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MCRD PARRIS ISLAND
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HEALTH AND SAFETY PLAN FOR REMEDIAL INVESTIGATION/RESOURCE
CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION AT SITE 21 AND SITE
INSPECTION/CONFIRMATORY SAMPLING AT SITES 4, 5, 7, 9, 13, 21, 27 AND 35 MCRD
PARRIS ISLAND SC
9/3/1999
TETRA TECH NUS

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Revision 1
09/03/99

Health and Safety Plan
for
Remedial Investigation/RCRA Facility
Investigation
at SWMU 21
and
Site Inspections/RCRA Confirmatory
Sampling
At Sites 4/13, 5, 7, 9 and
SWMUs 21, 27, and 35

Marine Corps Recruit Depot
Parris Island, South Carolina



Southern Division
Naval Facilities Engineering Command
Contract No. N62467-94-D-0888
Contract Task Order 0084

September 1999

**HEALTH AND SAFETY PLAN
FOR
REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION AT SWMU 21
AND
SITE INSPECTIONS/RCRA CONFIRMATORY SAMPLING
AT SITES 4/13, 5, 7, 9 AND SWMUs 21, 27, AND 35**

**MARINE CORPS RECRUIT DEPOT
PARRIS ISLAND, SOUTH CAROLINA**

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

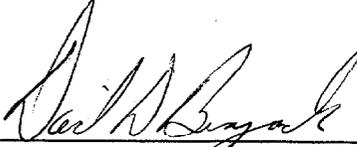
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**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0084**

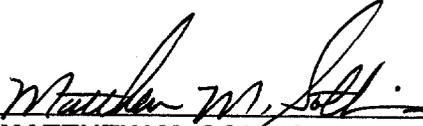
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1.0 INTRODUCTION

This Health and Safety Plan (HASP) addresses investigation activities to be conducted at the Marine Corp Recruit Depot (MCRD) at Parris Island, South Carolina as part of Contract Task Order (CTO) 0084. Specifically, this HASP addresses the performance of a Remedial Investigation (RI)/RCRA Facility Investigation (RFI) at Solid Waste Management Unit (SWMU) 21. Additionally, Site Inspections (SIs)/RCRA Facility Assessment Confirmatory Sampling (CS) will be conducted at six additional sites. The sites to be investigated are as follows.

Site 4/13 – Dredge Spoils Area Fire Training Pit (including Site 13 – Inert Disposal Area C)

Site 5 – Former Paint Shop Disposal Area

Site 7 – Page Field Fire Training Pit

Site 9 – Paint Waste Storage Area

SWMU 21 – Weapons Power Plant Oil/Water Separator

SWMU 27 – Equipment Parade Deck Satellite Accumulation Area (SAA)

SWMU 35 – Defense Reutilization and Marketing Office (DRMO) Salvage Storage Area.

This HASP is being prepared for MCRD as part of an overall effort conducted under 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. In addition to the HASP, a copy of the Tetra Tech NUS, Inc. (TtNUS) Environmental Health and Safety Guidance Manual must be present at the site during the performance of site activities. The Guidance Manual provides supporting information pertaining to the HASP, as well as TtNUS Standard Operating Procedures (SOP's). Both documents must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 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 by the Project Health & Safety Officer (PHSO) and approved by the TtNUS CLEAN Health and Safety Manager (HSM) and the Task Order Manager (TOM). The TOM will notify affected personnel of all changes.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility

for all onsite health and safety. These persons will be the primary points of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for onsite activities.

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

- ix. Investigates all accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
 - x. Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.
- Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TtNUS CLEAN HSM.

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

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) 525-3423

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 4.0), including soil boring (drilling), monitoring well installation, multi-media sampling, and other related activities.

Proposed Dates of Work: September 1999 until project completion

Project Team:

TtNUS Personnel:

David D. Brayack, P.E.

Gary Gunter, P.G.

Matthew M. Soltis, CIH, CSP

Delwyn E. Kubeldis, CIH, CSP

TBD

Non-TtNUS Personnel

TBD

Discipline/Tasks Assigned:

Task Order Manager (TOM)

Field Operations Leader (FOL)

CLEAN Health and Safety Manager (HSM)

Project Health and Safety Officer (PHSO)

Site Safety Officer (SSO)

Affiliation/Discipline/Tasks Assigned

Drilling Subcontractor(s)

Prepared By: Delwyn E. Kubeldis, CIH, CSP

TBD - To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section is part of a preplanning effort to direct and guide field personnel in the event of an emergency. In the event of onsite emergencies that cannot be handled by onsite personnel, they will be evacuated to a safe place of refuge, and the appropriate emergency response agencies will be notified. Because a majority of potential emergency situations will require assistance from outside emergency responders, TtNUS and subcontractor personnel will not provide emergency response support for significant emergency events beyond responding to easily controlled minor incidents. The emergency response agencies listed in this plan are capable of providing the most effective response and are designated as the primary responders. These agencies are located within a reasonable distance from the area of operations, a factor that 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 will, through necessary services, include initial response measures for incidents such as:

- Initial fire-fighting support and prevention
- Initial 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 PRE-EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, injury or illness resulting from exposure to chemical or physical hazards or fire are the most probable emergencies that can be encountered during site activities. To minimize and eliminate these potential emergency situations, pre-emergency planning activities associated with this project include the following. 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 includes 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 visual observation. A clear knowledge of the signs and symptoms of overexposure to contaminants of concern may alert personnel of the potential hazards concerning themselves or their fellow workers. These potential hazards, the activities with which they have been associated, and the recommended control methods are discussed in detail in Sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate any conditions that may predispose site personnel or properties to an emergency. The FOL and the SSO will constitute the site evaluation committee responsible for these periodic surveys. 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 these situations. However, if the FOL and/or the SSO determine that an incident has progressed to a serious emergency situation, TtNUS will withdraw, and notify the appropriate response agencies.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual, applicable OSHA regulations, and through periodic site surveys of work areas.

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 FOL at the place of safe refuge. 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 TtNUS FOL. 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 offer a point for communication purposes should this be required.

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, should they be needed.

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, assembly points at MCRD will be selected, 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 TtNUS personnel will not always be working in the proximity of each other, hand signals, voice commands, air horns, and two-way radios (approved by MCRD personnel) will comprise the mechanisms to alert site personnel of an emergency.

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

- Initiate incident alerting procedures (if needed) verbally, by air horn, or using two-way radios.
- Evacuate non-essential personnel.
- Initiate incipient response procedures.
- Describe to the FOL (who will serve as the Incident Commander) what has occurred in as much detail as possible.

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

- Contact 911 to report the incident (see Table 2-1). Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

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

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

2.7 EMERGENCY CONTACTS

Prior to initiating field activities, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted where it is readily available to 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) 525-3423 |
| Chemtrec National Response Center | (800) 424-9300 (800) 424-8802 |
| Tetra Tech NUS, Pittsburgh Office | (412) 921-7090 |
| Task Order Manager David D. Brayack, P.E. | (412) 921-8375 |
| CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP | (412) 921-8912 |
| Project Health & Safety Officer Delwyn E. Kubeldis, CIH, CSP | (412) 921-8529 |
| Navy Remedial Project Manager (RPM) Art Sanford | (843) 820-7482 |
| Maintenance (Emergency) Maintenance Division, Supervisor (Utilities) | (843) 525-3145 (843) 525-2720 |

2.8 EMERGENCY ROUTE TO HOSPITAL

Beaufort Memorial Hospital
121 South Ribaut Road
Beaufort, South Carolina
(803) 522-5200

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. Follow signs to entrance of Beaufort Memorial Hospital.

A map showing the route from the Main Gate to the hospital is shown as Figure 2-1.

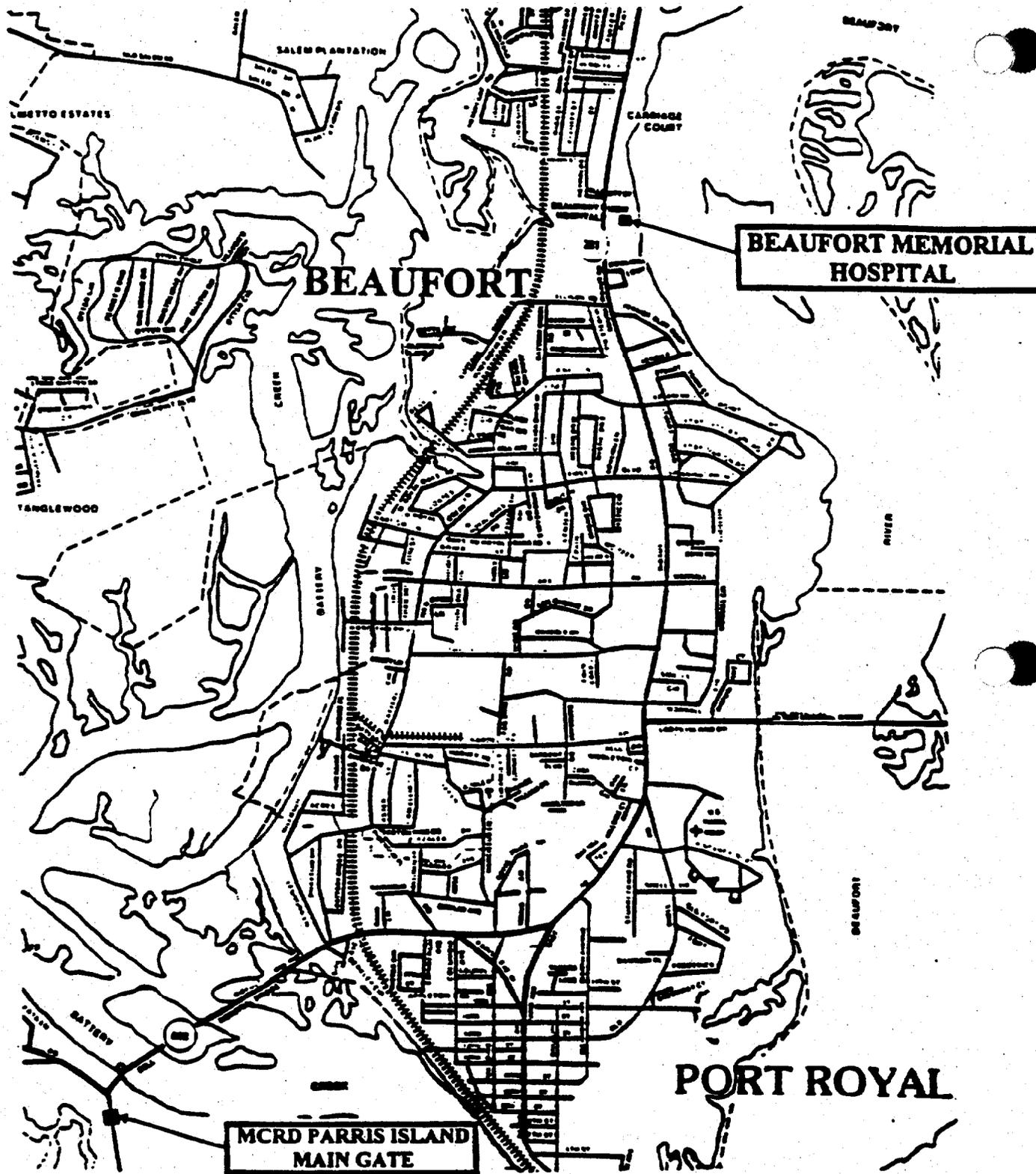


FIGURE 2-1
EMERGENCY ROUTE
MCRD PARRIS ISLAND

2.9 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

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

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

2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident. 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 Continuum Healthcare physician. Continuum Healthcare will contact the medical facility and request specific testing which may be appropriate. The care of the involved worker will be monitored by Continuum Healthcare physicians. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call Continuum Healthcare at 1-800-229-3674, being prepared to provide:
 - 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 Continuum Healthcare at (770) 457-1429.
- 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 the Continuum Healthcare Medical Director or Assistant Medical Director.

Continuum Healthcare 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 Continuum Healthcare.

**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. It 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 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 SITES DESCRIPTION

3.1.1 Site 4/13 – Dredge Spoils Area Fire Training Pit And Site 13 - Inert Disposal Area C

The Dredge Spoils Area Fire Training Pit was used from the 1940's to the 1960's to conduct fire-fighting exercises. Petroleum-based liquids were placed in a shallow pit, set on fire, and then extinguished. In 1976, the fire training pit was covered with dredge materials from the Marina Basin and Ballast Creek. As a result, there is no current visual evidence of the location of this former pit. Two potential locations of the pit have been identified from an aerial photograph taken in 1951 (see Figure 2-1 of the Work Plan).

Potential contaminant migration has been identified from the source area to a nearby stream via shallow groundwater. Useable data from historic Site 4 investigations are not currently available. Also, since the most recent data is over twelve years old and the potential primary site contaminants (fuels) are biodegradable, these data may not be representative of current conditions. Three monitoring wells from the IAS may still be present in the area, although the condition of the wells is unknown.

In 1996, two surface soil (sediment) samples were collected from near the dredge spoils area ditch. These samples were found to contain metals at concentrations greater than background and volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), pesticides, and Polychlorinated Biphenyls (PCBs). However, based on sample depth and location, these results are more likely associated with Site 13C.

3.1.2 Site 5 – Former Paint Shop Disposal Area

The former paint shop disposal area is a location where dried paint wastes were reportedly placed at the edge of the Beaufort River from the 1930s to the 1960s. In 1972, this area was covered with soils and later, construction rubble. The location of this area is illustrated on Figure 2-2 of the Work Plan

In 1996, two sediment samples along the bank were collected and found to contain metals at concentrations greater than background. Also, PAHs, VOCs, and pesticides were detected in the sediments at the site.

3.1.3 Site 7– Page Field Fire Training Pit

The Page Field Fire Training Pit was concrete lined and used from the mid-1960's to 1976 to practice fire-fighting techniques. Petroleum-based liquids were placed in a shallow pit, set on fire, and then extinguished. In 1976, a small leak in the unit was noticed. The unit was reportedly used for several months after the leak was discovered. The location of this former unit is shown in Figure 2-3 of the Work Plan.

Data from the previous work is not currently available. However, even if available, based on the time that the samples were collected, and the potential for biodegradation of the potential primary site contaminants (fuels), previous data would not be usable to determine if contamination is currently present. Three monitoring wells are reportedly present at the site, however the condition of these wells is unknown.

3.1.4 Site 9 – Paint Waste Storage Area

This area was an unlined pad used to store paint wastes from approximately 1969 to 1984 (see Figure 2-4 of the Work Plan). In 1984, the upper six inches of soil were removed and the area was paved. In 1996, three soil samples were collected from surface areas in close proximity to the paved area. These samples were found to contain elevated concentrations of several metals, PAHs, VOCs, PCBs, and several pesticides.

3.1.5 SWMU 21 – Weapons Power Plant Oil/Water Separator

The oil/water separator has been in use since at least 1978 (based on the name plate on the unit). The separator is designed to handle a maximum of 15 gallons per minute of precipitation from a No. 6 fuel oil aboveground storage tank and associated truck unloading pad. The site was originally considered for investigation because a sump located within the steam plant may have been tied into this separator. This sump could have contained hazardous chemicals and therefore releases from the separator could impact the receiving stream. Recent dye testing conducted by MCRD Parris Island on the sump indicated that

the sump does not tie into the separator, but rather the sump is tied into the sanitary sewer. The location of the oil/water separator is illustrated on Figure 2-5 of the Work Plan.

In 1996, one sediment sample was collected at the discharge point of the oil/water separator. Several metals at concentrations above background were detected. PAHs, one VOC, and one pesticide were also detected (although the concentrations of the VOC and pesticide are not considered significant).

3.1.6 SWMU 27 – Equipment Parade Deck SAA

SWMU 27 was used for storage of miscellaneous equipment for an unknown period of time. The location of SWMU 27 is illustrated in Figure 2-6 of the Work Plan. In 1996, two soil samples were collected in the area of the pad. Several metals were detected at concentrations similar to background. In addition, PAHs, VOCs, and pesticides were detected. One area was used for storage of transformers. This area was not tested in 1995 to determine if PCB contamination is present.

3.1.7 SWMU 35 – DRMO Salvage Storage Area

The DRMO Salvage Area (illustrated in Figure 2-7 of the Work Plan) has been used from 1964 to present to inventory miscellaneous salvage material, including waste lead acid batteries. In 1996, three soil samples were collected throughout the area. Several metals were detected at concentrations similar to background. In addition, several PAHs, VOCs, PCBs, and pesticides were detected in site soils. Samples were not collected in the area of the battery storage. As a result, it is unknown whether metal releases have occurred at the battery storage area.

4.0 SCOPE OF WORK

The following is a list of activities that are covered in this HASP for the contamination assessment to be conducted under CTO 0084. Note that not all tasks will be conducted at each site.

- Mobilization/demobilization
- Soil boring activities (using hollow stem auger or Direct Push Technology [DPT] techniques) (Sites 4/13, 7, 9, and SWMU 35)
- Monitoring well installation, purging, and development (Sites 4/13, 7, 9, and SWMU 35)
- Test pit operations (at Site 4/13)
- Multi-media sampling, including surface and subsurface soil, sediment, groundwater and investigative-derived waste (IDW) sampling
- Decontamination of sampling and heavy equipment
- Surveying
- IDW management

The following table summarizes these tasks for each site to be investigated:

| | Soil Borings | Well Installation | Test Pit Excavation | Multi-Media Sampling |
|-----------|--------------|-------------------|---------------------|----------------------|
| Site 4/13 | X | X | X | X |
| Site 5 | | | | X |
| Site 7 | X | X | | X |
| Site 9 | X | X | | X |
| SWMU 21 | | | | X |
| SWMU 27 | | | | X |
| SWMU 35 | X | X | | X |

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

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

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

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

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

Safe Work Permits issued for all Exclusion Zone activities (See Section 9.4 and Attachment IV) will use elements defined in Table 5-1 as the primary reference. The FOL or the SSO completing the Safe Work Permit will add additional site-specific information. In situations where the Safe Work Permit is more conservative than the direction provided in Table 5-1, the Safe Work Permit will be followed. As the project develops and more information is gained, the SSO will modify the Safe Work Permits to reflect this information.

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

| Tasks/Operation/ Locations | Anticipated Hazards | Recommended Control Measures | Hazard Monitoring | Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i> | Decontamination Procedures |
|--|---|---|---|---|--|
| Mobilization/ Demobilization | <p><i>Physical Hazards</i></p> <ol style="list-style-type: none"> 1) Lifting (strain/muscle pulls) 2) Pinches and compressions 3) Slip, trips, and falls 4) Heavy equipment hazards (rotating equipment, hydraulic lines, etc.) 5) Vehicular and foot traffic 6) Ambient temperature extremes (heat stress) <p><i>Natural hazards</i></p> <ol style="list-style-type: none"> 7) Insect/animal bites and stings, poisonous plants, etc. 8) Inclement weather | <ol style="list-style-type: none"> 1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 2) Keep any machine guarding in place. Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points. 3) Preview work locations for unstable/uneven terrain. 4) All equipment will be <ul style="list-style-type: none"> - Inspected in accordance with OSHA and manufacturer's design. - Operated by knowledgeable operators and ground crew. 5) Traffic and equipment considerations are to include the following: <ul style="list-style-type: none"> - Establish safe zones of approach (i.e. Boom + 3 feet). - Secure all loose articles to avoid possible entanglement. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the Base requirements. 6) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP. 7) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the Health and Safety Guidance Manual. 8) Suspend or terminate operations until directed otherwise by SSO. | Not required | <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - <i>Safety glasses</i> - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Reflective vest for high traffic areas</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> | Not required |
| Decontamination of Sampling and Heavy Equipment | <p><i>Chemical Hazards</i></p> <ol style="list-style-type: none"> 1) Primary types of contaminants include SVOCs (diesel fuel, waste oils, and general PAHs), metals (including lead and vanadium), pesticides (including Chlordane and DDT), and PCBs. Note that these contaminants may be bound to particulates (dusts, soils, etc.) and contact should be avoided whenever possible. None of the site contaminants, however, are anticipated to be present in significant concentrations to present an inhalation hazard. See Table 6-1 for more information on the chemicals of concern. 2) Decontamination fluids - Liquinox (detergent), acetone or isopropanol <p><i>Physical Hazards</i></p> <ol style="list-style-type: none"> 3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Vehicular and foot traffic 7) Ambient temperature extremes (heat stress) 8) Slips, trips, and falls <p><i>Natural Hazards</i></p> <ol style="list-style-type: none"> 9) Inclement weather | <ol style="list-style-type: none"> 1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination fluids used onsite. These must be used in well-ventilated areas, such as outdoors. 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). 3) Use multiple persons where necessary for lifting and handling sampling equipment for decontamination purposes. 4) Wear hearing protection when operating pressure washer. 5) Use eye and face protective equipment when operating pressure washer. All other personnel must be restricted from the area. 6) Traffic and equipment considerations are to include the following: <ul style="list-style-type: none"> - Establish safe zones of approach. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the Base requirements. 7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP. 8) Preview work locations for unstable/uneven terrain. 9) Suspend or terminate operations until directed otherwise by SSO. | Use visual observation, and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried. After decon is completed, screen equipment with a PID/FID. If any elevated readings (i.e., above background) are observed, perform decon again and re-screen. Repeat until no elevated PID/FID readings are noted. | <p>For Heavy Equipment This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Chemical resistant boot covers - Nitrile outer gloves - <i>PVC Rainsuits or PE or PVC coated Tyvek</i> - <i>Safety glasses underneath a splash shield</i> - <i>Hearing protection (plugs or muffs)</i> <p>For sampling equipment (trowels, MacroCore Samplers, bailers, etc.), the following PPE is required</p> <p>Note: Consult MSDS for PPE guidance. Otherwise, observe the following.</p> <p>Level D Minimum requirements -</p> <ul style="list-style-type: none"> - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves - Safety glasses <p>In the event of overspray of chemical decontamination fluids employ PVC Rainsuits or PE or PVC coated Tyvek as necessary.</p> | <p>Personnel Decontamination will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of outer boots and gloves, as applicable - Soap/water wash and rinse of the outer splash suit, as applicable - Disposable PPE will be removed and bagged. <p>Equipment Decontamination - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>Sampling Equipment Decontamination</p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p> <p>MSDS for any decon solutions (Alconox, isopropanol, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.).</p> <p>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 onsite and leaving the site. No equipment will be authorized access or exit without this evaluation.</p> |

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
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| Tasks/Operation/ Locations | Anticipated Hazards | Recommended Control Measures | Hazard Monitoring | Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i> | Decontamination Procedures |
|---|--|---|--|---|---|
| <p>Multi-media sampling, including soil, groundwater, sediment, and IDW sampling.</p> | <p>Chemical Hazards</p> <p>1) Primary types of contaminants include SVOCs (diesel fuel, waste oils, and general PAHs), metals (including lead), pesticides (including Chlordane and DDT), and PCBs. Note that these contaminants may be bound to particulates (dusts, soils, etc.) and contact should be avoided whenever possible. None of the site contaminants, however, are anticipated to be present in significant concentrations to present an inhalation hazard. Specific contaminants by Site or SWMU are:</p> <p>Site 4/13 - SVOCs (diesel fuel, waste oils, and general PAHs), metals (lead), and PCBs</p> <p>Site 5 - SVOCs (general PAHs), metals (vanadium), pesticides (Chlordane and DDT), and PCBs</p> <p>Site 7 - SVOCs (diesel fuel, waste oils, and general PAHs) and PCBs</p> <p>Site 9 - SVOCs (general PAHs), metals (lead), pesticides (Chlordane and DDT), and PCBs</p> <p>SWMU 21 - SVOCs (general PAHs) and metals (lead)</p> <p>SWMU 27 - SVOCs (general PAHs), metals (lead), and pesticides (DDT)</p> <p>SWMU 35 - SVOCs (general PAHs), metals (lead), pesticides (DDT), and PCBs</p> <p>See Table 6-1 for more information on the chemicals of concern.</p> <p>2) Transfer of contamination into clean areas</p> <p>Physical hazards</p> <p>3) Noise in excess of 85 dBA 4) Lifting (strain/muscle pulls) 5) Pinches and compressions 6) Slip, trips, and falls 7) Ambient temperature extremes (heat stress) 8) Vehicular and foot traffic</p> <p>Natural hazards</p> <p>9) Insect/animal bites and stings, poisonous plants, etc. 10) Inclement weather</p> | <p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, termination of activities may be used to minimize exposure to observed airborne dusts.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site.</p> <p>3) When sampling at the drill rig use hearing protection. The use of hearing protection outside of 25 feet from the drill rig should be incorporated under the following condition:</p> <p align="center">If you have to raise your voice to talk to someone who is within 2 feet of your location, hearing protection must be worn.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Keep any machine guarding in place. Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points.</p> <p>- A remote sampling device must be used to sample drill cuttings near rotating tools. The equipment operator shall shutdown machinery if the sampler is near moving machinery parts.</p> <p>6) Preview work locations for unstable/uneven terrain.</p> <p>7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP.</p> <p>8) Traffic and equipment considerations are to include the following:</p> <p>- Establish safe zones of approach (i.e. Boom + 3 feet).</p> <p>- Secure all loose articles to avoid possible entanglement.</p> <p>- All equipment shall be equipped with movement warning systems.</p> <p>- All activities are to be conducted consistent with the Base requirements.</p> <p>9) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the Health and Safety Guidance Manual.</p> <p>10) Suspend or terminate operations until directed otherwise by the SSO.</p> | <p>It is not anticipated that potential contaminant concentrations at outdoor sample locations will present an inhalation hazard.</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp or higher, 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 borehole 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> <p>- Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above 10 ppm in the breathing zone areas of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area.</p> <p>- Work may only resume if airborne readings in worker breathing zone areas return to below 10 ppm. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection.</p> <p>Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides.</p> | <p>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (double-layered if necessary) - <i>Reflective vest for high traffic areas</i> - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p> | <p>Personnel Decontamination will consist of a removal and disposal of non-reusable PPE (gloves, coveralls, etc., 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 - Outer coveralls, boot covers, and/or outer glove removal (as applicable) - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Soap/water wash and rinse of reusable PPE (e.g., hardhat) if potentially contaminated - Wash hands and face, leave contamination reduction zone. |

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
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| Tasks/Operation/ Locations | Anticipated Hazards | Recommended Control Measures | Hazard Monitoring | Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i> | Decontamination Procedures |
|---|---|--|---|---|---|
| <p>Soil borings using hollow-stem augers or Direct Push Technique (DPT).</p> <p>This task also includes monitoring well installation, development, and purging.</p> <p>This task will only be conducted at Sites 4/13, 7, 9, and SWMU 35.</p> | <p><i>Chemical Hazards</i></p> <p>1) Primary types of contaminants include SVOCs (diesel fuel, waste oils, and general PAHs), metals (including lead and vanadium), pesticides (including Chlordane and DDT), and PCBs. Note that these contaminants may be bound to particulates (dusts, soils, etc.) and contact should be avoided whenever possible. None of the site contaminants, however, are anticipated to be present in significant concentrations to present an inhalation hazard. Specific contaminants by Site or SWMU are:</p> <p>Site 4/13 - SVOCs (diesel fuel, waste oils, and general PAHs), metals (lead), and PCBs</p> <p>Site 7 - SVOCs (diesel fuel, waste oils, and general PAHs) and PCBs</p> <p>Site 9 - SVOCs (general PAHs), metals (lead), pesticides (Chlordane and DDT), and PCBs</p> <p>SWMU 35 - SVOCs (general PAHs), metals (lead), pesticides (DDT), and PCBs</p> <p>See Table 6-1 for more information on the chemicals of concern.</p> <p>2) Transfer of contamination into clean areas or onto persons</p> <p><i>Physical hazards</i></p> <p>3) Heavy equipment hazards (pinch/compression points, rotating equipment, hydraulic lines, etc.)</p> <p>4) Noise in excess of 85 dBA</p> <p>5) Energized systems (contact with underground or overhead utilities)</p> <p>6) Lifting (strain/muscle pulls)</p> <p>7) Slip, trips, and falls</p> <p>8) Vehicular and foot traffic</p> <p>9) Ambient temperature extremes (heat stress)</p> <p>10) Flying projectiles</p> <p><i>Natural hazards</i></p> <p>11) Insect/animal bites and stings, poisonous plants, etc.</p> <p>12) Inclement weather</p> | <p>1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (air, water, soils, etc.). Generation of dusts should be minimized. If airborne dusts are observed, area wetting methods may be used. If area wetting methods are not feasible, termination of activities may be used to minimize exposure to excessive airborne dusts.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site.</p> <p>3) All equipment to be used will be</p> <ul style="list-style-type: none"> - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600, 601, 602), and manufacturers design and documented as such using Equipment Inspection Sheet (see Attachment III of this HASP). - Operated by knowledgeable operators and ground crew. - Repaired using only manufacturer approved parts and equipment. <p>In addition to the equipment considerations, the following standard operating procedures will be employed:</p> <ul style="list-style-type: none"> - All personnel not directly supporting the drilling operation will remain at least 25 feet from the point of operation. - All loose clothing/protective equipment will be secured to avoid possible entanglement. - Hand signals will be established prior to the commencement of drilling activities. - A remote sampling device must be used to sample drill cuttings near rotating tools. - Work areas will be kept clear of clutter. - 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. - Areas will be inspected prior to the movement of drill rigs and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. <p>4) Hearing protection will be used during all subsurface activities.</p> <p>5) All subsurface activities must proceed in accordance with the TINUS 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.</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) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> - Establish safe zones of approach (i.e. Boom + 3 feet). - Secure all loose articles to avoid possible entanglement. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the Base requirements. <p>9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP.</p> <p>10) Wear eye protection (safety glasses) when drill rig is operating. All other personnel must be restricted from the area.</p> <p>11) Avoid nesting areas, use repellents. Wear appropriate clothing. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the Health and Safety Guidance Manual.</p> <p>12) Suspend or terminate operations until directed otherwise by SSO.</p> | <p>It is not anticipated that potential contaminant concentrations at outdoor sample locations will present an inhalation hazard.</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp or higher, 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 borehole 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 10 ppm in the breathing zone areas 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 areas return to below 10 ppm. 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) - Safety shoes (Steel toe/shank) - Safety glasses - Hardhat - Nitrile gloves or leather gloves with surgical style inner gloves - <i>Reflective vest for traffic areas</i> - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire.</i> - <i>Hearing protection during soil boring activities and for other high noise areas as directed by the SSO.</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p> | <p>Personnel Decontamination - Will consist of a soap/water wash and rinse for reusable protective equipment (e.g., gloves). This function will take place at an area adjacent to the drilling operations bordering the support zone.</p> <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of reusable outer gloves, as applicable - Outer coveralls, boot covers, and/or outer glove removal - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Wash hands and face, leave contamination reduction zone. |

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
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| Tasks/Operation/ Locations | Anticipated Hazards | Recommended Control Measures | Hazard Monitoring | Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i> | Decontamination Procedures |
|--|---|--|---|---|--|
| Surveying | <p><i>Chemical hazards:</i></p> <p>Exposure to site contaminants during this activity is anticipated to be unlikely given the limited contact with potentially contaminated media.</p> <p><i>Physical hazards:</i></p> <p>1) Slip, trips, and falls</p> <p><i>Natural Hazards:</i></p> <p>2) Inclement weather</p> <p>3) 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) Suspend or terminate operations until directed otherwise by SSO</p> <p>3) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison ivy, poison oak, etc.). Report potential hazards to the SSO. When feasible and necessary, use commercially available insect repellents. Refer to Section 4 of the Health and Safety Guidance Manual for additional information on natural hazards.</p> | <p>No air monitoring is needed given the unlikelihood that volatile contaminants are present. The potential for exposure to site contaminants during this activity is considered minimal.</p> <p>Minimize the generation of airborne dusts since many site contaminants are in the form of a particulate or may be bound to particulates.</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 - Steel-toe work boots or shoes - Safety glasses, hard hats (if working near machinery) - Snake chaps for heavily wooded area where encounters are likely. - Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks. Work gloves may be worn if desired. | <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> |
| IDW management and moving IDW drums to storage areas | <p><i>Chemical Hazards</i></p> <p>1) Primary types of site contaminants include SVOCs (diesel fuel, waste oils, and general PAHs), metals (including lead and vanadium), pesticides (including Chlordane and DDT), and PCBs. Given that IDW drums are usually closed and sealed, it is unlikely that exposure to any site contaminants will occur during this task. Nonetheless, see Table 6-1 for more information on the chemicals of concern.</p> <p>2) Transfer of contamination into clean areas</p> <p><i>Physical hazards</i></p> <p>3) Noise in excess of 85 dBA</p> <p>4) Lifting (strain/muscle pulls)</p> <p>5) Pinches and compressions</p> <p>6) Slip, trips, and falls</p> <p>7) Vehicular and foot traffic</p> <p>8) Ambient temperature extremes (heat stress)</p> <p><i>Natural hazards</i></p> <p>9) Insect/animal bites and stings, poisonous plants, etc.</p> | <p>1) Employ real-time monitoring instrumentation, action levels, and identify PPE to control exposures to potentially contaminated media (e.g. air, water, soils).</p> <p>2) Decontaminate all equipment and supplies, if they become contaminated, between locations and prior to leaving the site.</p> <p>3) When working near heavy equipment, use hearing protection.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Keep any machine guarding in place. Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points.</p> <p>6) Preview work locations for unstable/uneven terrain.</p> <p>7) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> - Establish safe zones of approach (i.e. Boom + 3 feet). - Secure all loose articles to avoid possible entanglement. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the Base requirements. <p>8) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP.</p> <p>9) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the Health and Safety Guidance Manual.</p> | <p>It is not anticipated that potential contaminant concentrations at outdoor sample locations will present an inhalation hazard.</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp or higher, 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 borehole 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 10 ppm in the breathing zone areas 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 areas return to below 10 ppm. 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>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (long sleeve shirt; long pants) - Nitrile or cotton/leather work gloves with surgical style inner gloves - Safety shoes (steel toe/shank) - Safety glasses - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Reflective vest for high traffic areas</i> - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario.</i> | <p>Personnel Decontamination will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of outer boots and gloves, as applicable - 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 FOR
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| Tasks/Operation/ Locations | Anticipated Hazards | Recommended Control Measures | Hazard Monitoring | Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)</i> | Decontamination Procedures |
|--|--|--|--|---|---|
| <p>Excavation of test pits (to be conducted at Site 4)</p> <p>The purpose of this activity is to determine whether there is any evidence of the former Dredge Spoils Area Fire Training Pit.</p> | <p><i>Chemical hazards:</i></p> <p>1) The nature and extent of contaminants present at Site 4 has not been fully determined. Based on historical usage of the site, however, the following are considered the potential contaminants:</p> <p>Site 4/13 - SVOCs (diesel fuel, waste oils, and general PAHs), metals (lead), and PCBs</p> <p>See Table 6-1 for more information on the chemicals of concern.</p> <p>2) Transfer of contamination into clean areas or onto persons.</p> <p><i>Physical hazards:</i></p> <p>3) Moving machinery/Vehicular and foot traffic (contact entanglement with equipment or machinery)</p> <p>4) Excavation collapse</p> <p>5) Energized systems (contact with underground or overhead utilities)</p> <p>6) Noise in excess of 85 dBA</p> <p>7) Lifting (strain/muscle pulls)</p> <p>8) Slips, trips, and falls</p> <p>9) Ambient temperature extremes (heat stress)</p> <p>10) Contact with sharp objects (glass, metal, etc.)</p> <p><i>Natural Hazards:</i></p> <p>11) Insect/animal bites and stings, poisonous plants, etc.</p> <p>12) Inclement weather</p> | <p><i>Chemical hazards:</i></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, termination of activities may be used to minimize exposure to excessive airborne dusts.</p> <p>2) Restrict the cross use of equipment and supplies between locations and activities without first going through a suitable decontamination.</p> <p><i>Physical hazards:</i></p> <p>3) All equipment to be employed 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, and documented as such using Equipment Inspection Checklist provided as Attachment III. Complete the Equipment Inspection Checklist for each piece of equipment used at the site. Equipment operation will be: - Conducted by knowledgeable operators and coordinated by experienced ground crew, as applicable. - Coordinated by ground crew who will verify safety of bucket position relative to ground conditions, personnel, and drums/objects. <p>Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none"> - Establish safe zones of approach (i.e., Bucket boom + 3 feet). - All equipment shall be equipped with movement warning systems. - Employ safety belts and follow the site traffic rules. <p>4) All excavations shall be in conformance with requirements established under 29 CFR 1926.650 - .652 concerning sloping, shoring, storage, and movement on and over and around trenches and excavations.</p> <ul style="list-style-type: none"> - No personnel associated with this field effort will enter any excavations (including test pits). - All supplies, clean fill, vehicular traffic will be maintained at a minimum distance of 3 feet from the excavation, or 2 feet if a sidewall restraining device is employed. - When drums or other containers are uncovered, the excavation activities shall be halted until the SSO characterizes any site contaminants and evaluates the implications of excavating and removing the drum. - Excavations will not proceed any closer than 6 feet to any foundation, footer, and/or support base. - No test pit will be permitted to be left open, unattended. - Site control during excavation will be accomplished through the use of barricade tape and weighted poles and signs indicating excavation in progress <p>5) All subsurface activities must proceed in accordance with the TINUS SOP "Utility Locating and Excavation Clearance" (see Attachment II of this HASP). All utility clearances shall be obtained prior to any excavation activities. Where the utility clearance cannot be obtained in a reasonable period, or not located, excavations shall proceed with extreme caution and proceed using cable and piping locators and other geophysical detection methods to avoid utility damage and unintentional contact with buried objects.</p> <p>6) Hearing protection will be worn by all personnel in the immediate area of the excavator during test pit operations.</p> <p>7) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>8) Preview work locations for unstable/uneven terrain. Avoid working/walking too close to excavation and other areas of unsure footing.</p> <p>9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Section 4 of the Health and Safety Guidance Manual.</p> <p>10) Avoid contacting sharp or jagged edges of containers or debris. Wear leather or cut-resistant gloves when handling excavated/sharp objects.</p> <p>11) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrist areas to prevent ticks, chiggers, etc., from attaching themselves to your skin. Follow directions as specified in Section 6.3 of this HASP and Section 4 of the Health and Safety Guidance Manual.</p> <p>12) Suspend or terminate operations until directed otherwise by SSO</p> | <p>Continuous monitoring will be performed during operations to ensure safe work conditions do not change as a result of work being performed or other external factors. Monitoring of each excavation activity, in particular, will be performed in an attempt to anticipate and characterize site contaminants.</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp or higher, or a Flameionization Detector (FID), will be used to screen operations and to detect the presence of any potential volatile organics. Source monitoring of the test pits 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 10 ppm in the breathing zone areas 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 areas return to below 10 ppm. 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 test pit operations will be performed in Level D protection.</p> <p>Level D protection constitutes the following minimum protection</p> <ul style="list-style-type: none"> - Standard field dress (long pants, sleeved shirts) - Steel toe safety shoes or boots - Hard-hat, safety glasses, and earplugs or muffs. - <i>Tyvek coveralls will be worn if there is a possibility of soiling work attire</i> - <i>Impermeable boot covers</i> - PVC or PE coated Tyvek will be incorporated if there is a potential for saturation of work attire. - <i>Gloves - Nitrile for handling soils and/or debris (These items are optional as conditions dictate)</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p> | <p>Personnel Decontamination - Will consist of a soap/water wash and rinse for outer protective equipment (e.g., boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the test pitting operations bordering the support zone.</p> <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none"> - Equipment drop - Soap/water wash and rinse of reusable PPE (e.g., splash suits), as applicable - Removal and disposal of disposable PPE items (gloves, disposable boot covers, etc) - Wash hands and face, leave contamination reduction zone. |

6.0 HAZARD ASSESSMENT

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

6.1 CHEMICAL HAZARDS

The potential health hazards associated with the tasks to be conducted at MCRD include inhalation, ingestion, and dermal contact of various contaminants that may be present in shallow and deep soils, sediment, and groundwater. Based on prior sampling activities at the site and site history, the types of contaminants anticipated include petroleum-based liquids (waste oil products and fuels), solvents, paints, maintenance-related wastes, and pesticides. As discussed in Section 3, various classes of contaminants were detected at the sites to be investigated during this project. Many of the contaminants were detected, however, in concentrations too low to represent a significant health hazard. Therefore, the following have been identified as the primary potential contaminants from a health and safety perspective:

- Semi-Volatile Organic Compounds (SVOCs), including petroleum-based liquids (waste oils, diesel fuel, and general Polynuclear Aromatic Hydrocarbons[PAHs])
- Metals, specifically lead and vanadium
- Pesticides, represented as Chlordane and DDT
- Polychlorinated Biphenyls (PCBs)

Depending on the location where work is being conducted, the applicable contaminants may vary. The following table summarizes the contaminants that have been detected at the work locations:

| | Site 4/13 | Site 5 | Site 7 | Site 9 | SWMU 21 | SWMU 27 | SWMU 35 |
|------------|-----------|--------|--------|--------|---------|---------|---------|
| SVOCs | X | X | X | X | X | X | X |
| Metals | X | X | | X | X | X | X |
| Pesticides | | X | | X | | X | X |
| PCBs | X | X | X | X | | | X |

* - Based on prior uses and history of the site.

The specific substances of concern at each site are presented in Table 5-1.

Table 6-1 provides information on the individual substances likely to be present at the sites of concern. Included is information on the toxicological, chemical, and physical properties of these substances. It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (drilling, soil sampling, etc.). Exposure to these compounds is most likely to occur through ingestion and inhalation of contaminated soil or water, or hand-to-mouth contact during soil disturbance activities. For this reason, PPE and basic hygiene practices (washing face and hands before leaving site) will be extremely important. Inhalation exposure will be avoided by using appropriate PPE and engineering controls where necessary.

6.2 PHYSICAL HAZARDS

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

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

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

6.2.1 Heavy Equipment Hazards (Pinch/compression points, rotating equipment, etc.)

Often the hazards associated with drilling operations are the most dangerous to be encountered during site activities. The SSO will thoroughly discuss safe drilling procedures during the pre-activities training session. All site personnel will sign the form in Figure 8-2 documenting that they received the training and understand the procedures. The following rules will apply to all drilling operations:

- Each rig must be equipped with emergency stop devices which will be tested daily to ensure that they are operational.

- Long handled shovels or equivalent shall be used to clear cuttings from the borehole and rotating equipment.
- The driller may not leave the controls when the augers are rotating.

6.2.2 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 T1NUS 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.

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.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA**

| Substance | CAS No. | Air Monitoring/Sampling Information | | Exposure Limits | Warning Property Rating | Physical Properties | Health Hazard Information |
|---|--|--|--|--|--|--|--|
| 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: <300-550°F; 149-288°C Melting Pt: Not available Solubility: Negligible Flash Pt: 95-145°F; 35-62°C Autoignition: 475°F, 246°C LEL/LFL: 0.6% UEL/UFL: 8.0% Vapor Density: >5 Vapor Pressure: <0.1 mmHg @ 70°F; 21°C Specific Gravity: 0.80 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. Because of the defatting capabilities, this exposure may lead to a dermatitis condition. High vapor concentrations are irritating to the eyes and respiratory tract. Exposure to high airborne concentrations may result in narcotic effects, including dizziness, headaches, and anesthetic to unconsciousness. High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation. |
| Waste Oils All information is based on mineral oil | Mixture N.E. 8012-95-1 for mineral oil | Varies between fractions however waste oils tend to be less volatile. The FID tends to handle the longer chained aliphatic hydrocarbons more efficiently than its PID counterpart and would be selected as the instrument of choice. | Sampling and analytical protocol shall be in accordance with NIOSH Method #5026 (the recommended method for mineral oil mist). | ACGIH; NIOSH: 5 mg/m ³ (oil mists); 10 mg/m ³ STEL. OSHA; 5 mg/m ³ (Oil mists) | Non-volatile substance, therefore no respiratory protection is required. In an aerosol form, dust and mist respirator would be considered acceptable for up to 500 mg/m ³ . Recommended gloves: Any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances, and will be acceptable). Natural rubber gloves should be avoided. | Boiling Pt: 680°F; 360°C Melting Pt: Not available Solubility: Insoluble Flash Pt: 275-500°F; 135-260°C depends on the distillation fraction LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: <0.5 mmHg Specific Gravity: 0.90 Incompatibilities: None reported Appearance and odor: Colorless, oily, with an odor of burned lubricating oil. | Minor irritation to the eyes, skin, and respiratory system. |

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**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
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| 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 <u>NIOSH Method 5506 or 5515</u> - 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). |
| Aroclor-1260 (Polychlorinated Biphenyl, PCB) It should be noted that this substance is representative of the more common isomers Aroclor - 1242, 1254, which may be encountered. | 11096-82-5 53469-21-9 (42%) 11097-69-1 (54%) | Substance is not volatile (VP=0.0000 6 mmHg), I.P. is unknown however is anticipated to be elevated, therefore, PID is not anticipated to detect substance. Substance is non combustible and as a result will not be detected by FID. | Air sample using a particulate filter, Florisil sorbent tube with glass fiber filter; hexane desorption; gas chromatography-electron capture detector. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #5503 (PCBs). | OSHA; ACGIH: 0.5 mg/m ³ (skin) NIOSH: 0.001 mg/m ³ IDLH: 5 mg/m ³ | Inadequate - However due to the low volatility it is assumed unless agitated this substance does not present a volatile vapor or gas respiratory threat. For dusty conditions where this material may cling to particulates, use a HEPA filter. APRs are approved for escape only when concentrations exceed the exposure limits. Concentrations greater than the exposure limits require PAPR or supplied air respirators. Recommended glove: Butyl rubber >24 hrs; Neoprene rubber >24.00 hrs; Silver shield or Viton (for pure product). | Boiling Pt: distillation range 689- 734°F; 365-390°C Melting Pt: -2 to 50°F; -19 to 10°C Solubility: Insoluble Flash Pt: Not applicable LEL/LFL: Not applicable UEL/UFL: Not applicable Nonflammable liquid, however, exposure to fire results in black soot containing PCBs, dibenzofurans, & chlorinated dibenzo-p-dioxins Vapor Density: Not available Vapor Pressure: 0.00006 - 0.001 mmHg Specific Gravity: 1.566 @ 60°F; 15.5°C Incompatibilities: Strong oxidizers Appearance and Odor: Colorless to pale yellow, viscous liquid or solid (Aroclor 54 below 50°F) with a mild, hydrocarbon odor | This substance is irritating to the eyes and skin. Chronic effects of overexposure may include potential to cause liver damage, chloracne, and reproductive effects. Recognized as possessing carcinogenic properties by NIOSH, and NTP. |

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**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
PAGE 3**

| Substance | CAS No. | Air Monitoring/Sampling Information | Exposure Limits | Warning Property Rating | Physical Properties | Health Hazard Information | |
|-----------|---|--|--|---|--|---|---|
| Lead | 7439-92-1 | Particulate form - Unable to be detected by either PID or FID. | Air sample using a mixed cellulose ester filter; or HNO ₃ or H ₂ O ₂ desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300. | OSHA: 0.05 mg/m ³ ACGIH: 0.05 mg/m ³ NIOSH: 0.10 mg/m ³ IDLH: 100 mg/m ³ as lead | The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m ³ . Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances). | Boiling Pt: 3164°F; 1740°C Melting Pt: 621°F; 327°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 11.34 Incompatibilities: Strong oxidizers, peroxides, sodium acetylde, zirconium, and acids Appearance and Odor: Metal: A heavy ductile, soft gray solid. | Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia. |
| Vanadium | 7440-62-2 as V metal 1314-62-1 as vanadium pentoxide | Particulate form - This substance is unable to be detected by PID/FID. | Air sample using a particulate filter; tetrahydrofuran desorption; XRD detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300. | OSHA; ACGIH: 0.05 mg/m ³ NIOSH: 0.05 mg/m ³ (Ceiling) | No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for dust and fume. Organic vapor acid gases with HEPA filter. Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances). | Boiling Pt: 5432°F; 3000°C Melting Pt: 3483°F; 1917°C Solubility: Insoluble Flash Pt: Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 6.11 Incompatibilities: Strong acids, halogens, sulfur, wood and other combustibles, lithium, oxidizers, nitril fluoride Appearance and odor: Bright white, soft, malleable ductile metal, odorless | Symptoms of overexposure to this substance may include conjunctivitis, rhinitis, irritation to the respiratory tract, coughing, rales, dyspnea, bronchitis, bronchospasms, with asthma-like diseases in more severe cases, anemia, loss of skin pallor, and GI disturbances. |

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**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SOUTH CAROLINA
PAGE 4**

| Substance | CAS No. | Air Monitoring/Sampling Information | | Exposure Limits | Warning Property Rating | Physical Properties | Health Hazard Information |
|---|-------------------------------|---|--|---|--|--|--|
| Chlordane | 57-74-9 | Substance is not volatile (VP=.00001 mmHg) I.P. is unknown, therefore detection by PID is unknown. Substance is non-combustible, therefore a FID is not expected to have a response to chlordane. | Air sample using Chromosorb-102 sorbent tube with mixed cellulose-ester filter or a xad-2 sorbent tube with filter. Toluene desorption and analysis by gas chromatography-electron capture detector. Sampling and analytical protocol will proceed in accordance with NIOSH Method #5510 or OSHA Method #67. | OSHA; NIOSH; ACGIH: 0.5 mg/m ³ | Adequate - can use an air purifying respirator with an organic vapor & high efficiency air filter cartridges. Recommended gloves: PTFE Teflon for pure product. Nitrile acceptable for incidental contact. | Boiling Pt: 347°F; 175°C Melting Pt: Not available Solubility: Insoluble Flash Pt: Not available LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 0.00001 mmHg Specific Gravity: 1.56 @ 60°F; 15.5°C Incompatibilities: Strong oxidizers and alkaline reagents Appearance and Odor: Amber-colored, viscous liquid with a pungent, chlorine like odor. | Earliest signs of overexposure manifest as hypersensitivity of the central nervous system characterized by hyperactive reflexes, muscle twitching, tremors, incoordination, ataxia, and clonic convulsions. Cycles of excitement and depression may be repeated over and over. Chronic health hazard information similar to those for DDT. |
| DDT and the major metabolites; DDD and DDE. | 50-29-3 72-54-8 72-55-9 | Substance is not volatile, I.P. is unknown, detection by PID is unknown. Substance non-combustible, therefore a FID is anticipated to have reduced response to DDT. | Air sample using a binder free, glass fiber filter; isoctane desorption; gas chromatography-electron capture detector. Sampling and analytical protocol will proceed in accordance with NIOSH Method #3(S274). | OSHA; ACGIH: 1 mg/m ³ NIOSH: 0.5 mg/m ³ | Adequate - Can use air purifying respirator with high efficiency particulate air filter (HEPA). Recommended glove: Nitrile acceptable for incidental contact. | Boiling Pt: 230°F; 110°C Melting Pt: 226°F; 108°C Solubility: Insoluble Flash Pt: 162-171°F; 72-77°C LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: Low Specific Gravity: 0.99 Incompatibilities: Strong oxidizers and alkalis Appearance and Odor: Colorless crystals or off-white powder with a slight aromatic odor | Large doses are followed by vomiting due to gastric irritation, diarrhea may follow. Numbness and paresthesias of the lips tongue and face associated with malaise, headache, sorethroat, fatigue and weakness. Coarse tremors (usually first of the neck, head, and eyelids). This may be accompanied by confusion, apprehension, and depression. Convulsions may result and death may occur from respiratory failure. DDT is absorbed and retained in the fat of humans. Chronic exposure may result in damage to the liver, kidneys and Peripheral Nervous System. DDT is recognized as possessing carcinogenic properties by IARC and NTP. |

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7.0 AIR MONITORING

Most of the anticipated site contaminants are not volatile or are semi-volatile, and are difficult to be detected with the use of direct reading instruments (DRIs). Specifically, the metals, pesticides, and PCBs exhibit poor detection characteristics due to their non-volatile nature and low vapor pressure property. Nonetheless, DRIs will be used to screen source areas (sample locations, wells, etc.) and worker breathing zones for any detectable contaminants. Action levels are listed in Table 5-1 as they may apply to a specific task or location. This approach (coupled with the use of personal protective equipment and the observance of the other control requirements presented in this HASP) will minimize the potential for personnel exposures to hazardous concentrations (known or unknown) of airborne contaminants. 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 and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting some of the 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. Daily background readings will be taken in clean areas away from any 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 TtNUS Equipment Manager. Operational checks and field calibration will be performed on all instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site for reference). All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that all of the information specified in Figure 7-1 is recorded. This required information includes the following:

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

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for 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. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120 (e)(4) will be required for site supervisory personnel.

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

8.1.2 Requirements for Subcontractors

All TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120 (e). Additionally, personnel who have had the introductory training more than 12 months ago, are required to have 8 hours of refresher training meeting the requirements of 29 CFR 1910.120 (e)(8) prior to performing field work at the MCRD facility if required. 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 in 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

Month, day, year

Mr. David D. Brayack, P.E.
Tetra Tech NUS, Inc.
Task Order Manager
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Training for MCRD, Parris Island, South Carolina

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 1926.

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)

Enclosed: Training Certificates

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all TtNUS employees and subcontractor 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 the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

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

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS Personnel

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

Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office 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" (See Figure 8-3) 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 copy of Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

Subcontractors who will not enter the Exclusion Zone during intrusive operations, 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 those stated for site-specific training (See 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 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 as per OSHA 29 CFR 1910.134(b)(10) and 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 which 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
 may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

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

Address

FIGURE 8-4
MEDICAL SURVEILLANCE LETTER

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

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

Month, day, year

Mr. David D. Brayack, P.E.
Tetra Tech NUS, Inc.
Task Order Manager
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Medical Surveillance for MCRD, Parris Island, South Carolina

Dear Mr. Brayack:

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. 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 TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site: 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 if the site where active work is being performed plus so many feet surrounding the point of operation (See Table 5-1 for specific operation). The Exclusion Zone for this activity will represent the areas where the soils are disturbed through soil borings, well installations, and sampling activities. All Exclusion Zones will be delineated (e.g., barrier tape, cones and/or 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 field team in an effort to identify proposed subsurface investigation locations, conduct utility clearances, and provide up-front notices concerning scheduled activities within the facility. In all cases, no subsurface activities will proceed without utility clearance and all activities must follow the TtNUS SOP for Utility Locating and Excavation Clearance. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Table 2-1 will be notified.

When base personnel are working within the proximity of this investigation, they will be moved or their operation temporarily discontinued to remove them from potential hazards associated with this operation.

9.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) will be a buffer area between the Exclusion Zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting Exclusion Zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. All equipment potentially contaminated will be bagged and taken to that location for decontamination.

9.3 SUPPORT ZONE

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

9.4 SAFE WORK PERMITS

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

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

**FIGURE 9-1
SAFE WORK PERMIT**

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

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

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

- II. Names: _____
- III. Onsite inspection conducted Yes No Initials of Inspector _____

TINUS
MCRD

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

- IV. Protective equipment required

| | |
|----------------------------------|--|
| Level D <input type="checkbox"/> | Respiratory equipment required |
| Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> |
| Level C <input type="checkbox"/> | Half face APR <input type="checkbox"/> |
| Level A <input type="checkbox"/> | SKA-PAC SAR <input type="checkbox"/> |
| Detailed on Reverse | Skid Rig <input type="checkbox"/> |
- | |
|---|
| Escape Pack <input type="checkbox"/> |
| SCBA <input type="checkbox"/> |
| Bottle Trailer <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 suits/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 |
| Safety shower/eyewash (Location & Use)..... <input type="checkbox"/> | Emergency alarms..... <input type="checkbox"/> |
| Procedure for safe job completion..... <input type="checkbox"/> | Evacuation routes..... <input type="checkbox"/> |
| Contractor tools/equipment inspected..... <input type="checkbox"/> | Assembly points <input type="checkbox"/> |

- VIII. Equipment Preparation

| | |
|---|--------------------------|
| Yes | NA |
| Equipment drained/depressured..... <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned..... <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed..... <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered..... <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, fill out appropriate section(s) on safety work permit addendum

X. Special instructions, precautions: _____

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

9.5 SITE VISITORS

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

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

It is not anticipated that this operation will result in a large number of site visitors. However, as some visitors can reasonably be expected, the following requirements will be enforced:

- 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 medical surveillance, as stipulated in Section 8 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.

NOTE: All site visitors will be escorted at all times while at the site.

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 MCRD Contact, if necessary.

9.6 SITE SECURITY

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As this activity takes place at Navy facilities open to public access, and along public highways, the first line of security will take place using traffic permit restrictions, Exclusion Zone

barriers, and any existing barriers at the sites to restrict the general public. The second line of security will take place at the work site referring interested parties to the FOL or designee. The FOL will serve as a focal point for all non-project interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 SITE MAP

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

9.8 BUDDY SYSTEM

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

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

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

9.10 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crews members will not be necessary. External communication will be accomplished by using the telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities, the FOL will determine and arrange for telephone communications.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

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

10.2 POTENTIAL SPILL AREAS

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

- Resource deployment
- Waste transfer
- Central staging

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

10.3 LEAK AND SPILL DETECTION

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

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

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

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that may be maintained (depending on anticipated need) 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

10.6 SPILL CONTROL PLAN

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

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

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

11.0 CONFINED-SPACE ENTRY

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

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

A Permit-Required Confined Space is one that:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor 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, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS 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 decon solution, fuels, sample preservations, calibration gases, etc.
- Follow-up Reports (to be completed by the FOL)
- A full size OSHA Job Safety and Health Poster
- Training/Medical Surveillance Documentation Form (blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED AT THE SITE

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

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

Material Safety Data Sheets (MSDS) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances

employed on site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

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

Site Clearance Posting - This list is found within the training section of the HASP (See Figure 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) - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards - 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) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

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

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

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

13.0 GLOSSARY

| | |
|----------|--|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CLEAN | Comprehensive Long-term Environmental Action - Navy |
| CNS | Central Nervous System |
| CTO | Contract Task Order |
| CZR | Contamination Reduction Zone |
| DOD | United States Department of Defense |
| eV | electron Volts |
| FDOT | Florida Department of Transportation |
| FOL | Field Operations Leader |
| HASP | Health and Safety Plan |
| HAZWOPER | Hazardous Waste Operations and Emergency Response |
| HSM | Health and Safety Manager |
| IDLH | Immediate Dangerous to Life or Health |
| IDW | Investigative-Derived Wastes |
| LEL/LFL | Lower Explosive Limit / Lower Flammable Limit |
| MSDA | Material Safety Data Sheets |
| N/A | Not Available |
| NIOSH | National Institute for Occupational Safety and Health |
| NTP | National Toxicity Program |
| OSHA | Occupational Safety and Health Administration (U.S. Department of Labor) |
| PEL | Permissible Exposure Limit |
| PID | Photoionization Detector |
| PPE | Personal Protective Equipment |
| SAP | Sampling and Analyses Plan |
| SOPs | Standard Operating Procedures |
| SSO | Site Safety Officer |
| TBD | To be determined |
| TLV | Threshold Limit Value |
| TOM | Task Order Manager |
| TWA | Time-Weighted Average |
| WP | Work Plan |

ATTACHMENT I

**INJURY/ILLNESS PROCEDURE
AND REPORT FORM**



CASE NO. _____

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE WORKER'S COMPENSATION PROGRAM

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

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

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

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

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

WHO IS COVERED:

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



CASE NO. _____

WHAT IS COVERED:

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



**TETRA TECH, INC.
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 Date | 06/99 | Revision | 0 |
| Applicability | Tetra Tech NUS, Inc. | | |
| Prepared | Health & Safety | | |
| Approved | D. Senovich | | |

Subject
UTILITY LOCATING AND EXCAVATION CLEARANCE

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1.0 PURPOSE

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

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility service locating and excavation clearance. It is the policy of TtNUS to provide a safe and healthful work environment for the protection of our employees. The purpose of this SOP is to aid in achieving the objectives of the TtNUS Utility Locating and Clearance Policy. The TtNUS Utility Locating and Clearance Policy should be reviewed by anyone 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 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 development of detailed operating procedures. This guidance is not intended to provide a detailed description of methodology and 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 a fixed distance apart. 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 - 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) or Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved Standards Operating Procedures or as otherwise dictated by the approved project plan(s).

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

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 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 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.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM is responsible for arranging for the procurement of a qualified, experienced, utility locating contractor 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 site inspection must be performed to compare the site plan information to actual conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation must be marked at the site in white paint or pin flags to notify personnel of the proposed excavation 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, 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.
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 on (and comply with) property owner requirements. It is important to note that private property owners may require from 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

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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 are to mark their respective lines within the specified time frame.

- Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other 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 location |
| red | electrical |
| yellow | gas, oil, steam |
| orange | telephone, communications |
| blue | water, irrigation, slurry |
| green | sewer, drain |

- 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 auguring. Each method has advantages and disadvantages including complexity, applicability, and price.
- At each location where trenching or excavating will occur using a backhoe or other heavy equipment and utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed with a hand augur or pole 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.
- All uncovered utilities must be supported. 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 Health and Safety Manager. 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 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. |

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6.0 UNDERGROUND LOCATING TECHNIQUES

6.1 Geophysical Methods

Geophysical methods include electromagnetics, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References in Section 6.0.

Electromagnetics

Electromagnetic (EM) 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 good example of this type of geophysical equipment is an EM-61.

EM 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 EM surveys, simple magnetic locating and traced nonmetallic surveys.

When access can be gained to a conduit, a flexible insulated trace wire can also 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) and steel utility lines. A good 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.

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 is 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. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into

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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. High-quality hand-held thermal imagers are available from \$15,000 to \$30,000, with prices decreasing as new systems are introduced.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to determine the exact horizontal and vertical location of 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 physical methods, borings must be hand-augured for all locations where there is a potential to impact buried utilities. Hand auguring must be performed to depths of no less than 4 feet. 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 placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 3 presents frost line depths for the regions of the continental United States. At a minimum, hand auger depths must be at least to the frost line depth plus two (2) feet, but never less than 4 feet below ground surface (bgs). For auguring, 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 that a post-hole digger is not 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 augurs. Tile probes must be performed to the same depth requirements as hand augurs. Depending upon the site conditions and intended probe usage, tile probes should be made of non-conductive material such as fiberglass.

| | | |
|---|-------------------------|--------------------------------|
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7.0 REFERENCES

TtNUS Utility Locating and Clearance Policy

TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction

TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys

TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

| | | |
|---|------------------|-------------------------|
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ATTACHMENT 2 UTILITY CLEARANCE FORM

Project No.: _____ Completed by: _____
 Site Location: _____ Work Date: _____
 Excavation Method/Overhead Equipment: _____

Circle One

1. **Underground Utilities**

| | | | |
|--|-----|----|-----|
| 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 |
| b) Excavation areas marked in the field? | yes | no | N/A |
| e) Utilities located in the field? | yes | no | N/A |
| f) Located utilities added to site maps? | yes | no | N/A |
| 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 auguring performed? | yes | no | N/A |
| Auguring 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): _____ | | | |

6. **Approval:**
 _____ Date _____
 Site Manager/Field Operations Leader

cc: PM/Project File
 Program File

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

COMPANY: _____ **UNIT NO.** _____
FREQUENCY: Inspect daily, document prior to use and as repairs are needed.

Inspection Date: ____/____/____ Time: _____ Equipment Type: _____

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

Safety Guards:

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

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

Portable Power Tools:

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

Cleanliness:

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

Operator Qualifications (as applicable for all heavy equipment):

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

Identification:

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

Additional Inspection Required Prior to Use On-Site

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

Site Safety Officer Signature

ATTACHMENT IV
SAFE WORK PERMITS

SAFE WORK PERMIT FOR MULTI-MEDIA SAMPLING

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Multi-media sampling including groundwater, soil, sediment, and IDW sampling.
- II. Required Monitoring Instrument(s): PID or FID (although most site contaminants are not detectable)
- 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 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 | SKA-PAC 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, surgical style gloves, and safety glasses. Hard hats and hearing protection will be worn when working near operating equipment or when required by the SSO. Reflective vests will be worn for high traffic areas.

- | | | |
|---------------------------------|-------------------------------|---------------------------------------|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| Site contaminants include _____ | Any sustained readings _____ | Suspend site activities and _____ |
| <u>SVOCs, metals, PCBs,</u> | <u>above 10 ppm in worker</u> | <u>retreat to an unaffected area.</u> |
| <u>and pesticides</u> | <u>breathing zones.</u> | |

- VI. 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 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 |

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths. SSO may dictate double-layering gloves.

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

- | | | |
|---|--------------------------|--------------------------|
| VIII. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

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

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR SOIL BORINGS AND WELL INSTALLATION

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Soil borings using hollow stem auger and Direct Push Technology techniques. Monitoring well installation is included in this task.
- II. Required Monitoring Instruments: FID or PID (although most site contaminants are not detectable)
- 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"/> | Respiratory equipment required | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> | Level A <input type="checkbox"/> | Full face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | | Half face APR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | | SKA-PAC SAR <input type="checkbox"/> | None <input checked="" type="checkbox"/> |
| | | Skid Rig <input type="checkbox"/> | |
- Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety shoes, safety glasses, hardhat, and nitrile gloves or leather gloves with surgical-style inner gloves.

- V. Chemicals of Concern
- | | | |
|--|--|--|
| <u>Potential site contaminants include SVOCs, metals, PCBs, and pesticides</u> | Action Level(s) <u>Any sustained readings above 10 ppm in worker breathing zones.</u> | Response Measures <u>Suspend site activities and retreat to an unaffected area.</u> |
|--|--|--|

- VI. Additional Safety Equipment/Procedures
- | | | |
|-------------------------------|---|--|
| Hard-hat | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input 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 _____) <input 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 |
- Modifications/Exceptions: Hearing protection during drilling activities. Reflective vests for high traffic areas. Tyvek coverall and impermeable boots if there is a potential for soiling work clothes.

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

- VIII. Equipment Preparation
- | | | |
|---|--------------------------|--------------------------|
| | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <input type="checkbox"/> | <input type="checkbox"/> |

- 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: Follow TtNUS SOP "Utility Locating and Excavation Clearance". Minimize generation of airborne dusts.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR TEST PIT OPERATIONS

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

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Test pit excavations at Site 4. Test pits will be excavated to determine whether there is any remaining evidence of the former Dredge Soils Area Fire Training Pit.

II. Required Monitoring Instruments: PID or FID (although most site contaminants are not detectable)

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"/> SKA-PAC SAR <input type="checkbox"/> Bottle Trailer <input type="checkbox"/> Skid Rig <input type="checkbox"/> None <input checked="" type="checkbox"/> |
|---|---|

Level D Minimum Requirements: Sleeved shirt and long pants and safety footwear. Safety glasses, hard hats, and hearing protection will be worn when working in the vicinity of the back-hoe.

| | | |
|---|--|---|
| V. Chemicals of Concern <u>Potential site contaminants include SVOCs, metals, and PCBs</u> | Action Level(s) <u>Any sustained readings above 10 ppm in worker breathing zones.</u> | Response Measures <u>Suspend site activities and report to an unaffected area.</u> |
|---|--|---|

| | | | |
|--|--|----------------------------------|---|
| VI. 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 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 (See Note) | Gloves (Type - Nitrile) | <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: Nitrile gloves if handling soils and/or debris. Reflective vests for high traffic areas. PVC or PE coated Tyvek if saturation or work cloths may occur. Impermeable boot covers if shoes may be soiled.

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

VIII. Site Preparation
Utility Clearances obtained for areas of subsurface investigation Yes No

| | | |
|---|--------------------------|--------------------------|
| IX. Equipment Preparation | Yes | NA |
| Equipment drained/depressurized | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment purged/cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| Isolation checklist completed | <input type="checkbox"/> | <input type="checkbox"/> |
| Electrical lockout required/field switch tested | <input type="checkbox"/> | <input type="checkbox"/> |
| Blinds/misalignments/blocks & bleeds in place | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous materials on walls/behind liners considered | <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: Test pits will be excavated in accordance with 29 CFR 1926.650-.652. Site personnel will not be permitted to enter any excavation. Samples will be collected from the bucket of the backhoe or by using a remote sampling device. Equipment, personnel, and machinery will be kept away from the edges of open excavations (> 3 feet). Open excavations will be barricaded. If any intact containers or drums are uncovered as a result of excavation activities, site operations will be suspended and the site contact will be notified. Follow guidance provided in the attached Safe Work Practices.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PRACTICES FOR EXCAVATING TEST PITS

- No one, under any circumstances, shall enter a test pit. Personnel must use remote samplers to collect samples from test pits or collect the samples from the backhoe bucket. The latter is recommended.
- Personnel must not lean over test pits.
- Personnel must stand upwind from the test pits and away from the reach of the backhoe, tires, and outrigger.
- Personnel must stand a minimum of two feet from the edge of any test pit. Unstable pits must be sloped at the sides to prevent cave-in.
- Personnel must develop hand signals with the backhoe operator.
- No open pits will be left unattended, under any circumstances.
- The backhoe operator shall not undermine the excavation.
- The SSO shall frequently inspect the test pits for slide or cave-in potential.
- All work areas must be kept free of ground clutter.
- Persons working near test pitting operations must remain more than three feet from the boom when the backhoe is operating.

ATTACHMENT V

HEAT STRESS

HEAT STRESS

Because some physically demanding fieldwork is expected to take place during warmer months or periods, heat related disorders are a potential problem. Discussed below are the common heat-related disorders and the recommended actions to prevent heat stress.

Heat Related Disorders

Heat Rash

Also known as prickly heat, this condition affects the skin. It occurs in situations where the skin remains wet most of the time. The sweat ducts become plugged and a skin rash soon appears.

Signs and Symptoms

- Skin rash will appear on affected areas of the body.
- Tingling or prickling sensation will be felt on the affected areas.

Heat Cramps

Heat cramps are muscle pains, usually in the lower extremities, the abdomen, or both, that occur after profuse sweating with accompanying salt depletion. Heat cramps most often afflict people in good physical condition, who overwork in conditions of high temperature and humidity. Untreated, heat cramps may progress to heat exhaustion.

Signs and Symptoms

- Cramps in the extremities and abdomen that begin suddenly during vigorous activity. Heat cramps can be mild with only slight abdominal cramping and tingling in the extremities, but more commonly present intense and incapacitating pain in the abdomen and extremities.
- Respiration rate will increase, decreasing after the pain subsides.
- Pulse rate will increase
- Skin will be pale and moist.
- Body temperature will be normal
- Generalized weakness will be noted as the pain subsides.
- Loss of consciousness and airway maintenance are seldom problems with this condition.

Treatment for heat cramps is aimed at eliminating the exposure and restoring the loss of salt and water.

Heat Exhaustion

Heat exhaustion is a more severe response to salt and water loss, as well as an initial disturbance in the body's heat-regulations system. Like heat cramps, heat exhaustion tends to occur in people working in hot environments. Heat exhaustion may progress to heat stroke. Treatment for heat exhaustion is similar in principle to that for heat cramps.

Signs and Symptoms

- Heat exhaustion may be accompanied present by a headache, fatigue, dizziness, or nausea with occasional abdominal cramping. More severe cases of heat exhaustion may resulting partial or complete temporary loss of respiration nd circulation due to cerebral ischemia.
- Sweating will be profuse.
- Pulse rate will be rapid and weak.
- Respiration rate will be rapid and shallow.
- The skin will be pale and clammy
- The body temperature will be normal or decreased.
- The person could be irritable and restless.

Heat Stroke

Heat stroke is caused by a severe disturbance in the body's heat-regulating system and is a profound emergency: The mortality rate ranges from 25 to 50 percent. It is most common in men over 40, especially alcoholics. It can also occur to people of any age having too much exposure to the sun or prolonged confinement in a hot atmosphere. Heat stroke comes on suddenly. As the sweating mechanism fails, the body temperature begins to rise precipitously, reaching 106°F (41°C) or higher within 10 to 15 minutes. If the situation is not corrected rapidly, the body cells -- especially have very vulnerable cells to the brain--are literally cooked, and the central nervous system is irreversibly damaged. The treatment for heat stroke is aimed at maintaining vital functions and causing as rapid a decrease of body temperature as possible.

Signs and Symptoms

- The person's pulse will be strong and bounding.
- The skin will be hot, dry, and flushed.
- The worker may experience headache, dizziness, and dryness of mouth
- Seizures and coma can occur.
- Loss of consciousness and airway maintenance problems can occur.

These are only guidelines for heat related emergencies. Actual training in emergency medical care or basic first aid is recommended.

Controlling Heat Stress

The SSO shall visually monitor personnel to note for signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids can be commercial mixes such as Gatorade®.
- Establish a work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- Breaks are to be taken in a cool rest area (77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

The heat stress of personnel onsite may be monitored utilizing biological monitoring.

One of the following biological monitoring procedures may be utilized by the SSO to monitor heat stress concerns.

- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of rest period stays the same. If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. The length of the initial work period will be determined by using the table below.

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

| <u>Work-Rest Regimen</u> | <u>Work Load</u> | | |
|--------------------------------|------------------|-----------------|--------------|
| | <u>Light</u> | <u>Moderate</u> | <u>Heavy</u> |
| Continuous | 80.0°F | 80.0°F | 77.0°F |
| 75% Work - 25% Rest, Each Hour | 87.0°F | 82.4°F | 78.6°F |
| 50% Work - 50% Rest, Each Hour | 88.5°F | 85.0°F | 82.2°F |
| 25% Work - 75% Rest, Each Hour | 90.0°F | 88.0°F | 86.0°F |

- Body temperature shall be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99°F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.7°F at the beginning of the next rest period, the following work cycle shall be further shortened by 33 percent. OT should be measured at the end of the rest period to make sure that it has dropped below 99°F. At no time shall work begin with the oral temperature above 99°F.

NOTE: External temperatures in excess of those stated above shall be regarded as inclement weather. Work continuation, termination, or alteration of the work schedule will be at the discretion of the FOL or SSO.