - Establishing air monitoring and decontamination procedures.
 - Assigning personal protective equipment 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 site work.
 - Modify this HASP when necessary.
- The Site Safety Officer (SSO) supports site activities by advising the TOM on all aspects of health and safety on site. These duties may include the following:
 - Coordinate all health and safety activities with the FOL.
 - Select, inspect, implement, and maintain personal protective equipment.
 - Establish work zones and control points.
 - Implements air-monitoring program for onsite activities.
 - Verify training and medical status of onsite personnel status in relation to site activities.
 - Implements hazard communication, respiratory protection, and other associated safety and health programs as necessary
 - Coordinates emergency services.
 - Provides site specific training for all onsite personnel.
 - Investigates all accidents and injuries (see Attachment 1 Illness/Injury Procedure and Report Form)
 - Provides input to the PHSO regarding the need to modify, this HASP, or other applicable health and safety associated documents as per site-specific requirements.
- Compliance with the requirements of this HASP are monitored by the SSO and coordinated through the TtNUS CLEAN Health and Safety Manager (HSM).

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: MCRD Parris Island **Address:** Parris Island, S.C.
Remedial Project Manager: Art Sanford **Phone Number:** (843) 820-7482
Site Contact: Tim Harrington **Phone Number:** (843) 228-3423

Purpose of Site Visit: These activities are divided into multi-task operations (see Section 4.0), including surveying, soil borings (hand auger and Direct Push Technology [DPT] methods, hollow-stem auger), multi-media sampling, and other related activities.

Proposed Dates of Work: March 2001

Project Team:

Tetra Tech NUS Personnel:

David Brayack PE

Jason Brown

Gary Gunter PG

TBD

TBD

James K. Laffey

Matthew M. Soltis, CIH, CSP

Discipline/Tasks Assigned:

Task Order Manager (TOM) CTO 0127 & 0150

Task Order Manager (TOM) CTO 0183

Field Operations Leader (FOL)

Site Safety Officer (SSO)

Field Technician

Project Health and Safety Officer (PHSO)

CLEAN Health and Safety Manager (HSM)

Non-TtNUS Environmental Personnel

TBD

Affiliation/Discipline/Tasks Assigned

Drilling Subcontractor

TBD - To be determined

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

James K. Laffey

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section is part of a planning effort to direct and guide field personnel in the event of an emergency. In the event of an emergency that cannot be handled by onsite personnel, site personnel will be evacuated to a safe place of refuge and the appropriate emergency response agencies will be notified. It has been determined that the majority of potential emergency situations would be better supported by outside emergency responders. Therefore, TtNUS will not provide emergency response support for significant emergency events beyond the capabilities of onsite response. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of operations, a factor which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

TtNUS personnel will, through necessary services, include initial response measures for incidents such as:

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

2.2 EMERGENCY PLANNING

From the initial site hazard/risk assessment, injury/illness resulting from exposure to chemical or physical hazards and fire are the most probable emergencies that could occur during site activities. To minimize or eliminate these potential emergency situations, pre-emergency planning activities include the following for which the SSO and/or the FOL are responsible for:

- Coordinating response actions with MCRD Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.
- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:
 - Chemical Inventory (for substances used onsite), with Material Safety Data Sheets.
 - Onsite personnel medical records (Medical Data Sheets).
 - A logbook identifying personnel onsite each day.
 - Emergency notification phone numbers in all site vehicles
- Identifying a chain of command for emergency action.
- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

It is the responsibility of the TtNUS FOL to ensure that this information is available and present at the site.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by worker observation. A clear knowledge of the signs and symptoms of overexposure to contaminants of concern may alert personnel of the potential hazards. These potential hazards, their associated activities, and recommended control measures are discussed in Sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate any conditions that may predispose site personnel or property to an emergency. Site surveys will be conducted at least once a week during the initiation of this effort.

The above actions will provide early recognition for potential emergency situations. Should an incident take place, TtNUS will take defensive and offensive measures to control the situation. However, if the FOL and/or the SSO determine that an incident has progressed to a serious situation, TtNUS will withdraw, and notify appropriate response agencies.

2.3.2 Prevention

TtNUS will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. In the event that an activity or

operation is covered by more than one of the these documents, the most stringent requirement shall apply.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, all personnel will immediately stop activities and report to the TTNUS FOL at the safe refuge area. Safe places of refuge will be determined prior to commencement of site activities and will be conveyed to personnel as part of the daily safety meeting conducted each morning. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the FOL or the on-site Incident Commander of the Emergency Response Team. The FOL or the SSO will take a head count at this location to confirm the location of all site personnel. The site logbook will be used to take the head count. Places of refuge will ideally be selected which offers a point for communication.

2.5 EVACUATION ROUTES AND PROCEDURES

Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services.

Evacuation procedures will be discussed prior to the initiation of any work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) will influence the designation of evacuation routes. As a result, multiple assembly points will be selected at MCRD, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since personnel will be working in close proximity of each other, hand signals, voice commands, air horns, and line of site communication will comprise the mechanisms to alert site personnel of an emergency.

If an emergency incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) via hand signals, voice commands, or vehicle horns.
- Describe to the FOL (who will serve as the Incident Commander) what has occurred and as many details as possible. Once all personnel are evacuated, incipient response procedures will be enacted to control the situation.

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

- Call 911 and report the emergency
- Give the emergency operator the location of the emergency and a brief description of what has occurred.
- Stay on the phone and follow the instructions given by the operator
- The appropriate agency will be notified and dispatched

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

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns, or two-way radio.
- Proceed to the assembly points as directed by MCRD personnel.

2.8 EMERGENCY CONTACTS

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

**TABLE 2-1
EMERGENCY CONTACTS
MCRD, PARRIS ISLAND**

AGENCY	TELEPHONE
EMERGENCY Police, Fire, and Ambulance Services)	911
Beaufort Memorial Hospital	(843) 522-5200
Provost Marshall's Office	(843) 525-2478
Facility Point of Contact Tim Harrington, NREAO	(843) 228-3423
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
TtNUS, Field Operations Leader Gary Gunter	(803) 649-7963
TtNUS, Pittsburgh Office	(412) 921-7090
Task Order Manager for CTOs 0127 & 0150 - David Brayack	(412) 921-8375
Task Order Manager for CTO 0183 - Jason Brown	(412) 921-8401
CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health & Safety Officer James K. Laffey	(412) 921-8678
Navy Remedial Project Manager (RPM) Art Sanford	(843) 820-7482
Maintenance (Emergency)	(843) 525-3145
Maintenance Division, Utilities Branch	(843) 525-3405

2.9 EMERGENCY ROUTE TO HOSPITAL

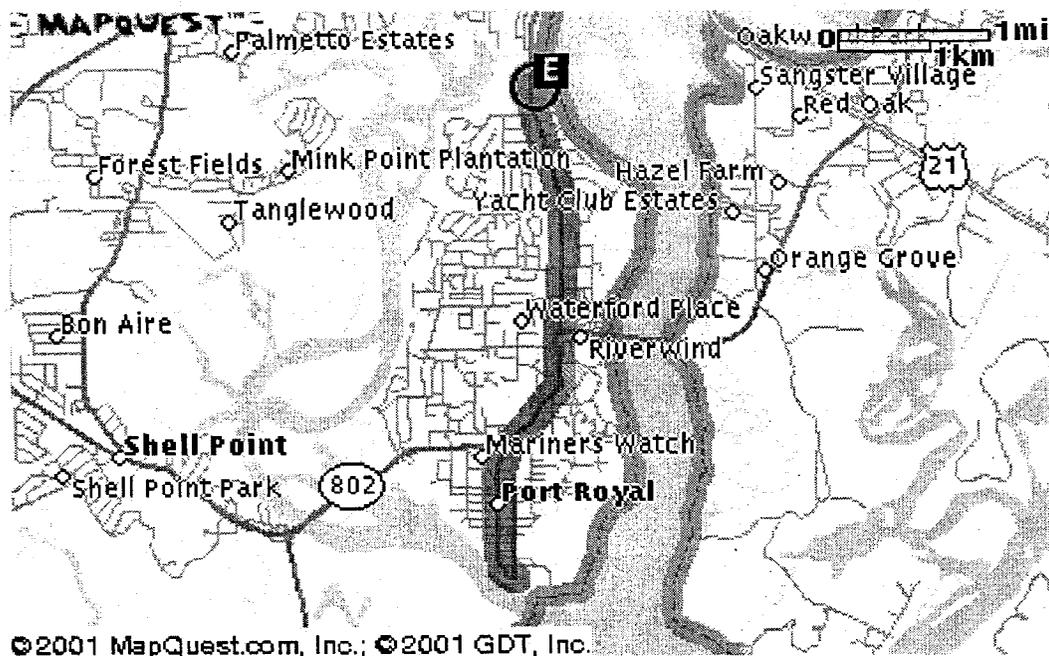
Beaufort Memorial Hospital
955 South Ribaut Road
Beaufort, South Carolina 29902
(843) 522-5200

A map showing the route from the worksite to the hospital is shown as Figure 2-1. Directions to the hospital are as follows:

Leave the island by way of Malecon Drive, over Archers Creek and across the Causeway.
Exit the Main Gate and proceed east over Battery Creek (Bell Memorial Bridge) onto Ribaut Road.
Proceed approximately three miles north on Ribaut Road to the hospital **E**.

Follow signs to entrance of Beaufort Memorial Hospital.

**FIGURE 2-1
EMERGENCY ROUTE**



2.9 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 action that initiates an evacuation would further endanger the lives of workers. However, a situation that would require workers to evacuate without first performing decontamination procedures is unlikely to occur at this site. **If the emergency involves personnel to exposures to chemicals, follow the steps provided in Figure 2-2.**

2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident. Also, as soon as possible Navy contact Tim Harrington must be informed of any incident or accident that requires medical attention.

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

FIGURE 2-2 EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of exposure situations. In the event of a personnel exposure to a hazardous substance or agent:

- 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 the exposed person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the 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 Tetra Tech NUS, Inc. 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) at 1-800-245-2730.

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)
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 there 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

The MCRD Parris Island is located approximately 3 miles south of the city of Beaufort, South Carolina. MCRD Parris Island was placed on the United States Environmental Protection Agency's (U.S. EPA's) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) in January of 1995, primarily due to the presence of unlined landfills placed in direct contact with surrounding wetlands.

MCRD Parris Island is an active facility. The mission of MCRD Parris Island is to provide for the reception and recruit training of enlisted male personnel east of the Mississippi River and all female personnel upon their first entry into the Marine Corps. The MCRD also provides field and combat skills for training of recruits; schools to train enlisted Marines as Drill Instructors and Field Staff, rifle marksmanship training for Marine officers and enlisted personnel in the southeastern United States, and training for Marine reserves.

3.1 SITE 45 MWR DRY CLEANING FACILITY

Site 45 – MWR Dry Cleaning Facility is a building located in the Main Post area of MCRD Parris Island, between Panama Street to the north, Kyushu Street to the south, and Samoa Street to the east. West of the facility are other commercial establishments, including a cobbler, a tailor, and a coin-operated laundry facility.

Four aboveground storage tanks are situated along the northern side of the building. These tanks were first put into place in 1988, following the removal of an underground storage system where hydrocarbon cleaning solvents were previously stored. The new storage tanks are positioned within a concrete catch basin used to contain any overflow during tank filling.

On March 11, 1994, a perchloroethylene (PCE) spill of unknown quantity was released into soils near the above-ground PCE storage tanks of Site 45. It was reported that one of the tanks was overfilled, causing the liquid PCE to spill onto the concrete catch basin and subsequently to the surrounding surface soils. It is also believed that many smaller spills have occurred at the tanks, and, due to the action of rainwater, PCE from these smaller spills could have been released into the soils as well.

PCE, also known as tetrachloroethene, is a chlorinated hydrocarbon used in many commercial applications, including chemical syntheses, dry cleaning, and metal degreasing. It is a nonflammable volatile organic compound (VOC) that can leach into groundwater if released into the environment. U.S. Environmental Protection Agency (U.S. EPA) studies have shown that elevated levels of oral PCE intake

by biological receptors may have significant impacts on neurological, renal, and hepatic functions and may also, through natural metabolic processes, cause genetic aberrations leading to higher cancer risks.

The objectives of this investigation are to characterize the nature and extent of contaminant migration from past PCE releases at Site 45. The media of concern that will be investigated are soil and groundwater located in the vicinity of Site 45.

Data collected from this investigation will be used to assess the human health risks associated with potential direct contact with contaminants. Human health risks to construction workers, site employees (maintenance and other), adolescent trespassers, and future residents will be assessed, as well as risks to ecological receptors. Based on this information, decisions for remedial action will be evaluated and determined.

3.2 SITE/SMWU 53 - HORSE ISLAND DEBRIS AREA

Site/SWMU (Site) 53 - Horse Island Debris Area is located in the east-central portion of Horse Island. Based on topography and location, Ribbon Creek is the nearest water body and would be the likely receptor for groundwater from this site.

Information on historic waste disposal is not currently available. The only evidence of the site is the visual presence of surface debris, including asphalt and corroded 55-gallon drums. An asphalt plant was reportedly located in this general area. Based on the presence of a steep bank adjacent to the observed surface debris, additional material may be buried at this site. This bank is approximately 3 to 6 feet in height. The extent of the debris area is uncertain but will be delineated during the Preliminary Assessment/Site Inspection based on a field survey of disturbed areas and or aerial photographs. The surface debris appears to be primarily nonhazardous construction type materials. However, hazardous wastes may be present. If present, these wastes may impact soils and groundwater.

3.2 RECRUIT TRAINING FACILITY

The Recruit Training Facility is a recently constructed large-auditorium style building that was and is currently used as classrooms for the Marine Corps Recruits. It is located on the corner of Alaska and Shanghi Streets. The floor is sloped from an upper elevation of approximately 9 feet (roughly corresponding to the outside ground surface elevation) to a low of approximately 5 ft 7 in. The lower areas of the floor lie below the surrounding water table and groundwater is seeping into these areas along the walls and floor.

Previous work has been performed in an attempt to correct the groundwater problem and keep the lower floor dry. Low permeability bentonite panels were installed along the outer walls of the building in the leaking areas. In addition, drains were installed along the footings in the leaking areas and water is currently being pumped from the drains to the nearby catch basins of the storm water collection system. This work appears to have helped, but the problem with wetness has not been eliminated.

This site is considered separate and distinct from the Remedial/RCRA Facility Investigation which are being conducted concurrently. This site is considered to be chemical free based upon past activities. It is geographically located on the main base, however it is located away from any existing SWMU. Tetra Tech NUS, Inc. has been asked to conduct a lithology study of the area because of the water seeping into the building. This HASP covers only the physical hazards involved with this operation.

4.0 SCOPE OF WORK

Field operation activities to be performed at MCRD Parris Island for CTO 0127, CTO 150 and CTO 183 investigation include:

- Mobilization/demobilization
- Soil boring installation and soil sampling
- Groundwater sampling
- Sediment sampling
- DPT and permanent monitoring well installation
- Hydraulic conductivity testing (slug tests)
- Water-level measurements
- Monitoring well abandonment
- Site surveying
- Decontamination of sampling and heavy equipment
- Disposal of both soil and water Investigative Derived Waste (IDW)

For more detailed description of the associated tasks, refer to the Work Plan (WP).

4.1 SITE 45 SAMPLING PROCEDURES

The following sections describe sampling procedures that will be followed during soil and groundwater sample collection. Additionally, the following sections present the proposed sampling locations for field activities.

4.1.1 Surface and Sub Surface Soil Sampling

Eight surface soil samples will be collected at a depth of 0- to 1-foot. Eight subsurface soil samples will be collected to at the same surface soil locations to define the nature and extent of contamination. Saturated subsurface soil samples will be collected from three on-site soil borings and three off-site soil borings to support groundwater modeling efforts. The off-site soil borings will be installed at approximately 500-foot intervals in the direction of the closest surface water body. A saturated subsurface soil will also be collected to support natural attenuation sampling.

4.1.2 Groundwater Sampling

Groundwater samples will be collected at the 25 temporary monitoring well locations. Based on the analytical results from these wells, up to an additional 10 temporary monitoring wells may be installed and sampled to delineate groundwater concentrations. Afterwards, nine permanent monitoring wells may be established in downgradient areas for long-term monitoring.

4.2 SITE 53 SAMPLING PROCEDURES

Three soil borings will be installed to collect subsurface soil samples in the waste area. The three soil boring locations will be biased toward the areas of visible waste. In each boring, soil samples will be collected continuously from the ground surface to the water table and used for waste identification, lithology, and field screening (PID).

4.2.1 Sampling

One subsurface soil sample per boring will be submitted for chemical testing. Surface soil samples will be collected in soil areas near waste at the location of the three soil borings. Two temporary monitoring wells will be installed and sampled during this investigation.

4.3 RECRUIT TRAINING FACILITY

Five 2-inch monitoring wells will be installed outside the perimeter of the building. Slug tests will be performed on the five exterior monitoring wells. Two piezometers (3/4-inch PVC) will be installed within the building. The piezometers will be installed within two closets within the auditorium. During installation of the inside piezometers, the concrete floor will be cored. During installation of the monitoring wells/piezometers, the soils from the boreholes will be continuously sampled and logged and used for lithology, and field screening (PID).

4.3.1 Sampling

Water-level measurements will be obtained from each monitoring well/piezometer. A subsurface soil sample will be collected from each of the outside monitoring wells and analyzed for grain-size analysis and Atterberg limits. Soil samples will be classified according to the Unified Classification System.

One groundwater sample will be collected from an outside monitoring well. One composite soil sample will be collected from soil IDW generated during monitoring well/piezometer installation. All monitoring wells/piezometers will be surveyed.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of the site-specific HASP, which identifies the tasks that are to be performed under this HASP. The anticipated hazards, recommended control measures, air monitoring recommendations, required PPE, and decontamination measures will be revised if the scope of work, contaminants of concern, or other conditions change. By using the table field personnel can determine which hazards are associated with each task, what hazards are present at each site, and what associated control measures are necessary to minimize injuries from those hazards. The table also assists the team members in determining which PPE and decontamination procedures to use based on proper air monitoring techniques and site-specific conditions.

5.1 SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1, the following general safe work practices (SWP) are to be followed when conducting work involving known and unknown site hazards. These SWPs establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations. This list is not inclusive and may be amended as necessary.

- Do not eat, drink, chew gum or tobacco, take medication, or smoke in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.
- Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces.
- Be familiar with, knowledgeable of, and adhere to all instructions in the site-specific HASP.
- Be aware of the location of the nearest telephone and all emergency telephone numbers.
- Attend briefings on anticipated hazards, equipment requirements, SWPs, emergency procedures, and communication methods before going on site.
- Plan and delineate entrance, exit, and emergency escape routes.

- Rehearse unfamiliar operations prior to implementation.
- Use the "buddy system" whenever respiratory protection equipment is in use. Buddies should establish hand signals or other means of emergency communication in case radios break down or are unavailable.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Safety Officer (SSO).
- Observe coworkers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DRILLING SAFE WORK PRACTICES

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

5.2.1 Before Drilling

- Identify all underground utilities and buried structures before drilling. Use the Utility Locating and Excavation Clearance Standard Operating Procedure. See Attachment II.
- All drill rigs will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. All repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist. Inspection frequencies will be once every 10 day shift or following repairs. See Attachment II

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding rotating equipment.
- The drillers helper will establish an equipment staging and laydown plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as drill flights will be provided to avoid the collapse stacked equipment.
- All potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.

5.2.2 During Drilling

- Secure frayed or loose clothing, hair, and jewelry when working with rotating equipment.
- Minimize contact to the extent possible with contaminated tooling and environmental media.
- Support functions (sampling and screening stations) will be maintained a minimum distance from the drill rig of the height of the mast plus five feet to remove these activities from within physical hazard boundaries.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill 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 Drilling

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determined cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- All motorized equipment will be fueled prior to the commencement of the days activities. During fueling operations all equipment will be shutdown and bonded to the fuel provider.
- When not in use all drill rigs will be shutdown, emergency brakes set, and wheels chocked.
- All areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
Mobilization/ Demobilization Site/SWMU 45 Site/SWMU 53 Recruit Training Facility	Physical Hazards 1) Lifting (muscle strains and pulls) 2) Pinches and compressions 3) Slip, trips, and falls 4) Moving machinery 5) Biological hazards (Insect/animal bites and stings) 6) Vehicular and foot traffic These hazards may also be associated with the other operations identified in this HASP, however they will not be repeated.	1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 2) Use pinch bars or other equipment to remove hands from the point of operation. 3) Preview work locations for unstable/uneven terrain. Barricade all excavations from access closer than two feet from the edge. 4) All equipment will be -Inspected in accordance with OSHA, and manufacturers design. -Operated by Certified operators, and knowledgeable ground crew. 5) Avoid nesting areas, use repellants. Report potential hazards to the SSO. 6) Identify all access routes hours of clearance, base contacts personnel may approach under the badge clearance and permit system.	Not required	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Steel toe Safety shoes - Safety glasses - Hardhat (when overhead hazards exists, or identified as a operation requirement) - Reflective vest for high traffic areas - Hearing protection for high noise areas, or as directed on an operation by operation scenario.	Not required
Multi-media sampling including soils using hand auger (surface and subsurface); sediments; water (surface and subsurface). This task also includes well development of existing and newly installed ground water monitoring wells, slug testing and water level measurements. Site/SWMU 45 Site/SWMU 53 Recruit Training Facility	Chemical Hazards 1) Site/SWMU 45: Air/particulate/water borne contaminant - PCE, TCE, cis/trans DCE, and vinyl chloride Site/SWMU 53: It is suspected that non-chlorinated solvents and polynuclear aromatic hydrocarbons could be present. Recruit Training Facility: There are no suspected contaminants at this site. Samples will be screened as part of the Sampling Protocol. Physical Hazards 3) Lifting (muscle strains and pulls) 4) Energized systems (contact with underground utilities) 5) Slip, trips, and falls 6) Biological hazards (Insect/animal bites and stings) 7) Ambient temperature extremes	Chemical Hazards 1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (e.g. air, water, soils). 2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. Physical Hazards 3) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 4) All subsurface activities must proceed in accordance with the TtNUS SOP "Utility Locating and Excavation Clearance" (see Attachment II of this HASP). All utility clearances must be obtained, in writing, prior to subsurface activities. Also, prior to any subsurface investigations, the locations of all underground utilities must be identified and marked. 5) Preview work locations for unstable/uneven terrain. 6) Avoid nesting areas, use repellants. Use caution when walking in wooded areas. When stepping over trees and debris be on the lookout for resting snakes. The area is known to be infested with rattle snakes, copperheads and water moccasins Report potential hazards to the SSO. 7) Wear appropriate clothing for the anticipated 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.	It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard. A Photoionization Detector w/ 10.6 eV lamp source, or a Flame Ionization Detector, will be used to monitor for applicable site contaminants. Source monitoring will be conducted at regular intervals to be determined by the SSO. Volatile organic vapor concentrations will be measured using a PID. Work shall be stopped and all workers evacuated from the area if any sustained breathing zone readings (above established background levels) are measured. Workers shall remain in an unaffected area until reading subsides or until further determination are made by the SSO.	Level D protection will be used for the initiation of all sampling activities. Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt, long pants) - Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire. - Nitrile gloves or leather gloves with surgical style inner gloves. - Hardhat - Safety glasses - Reflective vest for high traffic areas. - Steel-toe safety shoes - Hearing protection for high noise areas, as directed by the SSO. Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	Personnel Decontamination - Will consist of a soap/water wash and rinse for 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: - Equipment drop. - Soap/water wash and rinse of outer boots and gloves, as applicable. - Soap/water wash and rinse of outer splash suit, as applicable. - Disposable PPE will be removed and bagged. Sample acquisition - Sample equipment will be bagged to be decontaminated at the central location or decontaminated adjacent to the sample acquisition area. - Clean the outside of the sample containers/label/bag. - Soap/water wash and rinse of outer boots and gloves. - Pack and ice sample transport container.

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
<p>Soil borings and Monitoring Well Installation</p> <p>These tasks will be accomplished using the following methods:</p> <p>Soil boring: Direct-Push Technology [Geoprobe®] Hand Augering Drill Rig (Hollow Stem, Mud Rotary)</p> <p>Monitoring Well Installation Drill Rig (Hollow Stem, Mud Rotary)</p> <p>Site/SWMU 45</p> <p>Site/SWMU 53</p> <p>Recruit Training Facility</p>	<p>Chemical hazards: 1) Site/SWMU 45: Air/particulate/water borne contaminant - PCE, TCE, cis/trans DCE, and vinyl chloride</p> <p>Site/SWMU 53: It is suspected that non-chlorinated solvents and polynuclear aromatic hydrocarbons could be present.</p> <p>Recruit Training Facility: There are no suspected contaminants at this site. Samples will be screened as part of the Sampling Protocol.</p> <p>2) Transfer of contamination into clean areas or onto persons</p> <p>Physical hazards: 3) Heavy equipment hazards (pinch/compressions points, rotating equipment, hydraulic lines, etc.) 4) Noise in excess of 85 dBA 5) Energized systems (contact with underground or overhead utilities) 6) Lifting (strain/muscle pulls) 7) Slips, trips, and falls 8) Vehicular and foot traffic 9) Ambient temperature extremes (heat/cold stress) 10) Flying projectiles</p> <p>Natural hazards: 11) Insect/animal bites and stings, poisonous plants, etc. 12) Inclement weather</p>	<p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, activities must be suspended until dust levels subside, or until an acceptable alternative control method can be selected.</p> <p>-Verify monitoring well construction materials (grout, bentonite, sand, and decontamination solutions) MSDS are included in Hazard Communication Program. Ensure personnel constructing wells have reviewed the MSDS and understand potential health effects.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site. Wrap all portable equipment to be transported across clean areas of the site to the central decontamination pad.</p> <p>3) All equipment will be:</p> <ul style="list-style-type: none"> - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design. All inspections will be documented using the Equipment Inspection Checklist found in Appendix III of this HASP. - Operated and supported by knowledgeable operators, and ground crew. - Used within safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 25 feet from the point of operation. See Section 9.0 of this HASP. This will be the area identified as the exclusion zone. <p>In addition to equipment considerations, the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none"> - Hydraulic masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities. - Hand signals will be established prior to the commencement of the operation. - A remote sampling device must be used to sample drill cuttings near rotating tools - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (e.g., flight connectors). - Work areas will be kept clear of clutter. - Secure all loose articles to avoid possible entanglement during coring activities. - All self-propelled equipment shall be equipped with movement warning systems. - All personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then periodically) to ensure its operational status. - Areas will be inspected prior to the movement of the drill rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - The drill rig and support vehicles will be moved no closer than 3 feet to unsupported side-walls of excavations and embankments. <p>4) Hearing protection will be used during all subsurface activities using drill rig or DPT when noise levels are between 87 and 92 dBA (during operation). Boundaries will be established to limit noise hazard. Height of the mast + 5 feet or a minimum of 25 feet is normal. Excessive noise levels are being approach when you have to raise your voice to talk to someone within 2 feet of your location .</p> <p>5) All drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP. All utility clearances will be obtained, in writing, and locations identified and marked prior to activities. Overhead utilities will also be identified. See Attachment II of this HASP.</p> <p>6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>7) Preview work locations for unstable/uneven terrain.</p> <p>8) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when working in or along traffic thoroughfares.</p> <p>9) Wear appropriate clothing for weather conditions. Acceptable shelter and liquids for field crews.</p> <p>10) Wear eye protection and hard hat when the drill rig or DPT rig is operating. Restrict all others from the area.</p> <p>12) Avoid nesting areas, use repellents. Report potential hazards to the SSO.</p> <p>13) Suspend or terminate operations until directed otherwise by SSO.</p>	<p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp, or a 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"> - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above background in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. <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>All subsurface operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection:</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt, long pants) - Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire. - Nitrile gloves or leather gloves with surgical style inner gloves. - Hardhat - Safety glasses - Reflective vest for high traffic areas. - Steel toe safety shoes - Hearing protection for high noise areas, as directed by the SSO. <p>Note: The Safe Work Permits (Attachment IV) for this task 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 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"> - Equipment drop. - Soap/water wash and rinse of outer boots and gloves, as applicable. - Soap/water wash and rinse of outer splash suit, as applicable. - Disposable PPE will be removed and bagged. <p>Equipment Decontamination for Site/SWMU 45 and Site/SWMU 53 - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner. Current technology indicates hot water deactivation of the Mustard component is the most suitable means for removal and neutralization. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>Sampling Equipment Decontamination for Site/SWMU 45 and Site/SWMU 53</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>

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment Site/SWMU 45 Site/SWMU 53	<p>Chemical Hazards 1) Site/SWMU 45: Air/particulate/water borne contaminant – PCE, TCE, cis/trans DCE, and vinyl chloride</p> <p>Site/SWMU 53: It is suspected that non-chlorinated solvents and polynuclear aromatic hydrocarbons could be present.</p> <p>2) Decontamination fluids – Liquinox (detergent), and isopropanol</p> <p>Physical Hazards 3) Lifting (muscle strains and pulls) 4) Noise 5) Flying projectiles 6) Ambient temperature extremes (heat stress) 7) Slips, trips, and falls</p>	<p>Chemical Hazards 1 and 2) Use protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination solvents used onsite. Use appropriate PPE as identified on MSDS. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication section of a the Health and Safety Guidance Manual Section 5.</p> <p>Physical Hazards 3) Use multiple persons where necessary for lifting and handling heavier pieces of equipment for decontamination purposes. 4) Wear hearing protection when operating pressure washer. 5) Use eye and face protective equipment when operating pressure washer. Restrict all others from area. 6) Wear appropriate clothing for the anticipated 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. 7) Preview work locations for unstable uneven terrain.</p>	<p>Excessive chemical contaminant concentrations impacting field crews during this task is not anticipated.</p> <p>Use visual observation, and real-time monitoring instrumentation to ensure all equipment which has been cleaned and dried is properly cleaned of potentially contaminated media (water and soils).</p>	<p><i>For Heavy Equipment (e.g. Auger flights):</i> This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D Minimum requirements – -Standard field attire (Sleeved shirt; long pants) -Steel toe safety shoes -Chemical resistant boot covers -Nitrile outer gloves, cotton liners -PVC Rainsuits or PE or PVC coated Tyvek as needed -Safety glasses underneath a splash shield</p> <p>Respiratory protection is not anticipated for this activity.</p> <p>For sampling equipment including trowels, split spoons, bailers, etc. the following PPE is required</p> <p>If any solvents are used in sampling equipment decontamination, follow PPE specifications on the MSDS Standard field attire (Sleeved shirt; long pants) Steel toe safety shoes Nitrile outer gloves, cotton liners Safety glasses underneath a splash shield</p> <p>In the event of overspray of chemical decontamination fluids employ PVC Rainsuits or PE or PVC coated Tyvek as necessary.</p>	<p>Equipment Decontamination – All equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment such as drill rigs, backhoes, skid loaders, etc. will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing the base. Roadways shall be cleared of any debris resulting from the onsite activity.</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 entering or leaving the site. No equipment will be authorized access or exit without this authorization.</p> <p>Personnel Decontamination will consist of a soap/water wash and rinse for 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: Equipment drop. Soap/water wash and rinse of outer boots and gloves, as applicable. Soap/water wash and rinse of outer splash suit, as applicable. - Disposable PPE will be removed and bagged.</p>
IDW management and moving IDW drums to storage areas Site/SWMU 45 Site/SWMU 53	<p>Chemical Hazards 1) Site/SWMU 45: Air/particulate/water borne contaminant – PCE, TCE, cis/trans DCE, and vinyl chloride</p> <p>Site/SWMU 53: It is suspected that non-chlorinated solvents and polynuclear aromatic hydrocarbons could be present.</p> <p>2) Transfer of contamination into clean areas</p> <p>Physical Hazards 3) Lifting (muscle strains and pulls) 4) Noise 5) Pinches and compressions 6) Ambient temperature extremes 7) Slips, trips, and falls</p>	<p>Chemical Hazards 1 and 2) Use protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination solvents used onsite. Use appropriate PPE as identified on MSDS. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication section of the Health and Safety Guidance Manual Section 5.</p> <p>Physical Hazards 3) Use multiple persons where necessary for lifting and handling heavier pieces of equipment for decontamination purposes. 4) Wear hearing protection when working near heavy equipment. 5) Use pinch bars or other equipment to keep hands form the point of operation. 6) Wear appropriate clothing for the anticipated 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. 7) Preview work locations for unstable uneven terrain.</p>	<p>It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard.</p> <p>A Photoionization Detector w/ 10.6 eV lamp source will be used to monitor for applicable site contaminants.</p> <p>Source monitoring will be conducted at regular intervals to be determined by the SSO. Volatile organic vapor concentrations will be measured using a PID. Work shall be stopped and all workers evacuated from the area if any sustained breathing zone readings (above established background levels) are measured. Workers shall remain in an unaffected area until reading subside or until further determination are made by the SSO</p>	<p>Level D – (Minimum Requirements) -Standard field attire (Sleeved shirt; long pants) -Steel toe safety shoes Safety glasses Hardhat (when overhead hazards exists, or identified as a operation requirement) Reflective vest for high traffic areas Hearing protection for high noise areas, or as directed by the SSO.</p>	<p>Personnel decontamination will consists of a soap/water and rinse for reusable outer protective equipment (boots, gloves, procedure for Level D protection will consist of</p> <p>Soap/water wash and rinse of outer gloves Soap/water wash and rinse of the outer splash suit, as applicable Wash hands and face, leave contamination reduction zone</p>

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
<p>Monitoring well abandonment This task may involve the use of a drill rig.</p> <p>Site/SWMU 45</p> <p>Site/SWMU 53</p> <p>Recruit Training Facility</p>	<p><i>Chemical Hazards</i></p> <p>1) Site/SWMU 45: Air/particulate/water borne contaminant - PCE, TCE, cis/trans DCE, and vinyl chloride.</p> <p>Site/SWMU 53: It is suspected that non-chlorinated solvents and polynuclear aromatic hydrocarbons could be present.</p> <p>Recruit Training Facility: There are no suspected contaminants at this site. Samples will be screened as part of the Sampling Protocol.</p> <p>2) Cross contamination</p> <p><i>Physical Hazards</i></p> <p>3) Rotating machinery</p> <p>4) Noise</p> <p>5) Energized systems</p> <p>6) Ambient temperature extremes</p>	<p><i>Chemical Hazards</i></p> <p>1) Use real-time monitoring instrumentation, action levels, personal sampling, and identified PPE to control exposures to potentially contaminated media (e.g. air, water, soils, etc.).</p> <p>2) Decontaminate all equipment and supplies between drilling sites, or otherwise as approved by the MCRD.</p> <p><i>Physical Hazards</i></p> <p>3) All equipment to be used will be: inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600,.601,.602), and manufacturers design; operated by certified operators and knowledgeable ground crew; and used within established safe zones and clearly demarcated routes of approach. Complete the Equipment Inspection Checklist in Attachment III of this plan.</p> <p>In addition to equipment considerations, the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none"> - All personnel not directly supporting the drilling operation will remain at least 3 feet from the point of operation. - Drilling, drill masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities unless the exact location of the underground utility is known. - Hand signals will be established prior to the commencement of drilling. - The driller and helper can simultaneously handle moving augers or flights only when there is a standby person to activate the emergency stop device. All personnel will be instructed in the location and operation of the emergency shut off device(s). This device will be tested initially (and then periodically) to insure its operational status. - The driller must always stay at the controls while tools are rotating unless all personnel are clear of the rotating equipment. - A long handled shovel or equivalent shall be used to clear away drill cuttings from the hole and rotating equipment. Hands or feet shall not be used for this purpose. A remote sampling device must be used to sample drill cuttings near rotating tools. The driller shall shutdown operations if the sampler is near the tools. - Only manufacturer approved equipment may be used in conjunction with site equipment (i.e. pins for auger flights etc.). - Climbing drill masts is allowed only when rotating equipment is stopped. Use ANSI approved fall protection (i.e. belts, lanyards and a fall protection slide rail) or portable ladders which meet OSHA's requirements when climbing drill masts. - Work areas will be kept clear of clutter. - Secure all loose articles to avoid possible entanglement. - All equipment shall be equipped with movement warning systems. - All personnel working in equipment traffic areas are required to wear reflective vests for high visibility. <p>4) Hearing protection will be used during all drilling activities. The use of hearing protection beyond 25 feet from the drill rig should be used when you must raise your voice to talk to someone who is within 2 feet of your location.</p> <p>5) All utility clearances shall be obtained prior to excavation. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked. Obtain written permit clearance prior to all subsurface investigations. Where the clearance cannot be obtained in a reasonable period, or not located, excavation shall proceed with extreme caution.</p> <p>6) Wear appropriate clothing for the anticipated 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>Photoionization Detector w/ 10.6 eV UV lamp source.</p> <p>Source monitoring will be conducted at regular intervals determined by the SSO. Volatile organic vapor concentrations will be measured using the PID. Work shall be stopped and all workers evacuated from the area if any sustained breathing zone readings (above established background levels) are measured. Workers shall remain in an unaffected area until readings subside or until further determinations are made by the SSO.</p> <p>The SSO may perform noise dosimetry to ensure the drilling, and any contributing levels associated with the operation, do not surpass the noise attenuation factors associated with the hearing protection selected.</p>	<p>All subsurface operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection:</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt, long pants) - Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire. - Nitrile gloves or leather gloves with surgical style inner gloves. - Hardhat - Safety glasses - Reflective vest for high traffic areas. - Steel toe safety shoes - Hearing protection for high noise areas, as directed by the SSO. <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination - Will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, etc.). The decon function will take place at an area adjacent to site activities. This decontamination procedure will consist of:</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of outer boots and gloves - Soap/water wash and rinse of the outer splash suit, as applicable - Disposable PPE will be removed and bagged.

TABLE 5-1
 TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM
 MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
 PAGE 5

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment <i>(Items in Italics are deemed optional as conditions or the FOL or SSO dictate.)</i>	Decontamination Procedures
Surveying – Geographical and Geophysical Site/SWMU 45 Site/SWMU 53 Recruit Training Facility	<p><i>Chemical hazards:</i></p> <p>Significant exposure to site contaminants is anticipated to be unlikely given the nature of this task.</p> <p><i>Physical hazards:</i></p> <p>1) Slips, trips, and falls</p> <p>2) Ambient temperature extremes (cold stress)</p> <p><i>Natural hazards:</i></p> <p>3) Inclement weather</p> <p>4) Insect/animal bites or stings, poisonous plants, etc.</p>	<p>1) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation, establish temporary means for traversing hazardous terrain (i.e., rope ladders, etc.)</p> <p>2) Wear appropriate clothing for weather conditions. Acceptable shelter and liquids for field crews.</p> <p>3) Suspend or terminate operations until directed otherwise by SSO</p> <p>4) Avoid nesting areas, use repellents. Report potential hazards to the SSO.</p>	<p>The potential for exposure to site contaminants during this activity is considered minimal.</p>	<p>Surveying activities shall be performed in Level D protection</p> <p>Level D Protection consists of the following:</p> <ul style="list-style-type: none"> - Standard field dress including sleeved shirt and long pants - Safety shoes (Steel toe/shank) - <i>Safety glasses, hard hats (if working near machinery)</i> - <i>Snake chaps for heavily wooded area where encounters are likely.</i> - <i>Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks. Work gloves may be worn if desired.</i> <p>Note: The Safe Work Permit(s) for this task (see Appendix IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task. Protective levels may require modification should this activity be required to be conducted within a controlled zone due to an on-going operation.</p>	<p>Personnel Decontamination - A structured decontamination is not required as the likelihood of encountering contaminated media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to stop the transfer of these insects into vehicles, homes, and offices.</p>

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical hazards associated with the MCRD site and the activities that are to be conducted as part of the scope of work. Section 6.1 provides general information regarding significant contaminants that may be present at the MCRD sites.

6.1 CHEMICAL HAZARDS

Table 6-1, which is included as part of the site-specific HASP, provides various information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data.

Based on the available data and on planned activities, it is not anticipated that personnel will be exposed to any airborne hazards in concentrations that would constitute a health hazard.

Therefore, all work is planned to be accomplished in Level D protection. However, regular monitoring of worker breathing zone (BZ) in comparison to daily-established background levels will be performed. In the event that sustained, elevated BZ readings are detected, the initial response will be for all workers to immediately retreat to an unaffected area. Work may resume only when background levels are regained. If background levels are not regained, the CHSM is to be notified immediately, and work can resume only in elevated levels of protection by observing the action levels and other specifications of this HASP.

6.1.1 Site 45 Mwr Dry Cleaning Facility

Potential chemicals of concern (COCs) for the site, based on historical sources, are PCE, TCE, cis/trans DCE, and vinyl chloride.

6.1.2 Site/Smwu 53 - Horse Island Debris Area

At MCRD Parris Island only common commercial products were used at the base. The potential hazardous constituents that are considered are so because they were either directly used at the base such as non-chlorinated solvents (e.g., toluene) or they may be present as an impurity in other commercial products such as polynuclear aromatic hydrocarbons (PAHs) (semivolatile organics commonly found in fuels).

**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	
1,2-Dichloroethylene DCE	540-59-0	PID: I.P. 9.65 eV, high response with PID and 10.2 eV lamp. FID: 50% response with FID.	Air sample using charcoal tube; and carbon disulfide desorption; Sampling and analytical protocol in accordance with OSHA Method #07; and NIOSH Method #1003.	OSHA; NIOSH; ACGIH: 200 ppm IDLH: 1000 ppm	Adequate- odor threshold 0.085-17 ppm. Use organic vapor/acid gas cartridges for exceedances above the TWA up to 1,000 ppm. >1,000 ppm should use pressure-demand supplied air respirator above exposure limits. Recommended glove: nitrile - 0.12 hrs; viton - 0.95 hrs	Boiling Pt: 117°F; 47°C Melting Pt: 7°F; -13.8°C Solubility: 0.4% Flash Pt: 36°F; 2.2°C LEL/LFL: 5.6% UEL/UFL: 12.8% Vapor Density: 2.0 Vapor Pressure: 180-260 mmHg Specific Gravity: 1.27 @ 90°F; 32°C Incompatibilities: Strong oxidizers, alkalis, potassium hydroxide, and copper. When heated to decomposition temperatures will emit toxic fumes of phosgene. Appearance and Odor: Colorless liquid with an acrid odor.	Overexposure may result in CNS depression with potential to cause sleepiness, hallucinations, distorted perceptions, and stupor (narcosis). Systemically, symptoms may result in nausea, vomiting, weakness, tremors, and cramps. May also irritate the eyes, skin, and mucous membranes. Chronic exposures may result in dermatitis, liver, kidney, and lung damage.
Trichloroethylene See also Trichloroethene TCE	79-01-6	PID: I.P. 9.45 eV, High response with PID and 10.2 eV lamp. FID: 70% 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 #1022 or #1003.	OSHA: 50 ppm; 200 ppm (Ceiling) ACGIH: 50 ppm; 100 ppm STEL NIOSH: 25 ppm IDLH: 1000 ppm	Inadequate - Odor threshold 82 ppm. APRs with organic vapor/acid gas cartridges may be used for escape purposes. Exceedances over the exposure limits require the use of positive pressure-demand supplied air respirator. Recommended gloves: PV Alcohol unsupported >16.00 hrs; Silver shield >6.00 hrs; Teflon >24.00 hrs; or Viton >24.00 hrs; Nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection)	Boiling Pt: 188°F; 86.7°C Melting Pt: -99°F; -73°C Solubility: 0.1% @ 77°F; 25°C Flash Pt: 90°F; 32°C LEL/LFL: 8% @ 77°F; 25°C UEL/UFL: 10.5 @ 77°F; 25°C Vapor Density: 4.53 Vapor Pressure: 100 mmHg @ 90°F; 32°C Specific Gravity: 1.46 Incompatibilities: Strong caustics and alkalis, chemically active metals (barium, lithium, sodium, magnesium, titanium, and beryllium) Appearance and Odor: Colorless liquid with a chloroform type odor. Combustible liquid, however, burns with difficulty.	Central nervous system effects including euphoria, analgesia, anesthesia, paresthesia, headaches, tremors, vertigo, and somnolence. Damage to the liver, kidneys, heart, lungs, and skin have also been reported. Contact may result in irritation to the eyes, skin, and mucous membranes. Ingestion may result in GI disturbances including nausea, and vomiting NIOSH lists this substance a potential human carcinogen.

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
Tetrachloroethylene See also Perchloroethylene PERK PCE	127-18-4	PID: I.P. 9.32 eV, relative response ratio 200% with 10.6 eV lamp. FID: 70% relative response ratio with a FID.	Air sample using charcoal tube; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1003.	ACGIH: 25 ppm 100 ppm STEL OSHA: 100 ppm 200 ppm Ceiling; 300 ppm 5-minute max peak in any 3-hr period. IDLH: 150 ppm	Odor threshold for this substance has been determined to be at airborne concentrations of approximately 47 ppm, which is considered adequate. APR with organic vapor/acid gas cartridges should be used for escape purposes only. Exceedances over the recommended exposure limits requires the use of airline or airline/APR combination units. Recommended glove: Viton, PV alcohol 5-16 hrs; silver shield >6.00 hrs; teflon 10-24 hrs; and Nitrile in that order. The breakthrough time for the nitrile glove ranges between 1.5 - 5.5 hrs. during complete immersion.	Boiling Pt: 250°F; 121°C Melting Pt: -2°F; 19°C Solubility: 0.02% Flash Pt: Not available LEL/LFL: Not available UEL/UFL: Not available Vapor Density: 5.83 Vapor Pressure: 14 mmHg @ 77°F; 25°C Specific Gravity: 1.62 @ 77°F; 25°C Incompatibilities: Strong oxidizers, alkalis, fuming sulfuric acid, and chemically active metals. When heated to decomposition temperatures will emit toxic fumes of chlorine. Appearance and Odor: Colorless liquid with a mild chloroform like odor.	Overexposure may result in irritation to eyes, nose, throat, and skin. Potential CNS effects including sleepiness, incoordination, headaches, hallucinations, distorted perceptions, and stupor (narcosis). Systemically, symptoms may result in nausea, vomiting, weakness, tremors, and cramps. Chronic exposures may result in dermatitis, enlarged tender liver, kidney, and lung damage. This material is considered a animal carcinogen (liver tumors), however, inadequate evidence exists concerning carcinogenic potential in humans.
Vinyl chloride	75-01-4	PID: I.P. 9.99 eV, High response with PID and 10.2 eV lamp. FID: 40% response with FID.	Air sample using charcoal or Anasorb CMS sorbent tube; carbon disulfide desorption; gas chromatography-flame ionization detection; Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1007, or OSHA Method #75.	OSHA: 1.0 ppm; 5.0 ppm (Ceiling) ACGIH: 5 ppm NIOSH: Lowest Feasible Concentration	Inadequate - Odor threshold 10-20 ppm. Gas Mask with a vinyl chloride Type N canister may be employed for concentrations up to 25 ppm. Canisters employed must have a minimum service life of 4-hrs. Exceedances over 25 ppm, must use a positive pressure demand, open-circuit, self-contained breathing apparatus, pressure demand type, with full facepiece. Refer to 29 CFR 1910.1017(g) for specific requirements based on atmospheric concentrations of vinyl chloride. Recommended gloves: Silver shield >6.00 hrs; Nitrile 5.70 hrs; or Viton 4.4 hrs	Boiling Pt: 7°F; -13.9°C Melting Pt: -256°F; -160°C Solubility: 0.1% @ 77°F; 25°C Flash Pt: 18°F; -8°C LEL/LFL: 3.6% UEL/UFL: 33% Vapor Density: 2.21 Vapor Pressure: 3.3 atm Specific Gravity: N.A. Incompatibilities: Oxidizers, copper, aluminum, peroxides, iron, steel, Appearance and Odor: Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.	A severe skin, eye, and mucous membrane irritant(Liquid: frostbite). Narcotic effect causing weakness, abdominal pains, GI bleeding; and pallor skin or cyanosis. Chronic exposure has been linked to the formation of malignant tumors originating from blood lymphatic vessels in the liver (associated enlargement of the liver), and kidneys (angiosarcoma and nephroblastoma). Listed as a carcinogen by NTP, IARC and ACGIH.
Toluene	108-88-3	PID: I.P. 8.82 eV, High response with PID and 10.2 eV lamp. 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 300 ppm (Ceiling) ACGIH: 50 ppm (skin) NIOSH: 100 ppm 150 ppm STEL 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. 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 Melting Pt: -139°F; -95°C Solubility: 0.05% (61°F;16°C) Flash Pt: 40°F; 4°C LEL/LFL: 1.2% UEL/UFL: 7.1% Vapor Density: 3.14 Vapor Pressure: 20 mmHg @ 65°F; 18°C Specific Gravity: 0.87 Incompatibilities: Strong oxidizers 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.

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
General PAHs / Coal Tar Pitch Volatiles / Creosote / cresol (Fluoranthene, pyrene, benzo(a) anthracene, benzo(a) pyrene, benzo(f)fluoranthene, benzo(k)fluoranthene, etc.)	(CAS Numbers vary depending on specific compound)	PID: I.P. of 8.97 eV, relative response ratio unknown. FID: Response factor unknown but given the substances flammability, detection by FID can be anticipated.	Refer to NIOSH methods for each specific compound for appropriate air sampling protocols. Many PAHs can be sampled using NIOSH Method 5506 or 5515 - Teflon filter with support ring - High pressure liquid chromatography with UV detector. For cresol (a major constituent of creosote) by silica gel or xad-7 sorbent tube; Acetone desorption and analysis by gas chromatography - flame ionization detector or high-pressure liquid chromatography. (NIOSH Method #2001, or OSHA Method #32)	General PAHs: Most PAHs have no established exposure limits. Other Coal Tar Pitch Volatiles / PAHs such as chrysene and benzo(a)pyrene have an exposure limit of 0.2 mg/m ³ (OSHA and ACGIH). 0.1 mg/m ³ - (NIOSH) Creosote / Cresol: OSHA; ACGIH: 5 ppm NIOSH: 2.3 ppm IDLH: 80 mg/m ³	Adequate - use a full-face air-purifying respirator with organic vapor / dust/mist cartridge up to 250 ppm. Cresol has an Odor Threshold of 0.00005-0.0079 ppm. Recommended gloves: Viton >96.00 hrs; butyl rubber >90.00 hrs; neoprene >4.50 hrs	Properties of various PAHs/Coal Tar Pitch Volatiles vary depending upon the specific compound. <i>For Creosote/Cresol:</i> Boiling Pt: 376-397°F; 191-203°C Melting Pt: 52-96°F; 10.9-35.5°C Solubility: Insoluble Flash Pt: 178°F; 81°C LEL/LFL: Not available UEL/UFL: Not available Vapor Density: 3.72 Vapor Pressure: 1 mmHg @ 100-127°F; 38-53°C Specific Gravity: 1.030-1.038 Incompatibilities: Nitric acid, oleum, chlorosulfonic acid, oxidizers Appearance and Odor: Yellowish or colorless, flammable, oily liquid (often brownish because of impurities or oxidation)	Regulated based on effects on respiratory tract and skin irritation. Other effects may include eye irritation and central nervous system, disturbances. Acute exposures may result in difficulty breathing, respiratory failure and skin and eye irritation and burns. Chronic exposure may damage the liver, kidneys, lungs and skin and cause photosensitivity. IARC, NTP, NIOSH, ACGIH, and the EPA list some PAHs such as benzo(a)pyrene as a potential carcinogen (ARC 2A, NTP-2, ACGIH TLV-A2, NIOSH-X, EPA-B2).
Diesel Fuel No.2-D	Mixture	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID.	Air sampling use charcoal tube as a collection media; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with NIOSH Method #1550.	OSHA NIOSH ACGIH: 5 mg/m ³ as mineral oil mist. In addition NIOSH and ACGIH establish 10 mg/m ³ as a STEL.	Kerosene odor Recommended Air Purifying cartridges: Organic vapor Recommended gloves: Nitrile	Boiling Pt: <170-400°F; 77-204°C Melting Pt: Not available Solubility: Negligible Flash Pt: 125°F; 52°C LEL/LFL: 0.6% UEL/UFL: 7.5% Vapor Density: >5 Vapor Pressure: <1 mmHg @ 70°F; 21°C Specific Gravity: 0.86 Incompatibilities: strong oxidizers, halogens, and hypochlorites Appearance and odor: Colorless to amber with a kerosene odor	Prolonged or repeated exposures to this product may cause skin and eye irritation. Due to the defatting capabilities this exposure may lead to a dermatitis condition. High vapor concentrations are irritating to the eyes and respiratory tract. Exposure to high airborne concentrations may result in narcotic effects including dizziness, headaches, and anesthetic unconsciousness. High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation.

6.1.3 Recruit Training Facility

The work conducted at this site is to correct an existing water seepage problem in a newly constructed building. Site sampling is being conducted to verify that the area is free of chemical contamination.

6.2 PHYSICAL HAZARDS

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

- Slips, trips, and falls
- Energized systems (contact with underground or overhead utilities)
- Lifting (strain/muscle pulls)
- Pinch/compression points.
- Noise in excess of 85 decibels (dBA)
- Ambient temperature extremes
- Exposure to moving machinery

These physical hazards are discussed in detail in Table 5-1 as applicable to each site task. Further, many of these hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual. Specific discussions 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 may be present throughout the facility. **Therefore, all subsurface activities must be conducted following the requirements of the TtNUS SOP for "Utility Locating and Excavation Clearance (HS-1.0)".** A copy of this SOP is provided as Attachment II. Clearance of underground and overhead utilities for each sample location will be coordinated with MCRD personnel. The Maintenance Supervisor is the point-of-contact for utilities clearance and can be reached at (843) 525-2720. Additionally, drilling operations will be conducted at a safe distance (>20 feet) from overhead power lines. Whenever underground utilities are suspected to be close to subsurface sampling locations, the borehole will be advanced to a minimum of five (5) feet with a hand auger prior to drilling. As built drawings may also be

utilized for additional clarification. In certain cases, MCRD personnel may need to de-energize electrical cables using facility lockout/tagout procedures to insure electrical hazards are eliminated.

6.2.3 Ambient Temperature Extremes

Overexposure to high ambient temperatures (heat stress) may exist during performance of this work depending on the project schedule. Extremely cold temperatures are not expected to be encountered due to project location. 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, workload and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. Additional information such as Work-Rest Regimens and personnel monitoring may be found in Attachment V. The SSO will recommend additional heat stress control measures as they are deemed necessary as per ACGIH guidelines

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. In general, avoidance of areas of known infestation or growth will be the preferred exposure control for insects/animals and poisonous plants. Specific discussion on principle hazards of concern follows:

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

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. For information regarding tick removal procedures, and symptoms of exposure, consult Section 4.0 of the Health and Safety Guidance Manual.

Contact with poisonous plants and bites or stings from poisonous insects are other biological hazards that must be considered. Long pants (tucked into boots), and avoiding potential nesting areas will minimize the hazards of exposure. All site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful since severe illness and death may result from allergic reactions. As with

any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SSO notified.

One mosquito-borne disease that occurs nearly every year in South Carolina is Eastern Equine Encephalitis or EEE. This is primarily a disease found in birds, but it sometimes infects horses and humans. Last year, there were four suspected cases of EEE in horses in South Carolina. In the year 2000, one confirmed case was reported in a horse in Horry County.

6.3.2 Inclement Weather

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

6.3.2.1 Tropical Storms and Hurricanes

As MCRD Parris Island is in a tropical storm, hurricane prone area, the following information is supplied to explain the potential severity of these natural hazards. The decision to curtail operations and evacuate the area should be made by the FOL, PM, and the HSM.

During the early summer to late fall months, typically from the first of June through the end of November, disturbances migrating off the West Coast of Africa move into the Atlantic Ocean and develop into tropical cyclones known as tropical storms and hurricanes. Many of these cyclones become strong enough to threaten life and property along the Eastern Seaboard and Gulf Coast. There are three main threats associated with tropical storms and hurricanes:

- High winds
- Excessive rainfall
- Storm surge

The impacts of high winds and excessive rainfall occur hours, maybe days, before the tropical storm or hurricane makes landfall. However, the storm surge accompanies the storm or hurricane at the time that landfall occurs.

High Winds

Sustained winds vary greatly from storm to storm, but can range from 39 to 73 miles per hour (wind speeds associated with a tropical storm) to greater than 74 miles per hour (minimal wind speed for a Category 1 hurricane). The table below compares the type of storm or hurricane and the corresponding wind speed.

**Table 6-2
Tropical Storm/Hurricane Rating Scale**

TYPE	CATEGORY*	WINDS (MPH)
Tropical Depression	NA	>35-38
Tropical Storm	NA	39 – 73
Hurricane	1	74 – 95
Hurricane	2	96 – 110
Hurricane	3	111 – 130
Hurricane	4	131 – 155
Hurricane	5	>155

NA – Not Applicable

* Based on the Saffir-Simpson scale

In addition to strong winds, there is the threat of debris (i.e. building material, trees, etc.) becoming airborne projectiles as they are carried by the high winds. Thunderstorms and tornadoes embedded within the tropical storm or hurricane can further increase the wind speeds on a localized level.

Excessive Rainfall

Heavy rains associated with tropical storms and hurricanes also vary greatly from storm to storm. On average, an inch of rainfall an hour is not uncommon with major hurricanes, somewhat lesser amounts with tropical storms. However, the primary threat is not the intensity of rain, but the duration of rainfall. Since many tropical storms and hurricanes are slow-movers, they are capable of producing sustained heavy rainfall over a long period of time. It is not uncommon for an area to receive nearly 20 inches of rain in 24 hours. Under these conditions, street; stream and creek flooding is inevitable only to be exacerbated by locally heavier rains from thunderstorms.

Storm Surge

The storm surge is an abnormal rise in sea level accompanying a hurricane or tropical storm. The height of the storm surge (usually measured in feet) is the difference in sea level from the observed level (during the storm) and the level that would have occurred in the absence of the storm or hurricane. The more intense the storm or hurricane the higher the storm surge. Storm surges become even higher if they occur during periods of high tide.

The following table defines some of the terminology and possible calls to action regarding tropical cyclones:

Table 6-3
TROPICAL STORM/HURRICANE
WATCH AND WARNING

STORM DESCRIPTION	DEFINITION	CALL TO ACTION
Tropical Storm Watch	Tropical storm conditions are possible in the specified area of the watch, usually within 36 hours	Weather conditions should be monitored for further advisories. Prepare for possible evacuation by local officials
Tropical Storm Warning	Tropical storm conditions are expected in the specified area of the warning, usually within 24 hours.	Work should be suspended in areas where lightning, high winds and rainfall could pose a threat to life. Mandatory evacuations may be enforced by local officials.
Hurricane Watch	Hurricane conditions are possible in the specified area of the watch, usually within 36 hours.	Weather conditions should be monitored for further advisories. Prepare for possible evacuation by local officials
Hurricane Warning	Hurricane conditions are expected in the specified area of the warning, usually within 24 hours.	Mandatory evacuations will most likely be enforced by local officials.

A NOAA Weather Radio is the best means to receive watches and warnings from the National Weather Service. The National Weather Service continuously broadcasts updated hurricane advisories that can be received by widely available NOAA Weather Radios.

7.0 AIR MONITORING

Direct reading instruments will be used at the sites to evaluate the presence of detectable site contaminants and other potentially hazardous conditions. As a result, specific air monitoring measures and requirements are established in Table 5-1 pertaining to the specific hazards and tasks of an identified operation. Additionally, the Health and Safety Guidance Manual, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENTS AND USE

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

7.1.1 Photoionization Detector or Flame Ionization Detector

In order to accurately monitor for any substances which may present an exposure potential to site personnel, a Photoionization Detector (PID) using a lamp energy of 10.6 eV or higher will be used. This instrument will be used to monitor potential source areas (boreholes, monitoring wells, free product recovery, etc.) and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting potential organic vapors of concern (NOTE: A Flame Ionization Detector [FID] may be used as an alternative to the PID).

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

7.1.2 Hazard Monitoring Frequency

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

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the Tetra Tech NUS Equipment Manager. Operational checks and field calibration will be performed on all instruments each

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

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

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

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

8.1.1 Requirements for TtNUS Personnel

All TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the MCRD facility. Additionally, TtNUS personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training in the past 12 months before being cleared for site work. Also 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 prior to initiating site work. TtNUS will also conduct a brief meeting daily to discuss the operations planned for that day. At the end of the workday, a short meeting will be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 9.4).

8.1.2 Requirements for Subcontractors

All TtNUS subcontractor personnel must have completed 40 hours of introductory hazardous waste site training as defined in OSHA Standard 29 CFR 1910.120 (e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120 (e)(8) prior to performing field work. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter (on company letterhead) containing the information in the example letter provided as Figure 8-1, and by providing copies of certificates for all subcontractor personnel participating in site activities.

**FIGURE 8-1
TRAINING LETTER**

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

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555-5555

Month, day, year

Mr. David Brayak PE
Task Order Manager
Tetra Tech NUS
Foster Plaza VII
661 Andersen Drive
Pittsburgh, Pennsylvania 15220-2745

Subject: HAZWOPER Training for MCRD Parris Island, S.C.

Dear Mr. Brayack:

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

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires 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 hour of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

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

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

Sincerely,

(Name and Title of Company Officer)

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all site personnel who will perform work on this project. Site-specific training will also be provided to all personnel (U.S. Department of Defense, 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 on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of this Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of the contents of relevant Material Safety Data Sheets

Documentation of site-specific training 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 TtNUS's medical surveillance program. Field personnel must be medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office 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 all of 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 Medical Data Sheet as specified in Tab 7 of the Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

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.

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 MCRD work site
 not qualified to perform work at the MCRD work site

and,

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

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

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

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

Part B

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

and have determined the following information:

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

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

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

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

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

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

- may
 not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

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

Address

**FIGURE 8-4
MEDICAL SURVEILLANCE LETTER**

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

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555-5555

Month, day, year

Mr. David Brayak PE
Task Order Manager
Tetra Tech NUS, Inc.
Foster Plaza VII
661 Andersen Drive
Pittsburgh, Pennsylvania 15220-2745

Subject: Medical Surveillance Training for MCRD Parris Island, S.C.

Dear Mr. Brayak:

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR) Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response: Final Rule". I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a license 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 MCRD facility.

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

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

Sincerely,

(Name and Title of Company Officer)

9.0 SITE CONTROL

This section outlines the means by which TiNUS 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: exclusion zone, contamination reduction zone, and 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 potentials for the spread of contaminants and to protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of the site of known or suspected contamination. It is not anticipated that significant amounts of surface contamination are 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 drilling. Furthermore, once such 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 various distances surrounding the point of operation (See Table 5-1 for specific operation). The exclusion zone for this activity will be fragmented to represent the areas where the soils are disturbed through drilling and direct push subsurface activities.

Exclusion Zones will be established at each sampling point/location. The impact area is that area which could be adversely impacted by either chemical, physical, or energetic hazards. Exclusion zone size and dimensions will vary based on activities. Impact areas dimensions will be influenced by the following considerations:

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

- Potential for exposure

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

- Soil borings including monitoring well installation and abandonment (Hollow stem auger, Direct Push Technology). The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, with a minimum of 25 feet. This distance will also apply when subsurface soil sampling from behind these type rigs.
- Monitoring well development and sampling. The exclusion zone for this activity will be set at 10 feet surrounding the well head and discharge collection container.
- In all sampling the exclusion zone will be set at five feet surrounding the point of operation.
- Decontamination operation. The exclusion zone for this activity will be set at 25 feet surrounding the gross contamination wash and rinse as well as 25 feet surrounding the heavy equipment decontamination area.
- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

All exclusion zones will be delineated using barrier tape, cones and /or drive poles, and postings to inform and direct facility personnel.

9.1.1 Exclusion Zone Clearance

A pre-startup site visit will be conducted by members of the identified field team in an effort to identify proposed subsurface investigation locations, obtain utility clearance, and provide up front notices concerning scheduled activities within various sections of the facility. Access to the different sections will be coordinated through the Base Contact (Tim Harrington). Utility clearances will be given by the base Maintenance Division, Utilities Branch.

In all cases, no subsurface activities will proceed without utility clearance. In the event a utility is struck during subsurface investigation activity, the emergency numbers provided in Section 2-9, Table 2-1 will be notified.

9.1.2 Site Restoration

If investigation activities (e.g., monitoring well installation) disturb or alter the landscape, vegetation, or other features of Site 45, the site may require restoration to reestablish conditions existing prior to the investigation. If vegetation is stressed or damaged as a result of investigation activities, the affected area will be reseeded. Portions of Site 45 will be regraded if investigation activities alter the natural contour of the sites. Additionally, all equipment used during the investigation and all investigation-derived waste (IDW) will be removed from the site.

9.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. 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. This area will be delineated using barrier tape, cones and/or drive poles, and postings to inform and direct facility personnel.

9.3 SUPPORT ZONE

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

9.4 SAFE WORK PERMITS

All exclusion zone work conducted in support of this project will be performed using Safe Work Permits (Figure 9-1) to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. These work permits will be further supported by the daily meetings conducted during their generation. This effort will ensure all site-specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signatures of the FOL and SSO. All personnel engaged in onsite activities will be aware of the elements indicating levels of protection and precautionary measures to be used.

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

9.5 SITE MAPS

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

9.6 BUDDY SYSTEM

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

9.7 MATERIALS SAFETY DATA SHEET (MSDS) REQUIREMENTS

TTNUS and subcontractor personnel will provide MSDSs for all chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. The MSDSs will then be maintained in a central location and will be available for anyone to review upon request.

9.8 COMMUNICATION

TTNUS personnel will be working in proximity to one another during field activities. As a result, hand signals, voice commands, and line of site will provide sufficient means of communication.

**FIGURE 9-1
SAFE WORK PERMIT**

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

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

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

- II. Names: _____

- III. Onsite Inspection conducted Yes No Initials of Inspector _____

 _____ PM

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

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

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

- VI. Additional Safety Equipment/Procedures
- | | | | |
|-------------------------------|--|---|--|
| Hardhat | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (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 | <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 suite/coveralls | <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type) | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe/shank Workboots .. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes <input type="checkbox"/> No |
- Modifications/Exceptions: _____

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

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

- VIII. Additional Permits required (Hot work, encl PMed entry, excavation etc.)
- If yes, fill out appropriate section(s) on safety work permit addendum* Yes No

IX. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____
 Job Completed by: _____ Date: _____

External communication will be accomplished by using the telephones at predetermined and approved locations or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications.

9.9 SITE VISITORS

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

- Personnel invited to observe or participate in operations by TtNUS personnel
- Regulatory personnel (SCDHEC, DOD, EPA, OSHA, etc.)
- Southern Division Navy personnel
- Other authorized visitors

All non-DOD personnel working on this project are required to gain initial access to the base by coordinating with our the FOL or designee and following established base access procedures.

Once access to the base is obtained, all personnel who require site (areas of ongoing operations) access will be required to obtain permission from the FOL and SSO. Upon gaining access to the site, all site visitors wishing to observe operations in progress will be required to meet the following minimum requirements:

- All site visitors will be routed to the FOL, who will sign them in to the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), who they represent, and purpose for the visit.
- All site visitors will be required to produce the necessary information supporting clearance onto the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for all Southern Division Navy personnel) and to medical surveillance, as stipulated in Section 8.3 of this document. In addition, to enter the site's operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this document.

Following this, the site visitor will be permitted to enter the site and applicable operational areas. All visitors are required to observe the protective equipment and site restrictions in effect at the area of their visit. Any and all visitors not meeting the requirements as stipulated in this plan for site clearance will not

be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause all onsite activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the FOL, SSO, or onsite security personnel. At a minimum, the Base Contact will be notified of any unauthorized visitors.

9.10 SITE SECURITY

Site security will be accomplished using existing base security resources and procedures, supplemented by TtNUS or subcontractor personnel if necessary. TtNUS personnel will retain control over active operational zones.

As this activity will take place at a Navy facility, the first line of security will take place at the Base gate restricting the general public. The second line of security will take place at the work site, where interested parties will be referred to the FOL.

The FOL will serve as a focal point for site personnel and for interested parties and will serve as the final line of security and the primary enforcement contact.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be handled at any given time as part of this scope of work. It is also not anticipated that such spillage would constitute a danger to human health or the environment. However, as the job progresses, the potential may exist for accumulating Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters, in a central staging area. As needed, 55-gallon drums will be used to contain purge water, decon fluids, and soil cuttings generated during field activities. Once all fluids and other materials have been characterized, they can be removed from this area and properly disposed. Because these fluids and soils remained uncharacterized while in the staging area, a spill containment program will be developed and instituted as part of this HASP.

10.2 POTENTIAL SPILL AREAS

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

- Resource deployment
- Waste transfer
- Central staging

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

10.3 LEAK AND SPILL DETECTION

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

solid substances will be shoveled into an appropriate container. These materials will be containerized and secured for disposal pending analysis. All inspections will be documented in the project logbook.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

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

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

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

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

10.6 SPILL CONTROL PLAN

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

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

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

11.0 CONFINED-SPACE ENTRY

Personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces. A confined space is defined as an area 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, manholes, sewers, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.
- Contains or has a potential to contain a hazardous atmosphere.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly caving walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined-space operations, consult the Health and Safety Guidance Manual or call the PHSO. Any activity that may be considered a confined-space entry shall require modifications of this HASP.

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

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

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

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

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

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

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies all 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 all phone communications points and in each site vehicle.

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

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

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

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

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

13.0 GLOSSARY

µg	Microgram
ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirator
ASTM	American Society of Testing and Materials
ASVE	Air Sparging Vapor Extraction
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action - Navy
CNS	Central Nervous System
COCs	Chemicals of concern
CTO	Contract Task Order
CZR	Contamination Reduction Zone
DCE	Dichloroethene
DOD	United States Department of Defense
DPT	Direct-push technologies
EPA	United States Environmental Protection Agency
eV	electron Volts
FFA	Federal Facilities Agreement
FID	Flame ionization detector
FOL	Field Operations Leader
GC	Gas Chromatograph
GOCO	government-owned and contractor-operated
HASP	Health and Safety Plan
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High-Efficiency Particulate Air
HSM	Health and Safety Manager
IDLH	Immediate Dangerous to Life or Health
IDW	Investigation-Derived Waste
kg	Kilogram
L	Liter
LEL/LFL	Lower Explosive Limit / Lower Flammable Limit

MCRD	Marine Corps Recruit Depot
MCRD	Marine Corps Recruit Depot
MCX	Marine Corps Exchange
MHSP	Master Health and Safety Plan
MS	Mass Spectrometry
MSDS	Material Safety Data Sheets
MWR	Morale, Welfare, and Recreation
N/A	Not Available
NAVFAC	Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAI	Parris Island
PCE	Perchloroethylene
PEL	Permissible Exposure Limit
PID	Photoionization Detector
ppb	Parts per billion
PPE	Personal Protective Equipment
ppm	Parts per million
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limits (NIOSH)
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SAP	Sampling and Analyses Plan
SARA	Superfund Amendments and Reauthorization Act
SCBA	Self-Contained Breathing Apparatus
SCDHEC	South Carolina Department of Health and Environmental Control
SOPs	Standard Operating Procedures
SOUTHDIV	Southern Division
SSO	Site Safety Officer
STEL	Short-Term Exposure Limit
SVOCs	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TBD	To be determined

TCE	Trichloroethene
TLV	Threshold Limit Value
TOC	Total Organic Carbon
TOM	Task Order Manager
TtNUS	Tetra Tech NUS, Inc.
TWA	Time-Weighted Average
U.S. EPA	United States Environmental Protection Agency
UEL/UFL	Upper Exposure Limit / Upper Flammable Limit
UV	Ultraviolet
VOCs	Volatile Organic
WP	Work Plan

ATTACHMENT I
INJURY/ILLNESS PROCEDURE
AND REPORT FORM

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

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

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

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

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

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

WHO IS COVERED:

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



case no. _____

All 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.



case no. _____

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

To: Corporate Health and Safety Manager
Human Resource Administrator

Prepared by: _____

Position: _____

Project Name: _____

Office: _____

Project No. _____

Telephone: _____

Information Regarding Injured or Ill Employee:

Name: _____

Office: _____

Home address: _____

Gender: M F No. of dependents: _____

Marital status: _____

Home telephone: _____

Date of birth: _____

Occupation (regular job title): _____

Social Security No.: _____

Department: _____

Date of Accident: _____

Time of Accident: _____

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

Street address: _____

City, state, and zip code: _____

County: _____

Narrative Description of How Accident Occurred: (Be specific. Explain what the employee was doing and how the accident occurred.)



**TETRA TECH, INC.
INJURY/ILLNESS REPORT**

Did employee die? Yes No
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 accident report.

Witness(es):
Name: _____
Address: _____
Telephone: _____

Describe the Illness or Injury and Part of Body Affected:

Name the Object or Substance which Directly Injured the Employee:

Medical Treatment Required:
 No Yes First Aid Only
Physician's Name: _____
Address: _____
Hospital or Office Name: _____
Address: _____
Telephone No.: _____

Lost Work Days:
 No. of Lost Work Days _____
Last Date Worked _____
Time Employee Left Work _____
Date Employee Returned to Work _____
 No. of Restricted Work Days _____
 None

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: _____

	Printed Name	Signature	Telephone No.	Date
Project or Office Manager				
Site Safety Coordinator				
Injured Employee				

To be completed by Human Resources:

Date of hire:

Hire date in current job:

Wage information: \$ _____ per _____ (hour, day, week, or month)

Position at time of hire:

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 insurance carrier:

Date reported:

Reported by:

TeleClaim phone number:

TeleClaim account number:

Location code:

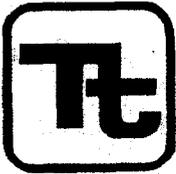
Confirmation number:

Name of contact:

Field office of claims adjuster:

ATTACHMENT II

STANDARD OPERATING PROCEDURE
FOR
UTILITY LOCATING AND EXCAVATION CLEARANCE



TETRA TECH NUS, INC.

STANDARD OPERATING PROCEDURES

Number	HS-1.0	Page	1 of 11
Effective	03/00	Date	Revision 1
Applicability	Tetra Tech NUS, Inc.		
Prepared	Health & Safety		
Approved	D. Senovich <i>DS</i>		

Subject
UTILITY LOCATING AND EXCAVATION CLEARANCE

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1.0 PURPOSE

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

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

2.0 SCOPE

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

3.0 GLOSSARY

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

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

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

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

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

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

4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure and the TtNUS Utility Locating and Clearance Policy.

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

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

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

Site Personnel – Responsible for understanding and implementing this SOP and the TtNUS Utility Locating and Clearance Policy.

5.0 PROCEDURES

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

5.1 Buried Utilities

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

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

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

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

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

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using such methods as passive and intrusive surveys, physical probing, or hand augering. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in many states, initial excavation is required by hand to a specified depth.
7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed with a hand auger or pole (tile probe) made of non-conductive material. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.
8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

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

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adequate to prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

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

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

6.0 UNDERGROUND LOCATING TECHNIQUES

6.1 Geophysical Methods

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

Electromagnetic Induction

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

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

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

Magnetics

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

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

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Ground Penetrating Radar

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

6.2 Passive Detection Surveys

Acoustic Surveys

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

Thermal Imaging

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

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

6.3 Intrusive Detection Surveys

Vacuum Excavation

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

Hand-auger Surveys

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

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placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand-auger depths must be at least to the frost line depth plus two (2) feet, but never less than 4 feet below ground surface (bgs). For augering, the hole must be reamed by hand to at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand-auger. It is important to note that a post-hole digger must not be used in place of a hand-auger.

Tile Probe Surveys

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

7.0 INTRUSIVE ACTIVITIES SUMMARY

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

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

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

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

8.0 REFERENCES

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

Subject UTILITY LOCATING AND EXCAVATION CLEARANCE	Number HS-1.0	Page 8 of 11
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**ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES**

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

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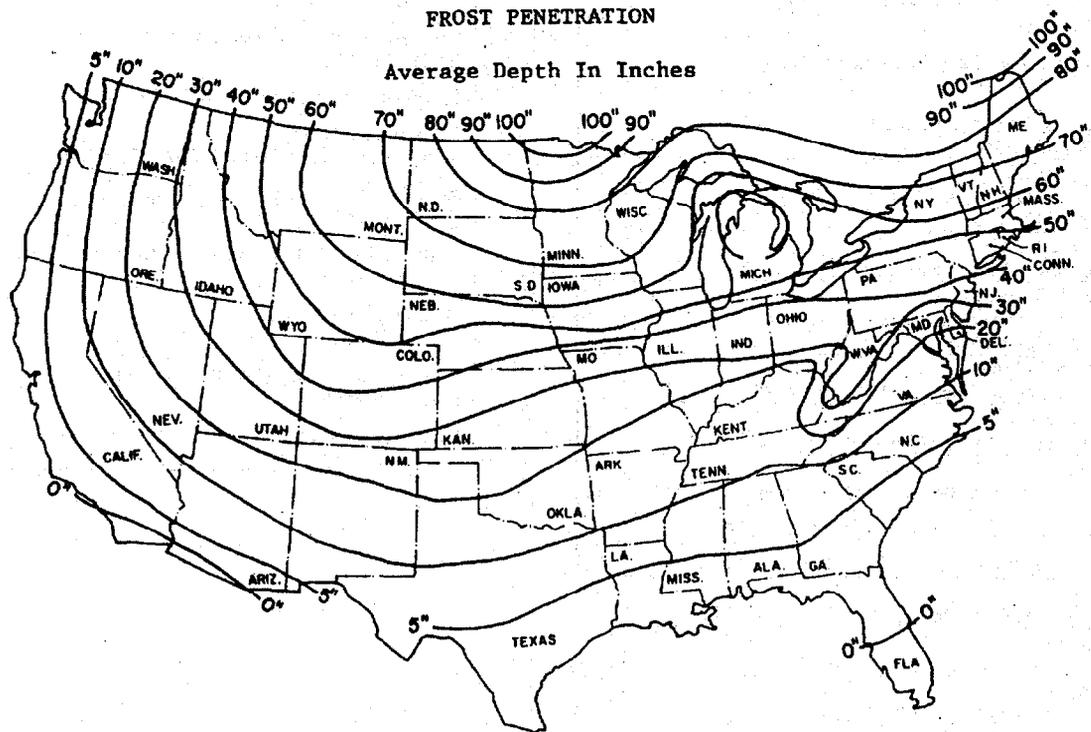
Oregon Utilities Underground Location Center (800) 424-5555 Douglas Utilities Coordinating Council (503) 673-6676 Josephine Utilities Coordinating Council (503) 476-6676 Rogue Basin Utility Coordinating Council (503) 779-6676 Utilities Notification Center (800) 332-2344
Pennsylvania Pennsylvania One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

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

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ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

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**ATTACHMENT 3
UTILITY CLEARANCE FORM**

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

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

3. Notes:

Approval:

 Site Manager/Field Operations Leader Date

c: PM/Project File
 Program File

ATTACHMENT III
EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION FOR DRILL RIGS

COMPANY: _____ UNIT NO. _____

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

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

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

	Good	Needs Repaired	N/A
- Number of U-Type (Crosby) Clips (5/16 – 5/8 = 3 clips minimum) (3/4 – 1 inch = 4 clips minimum) (1 1/8 – 1 3/8 inch = 5 clips minimum)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
➤ Kinks, bends – Flattened to > 50% diameter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
➤ Hemp/Fiber rope (Cathead/Split Spoon Hammer)			
- Minimum 3/4; maximum 1 inch rope diameter (Inspect for physical damage)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Rope to hammer is securely fastened	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Safety Guards:

Yes No

Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____

Hot pipes and surfaces exposed to accidental contact? _____

All emergency shut offs have been identified and communicated to the field crew? _____

Are any structural members bent, rusted, or otherwise show signs of damage? _____

Are fueling cans used with this equipment approved type safety cans? _____

Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? _____

Cleanliness:

Overall condition (was the decontamination performed prior to arrival on-site considered acceptable)? _____

Where was this equipment used prior to its arrival on site? _____

Site Contaminants of concern at the previous site? _____

Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls? _____

Flammable solvents stored in the operators cab? _____

Operator Qualifications (as applicable for all heavy equipment):

Does the operator have proper licensing where applicable, (e.g., CDL)? _____

Does the operator, understand the equipment's operating instructions? _____

Is the operator experienced with this equipment? _____

Is the operator 21 years of age or more? _____

ADDITIONAL INSPECTION REQUIRED PRIOR TO USE ON-SITE

Yes No

Does equipment emit noise levels above 90 decibels? _____

If so, has an 8-hour noise dosimetry test been performed? _____

Results of noise dosimetry: _____

Defects and repairs needed: _____

General Safety Condition: _____

Operator or mechanic signature: _____

Site Safety Officer Signature: _____

Approved for Use: Yes No

ATTACHMENT IV
SAFE WORK PERMITS

**SAFE WORK PERMIT
MOBILIZATION AND DEMOBILIZATION
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Mobilization and demobilization activities.
- II. Required Monitoring Instruments: None
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, or coveralls, safety glasses and safety footwear. Hard hats and hearing protection will be worn when working near operating equipment

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated</u>	_____	_____
_____	_____	_____

- 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 | <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 - leather/cotton) | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Pant legs taped to work boots if in an area of heavy vegetation. Tyvek coverall may also be used to protect against natural hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake chaps to protect against bites. Area which are frequented by alligators should also take the necessary precautions listed in Section 6.3 of this HASP

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

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

- X. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

XI. 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. Employ proper lifting techniques as described on Table 5-1 for this task.

Permit Issued by: _____ Permit Accepted by: _____ Permit No. _____ Date: _____

**SAFE WORK PERMIT
MULTI MEDIA SAMPLING
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Multi media sampling; slug testing and water level measurements.
- II. Required Monitoring Instrument(s): PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TINUS

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

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

Modifications/Exceptions: Minimum requirement are stated below.

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>PCE, TCE, DCE, Vinyl Chloride</u>	<u>Any readings above back</u>	<u>Evacuate area and only</u>
<u>Solvents and PAHs</u>	<u>ground > 1 minute in</u>	<u>investigate when safe levels</u>
	<u>duration</u>	<u>return</u>

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
Chemical/splash goggles	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades.....
Splash suits/coveralls.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type - Nitrile).....
Steel toe Work shoes or boots	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen.....
Chemical Resistant Boot Covers	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Impermeable apron.....

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work clothes and PVC or PE coated Tyvek if saturation or work clothes may occur. Impermeable aprons may be used in lieu of the coveralls if it can be demonstrated that it offers as much protection as the coveralls. This modification may be made to support measures against effects of heat stress.

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

IX. 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 Cleared and Established.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- X. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

XI. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
SOIL BORING AND MONITORING WELL INSTALLATION
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Soil borings and Monitoring Well installation using direct push technology or hollow stem auger.
- II. Required Monitoring Instruments: PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector: TtNUS

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

- V. Protective equipment required
 Level D Level B
 Level C Level A
 Detailed on Reverse
- Respiratory equipment required
 Full face APR
 Half face APR
 SAR
 Skid Rig
- Escape Pack
 SCBA
 Bottle Trailer
 None

Modifications/Exceptions: _____

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>PCE, TCE, DCE, Vinyl Chloride</u>	<u>Any readings above back</u>	<u>Evacuate area and only</u>
<u>Solvents and PAHs</u>	<u>ground > 1 minute in</u>	<u>investigate when safe levels</u>
	<u>duration</u>	<u>return</u>

- 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..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical Resistant Boot Covers..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Impermeable apron..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work clothes. PVC or PE coated Tyvek, if saturation or work clothes may occur. The Drillers should wear impermeable aprons to prevent soiling of work clothes when handling auger flights against the body. This can be used if heat stress is an issue. Safety harnesses will be used for activities greater than 6 feet above ground surface without support of safety handrail.

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

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

- X. Additional Permits required (Utility Locating and Excavation Clearance – Attachment II)..... Yes No
 If yes, complete permit required or contact Health Sciences, Pittsburgh Office

XI. Special instructions, precautions: Follow safe work practices specified in Section 5.0 of this HASP. Complete an Equipment Inspection Checklist for the Drill Rig upon arrival to the site, and then every 10 day shift thereafter or after major repairs. Test all emergency stop devices initially then periodically to insure operational status. Decontamination of equipment will consist of soap and water wash and rinse with the use of a pressure washer until visibly clean. Personnel decontamination will consist of soap and water wash and rinse of outer PPE and hands and face prior to breaks or meals.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
DECONTAMINATION ACTIVITIES
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment and machinery (i.e., drill rigs, augers). Brushes and spray bottles will be used on small sampling equipment. Pressure washers or steam cleaning units will be used on augers and drilling rig.
- II. Required Monitoring Instrument(s): None
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: When using pressure washers, steam cleaners field crews will wear hearing protection, and face shields.

- | | | |
|--------------------------------------|--------------------------------|-------------------------------------|
| VI. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>PCE, TCE, DCE, Vinyl Chloride</u> | <u>Any readings above back</u> | <u>Evacuate area and only</u> |
| <u>Solvents and PAHs</u> | <u>ground > 1 minute in</u> | <u>investigate when safe levels</u> |
| | <u>duration</u> | <u>return</u> |

- | | | |
|---|---|---|
| VII. Additional Safety Equipment/Procedures | | |
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio |
| Splash Shield | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Barricades |
| Splash suits/coveralls | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type - Nitrile) |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen |
| Chemical Resistant Boot Covers | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Impermeable apron |

Modifications/Exceptions: PVC rain suits or PE or PVC coated Tyvek for protection against splashes and overspray. Chemical resistant boot covers if excessive liquids are generated or to protected footwear. Hearing protection when operating the steam cleaner or pressure washer. Impermeable aprons are acceptable when cleaning sampling equipment instead of a splash suit.

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

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| IX. 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 Cleared and Established | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Physical Hazards Barricaded and Isolated | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Emergency Equipment Staged | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- X. Additional Permits required (Hot work, confined space entry, excavation etc.) Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- XI. Special instructions, precautions: Use PPE to prevent contact with equipment. Refer to the manufacturer's MSDS regarding decontamination fluids. For pressure washers or steam cleaners in excess of 3,000 psi use a fan tip of 25° or greater to control potential for water cuts. Inspect all hoses and fittings for structural integrity prior to use. Decontamination Pad construction – sloped a sufficient degree to allow collection at a sump away from the work area; constructed of 10-30 mil polyethylene sheeting should be covered in a light coating of sand if the surface becomes to slippery.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
HANDLING IDW
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Handling, sampling, and staging of IDW drums
- II. Required Monitoring Instruments: PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety shoes, hardhat, nitrile outer gloves with surgical-style inner gloves, impermeable boot covers.

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|--------------------------------------|--------------------------------|-------------------------------------|
| VI. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>PCE, TCE, DCE, Vinyl Chloride</u> | <u>Any readings above back</u> | <u>Evacuate area and only</u> |
| <u>Solvents and PAHs</u> | <u>ground > 1 minute in</u> | <u>investigate when safe levels</u> |
| | <u>duration</u> | <u>return</u> |

- | | | |
|---|---|---|
| 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 type="checkbox"/> No |
| Safety Glasses..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input 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 type="checkbox"/> No | Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling clothes. Work/rest regimen to be determined by SSO & site personnel. Cotton or leather gloves with surgical inner gloves.

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|---|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| VIII. Procedure review with permit acceptors | Yes | NA | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

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

- X. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

XI. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR MONITORING WELL ABANDONMENT MCRD PARRIS ISLAND, SOUTH CAROLINA

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Monitoring well abandonment
- II. Required Monitoring Instruments: PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS

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

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

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile or leather gloves with surgical inner gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the Drill Rig or other operating equipment.

V. Chemicals of Concern <u>PCE, TCE, DCE, Vinyl Chloride</u> <u>Solvents and PAHs</u>	Action Level(s) <u>Any readings above back</u> <u>ground > 1 minute in</u> <u>duration</u>	Response Measures <u>Evacuate area and only</u> <u>investigate when safe levels</u> <u>return</u>
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- | | |
|---|--|
| VI. Additional Safety Equipment/Procedures
Hard-hat <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash Shield <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Steel toe Work shoes or boots <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Radio <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Barricades <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Work/rest regimen <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
|---|--|

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall and disposable boots if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

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

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

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

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT FOR
GEOPHYSICAL AND GEOGRAPHICAL SURVEYING
MCRD PARRIS ISLAND, SOUTH CAROLINA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Geophysical and Geographical Surveying
- II. Required Monitoring Instruments: None
- III. Field Crew: _____
- IV. On-site Inspection conducted Yes No Initials of Inspector _____

TtNUS

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

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

Modifications/Exceptions: Minimum requirements include sleeved shirt and long pants and safety footwear. (except for magnetometer, geophysical surveys) Safety glasses, hard hats, and hearing protection will be worn when working near operating equipment.

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated given the nature of surveying activities and limited contact w/ media.</u>	<u>None</u>	

- | | |
|--|--|
| VII. Additional Safety Equipment/Procedures | |
| Hard-hat..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio..... <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 type="checkbox"/> No | Gloves (Type - Work)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Pant legs are to be taped to work boots to prevent entry under the clothing by ticks and other insects. Use repellants applied directly to the clothing at all entry points (pants to boots, shirt to pants, etc.) Tyvek coveralls may be used in heavy brush to protect against natural hazards (e.g., ticks) and also to make identification easier. If working in areas where snakes are a threat, we snake chaps to protect against bites.

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

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| IX. 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 Cleared and Established..... | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Physical Hazards Barricaded and Isolated..... | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Emergency Equipment Staged..... | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

- X. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
 If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- XI. 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. Decontamination is not required for this operation, it is however, required that persons perform a close body inspection upon exiting wooded or brush areas for ticks prior to entering vehicles and work trailers, etc. Suspend site activities in the event of inclement weather. Inspect all hand tools to insure in good condition prior to use.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V
MEDICAL DATA SHEET

MEDICAL DATA SHEET

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

Project MCRD PARRIS ISLAND

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals _____

What medications are you presently using? _____

Do you have any medical restrictions? _____

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

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

Signature

Date