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HEALTH AND SAFETY PLAN RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY INVESTIGATION (SWMU 23) BATTERY SHOP BUILDING 36 AT NSA CRANE IN
07/01/2012
TETRA TECH

Health and Safety Plan

Resource Conservation and Recovery Act Facility Investigation

SWMU 23 - Battery Shop Building 36

at

Naval Support Activity (NSA) Crane

Crane, Indiana



**Naval Facilities Engineering Command
Mid-West**

Contract No. N62470-08-D-1001

Contract Task Order F27Q

July 2012

HEALTH AND SAFETY PLAN
FOR
RESOURCE CONSERVATION AND
RECOVERY ACT FACILITY INVESTIGATION
SWMU 23 - BATTERY SHOP BUILDING 36

NAVAL SUPPORT ACTIVITY
CRANE, INDIANA

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1.0 INTRODUCTION

The objective of this Health and Safety Plan (HASP) is to provide the safety and health requirements, practices and procedures for Tetra Tech personnel during the RCRA Investigation at SWMU 23 Battery Shop, Building 36 and the surrounding area at the Naval Support Activity Crane (NSA Crane), located in Crane, Indiana.

This HASP is to be used in conjunction with the Tetra Tech NUS Health and Safety Guidance Manual (HSGM). The HSGM provides detailed information pertaining to hazard recognition and control, and Tetra Tech standard operating procedures. This HASP and the contents of the HSGM were developed to comply with the requirements stipulated in 29 Code of Federal Regulations (CFR) 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response Standard). Both documents must be present at the site to satisfy these requirements.

This HASP has been written to support proposed tasks and techniques associated with the scope of work as presented in Section 4.0. It has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work at the site. Should the proposed work site conditions and/or suspected hazards change, or if new information becomes available, this document will be modified. Changes to the HASP will be made with the approval of the Tetra Tech Site Safety Officer (SSO) and the Tetra Tech Health and Safety Manager (HSM). Requests for modifications to the HASP will be directed to the SSO who will determine whether to make the changes. The SSO will notify the Navy Remedial Project Manager (RPM), who will notify the affected personnel of changes.

1.1 AUTHORITY

This work is authorized under the Comprehensive Long - Term Environmental Action Navy (CLEAN) contract, administered through the U.S. Navy Southeast, Naval Facilities Engineering Command, as defined under Contract No. N62470-08-D-1001 Contract Task Order Number F27Q.

1.2 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibilities for site safety and health for Tetra Tech employees engaged in onsite activities. The personnel assigned to participate in the field work have the primary responsibility for performing their work tasks in a manner that is consistent with the Tetra Tech Health and Safety Policy, the health and safety training that they have received, the contents of this HASP, and in an overall manner that protects their personal safety and health and that of their co-workers. The following persons

are the primary point of contact and have the primary responsibility for observing and implementing this HASP and for overall on-site health and safety.

- The Tetra Tech Project Manager (PM) is responsible for the overall direction and implementation of health and safety for this work.
- The HSM is responsible for the Navy CLEAN Health and Safety Program
- The PHSO is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
 - Providing information regarding site contaminants and physical hazards associated with the site.
 - Establishing air monitoring and decontamination procedures.
 - Assigning personal protective equipment based on task and potential hazards.
 - Determining emergency response procedures and emergency contacts.
 - Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
 - Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
 - Modifying this HASP, as it becomes necessary.
- The Tetra Tech Field Operations Leader (FOL) is responsible for implementation of this HASP. The FOL manages field activities, executes the Work Plan, and enforces safety procedures as applicable to the Work Plan. Specifically, the FOL will:
 - Verify training and medical status of on-site personnel in relation to site activities.
 - Assist and represent Tetra Tech with emergency services (if needed)
 - Provide elements site-specific training for on site personnel.
- The Tetra Tech SSO or his/her representative supports the FOL concerning the aspects of health and safety including, but not limited to:
 - Coordinating health and safety activities
 - Selecting, applying, inspecting, and maintaining personal protective equipment
 - Establishing work zones and control points
 - Implementing air monitoring procedures
 - Implementing hazard communication, respiratory protection, and other associated safety and health programs
 - Coordinating emergency services
 - Providing elements of site-specific training

Compliance with these requirements is monitored by the Tetra Tech SSO and is coordinated through the HSM.

1.3 STOP WORK AUTHORITY

All employees are empowered, authorized, and responsible to stop work at any time when an imminent and uncontrolled safety or health hazard is perceived. In a Stop Work event (immediately after the involved task has been shut down and the work area has been secured in a safe manner) the employee shall contact the Project Manager and the Tetra Tech HSM. Through observations and communication, all parties involved shall then develop, communicate, and implement corrective actions necessary and appropriate to modify the task and to resume work.

1.4 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Support Activity Crane **Address:** Crane, Indiana

Remedial Project Manager: Howard Hickey **Phone Number:** (847) 688-5999

Site Contact: Thomas Brent **Phone Number:** (812) 854-6160

Site Address: 300 Highway 361 Crane, Indiana 47522-5001

Purpose of Site Visit: Conduct investigation to determine extent of contamination behind Building 36.

Proposed Start-up Date: July 2012 until completion of Phase 2

Project Team:

Tetra Tech Personnel:

Discipline/Tasks Assigned:

James Goerd

PM

TBD

FOL/SSO

Matthew M. Soltis, CIH, CSP

HSM

Clyde Snyder

PHSO

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

Prepared by:

Clyde Snyder

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. In the event of an emergency, the field team will evacuate and assemble to an area unaffected by the emergency and notify the appropriate local emergency response personnel/agencies. Workers who are ill or who have suffered a minor injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. The RPM Howard Hickey and Navy Site Contact Thomas Brent will be notified if outside response agencies are contacted.

Tetra Tech personnel may participate in minor event response and emergency prevention activities 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 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, emergencies resulting from chemical, physical, or fire hazards are the types of emergencies which could be encountered during site activities. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following (which are the responsibility of the FOL/SSO):

- Coordinating with local Emergency Response personnel to ensure that Tetra Tech emergency action activities are compatible with existing emergency response procedures.
- Base Fire Protection and Emergency Services will be notified of scheduled events and activities. This is most imperative in situations where their services may be required. In addition since this scope of work is basewide emergency services along with the site contact will be apprised of the field crews location at all times.

- Because the nearest hospital/medical center is over four minutes away, a Cardio Pulmonary Resuscitation (CPR)/First Aid trained personnel must be on-site during the times work is being conducted.
- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:
 - Chemical Inventory (of chemicals used onsite), with Material Safety Data Sheets.
 - Onsite personnel medical records (Medical Data Sheets).
 - A log book identifying personnel onsite each day.
 - Hospital route maps with directions (these should also be placed in each site vehicle).
 - Emergency Notification - phone numbers.

The Tetra Tech FOL/SSO will be responsible for the following tasks:

- 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.
- Periodically performing practice drills to ensure site workers are familiar with incidental response measures.
- Providing the necessary equipment to safely accomplish identified tasks.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. Visual observation will also play a role in detecting potential exposure events to some chemical hazards. To adequately recognize chemical exposures, site personnel must have a clear knowledge of signs and symptoms of exposure associated with the principle site contaminants of concern as presented in this HASP. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in detail in Sections 5.0 and 6.0. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The FOL/SSO is responsible for performing surveys of work areas prior to

initiating site operations and periodically while operations are being conducted. Survey findings are documented by the FOL/SSO in the Site Health and Safety log book; however, site personnel are responsible for reporting hazardous situations. Where potential hazards exist, Tetra Tech will initiate control measures to prevent adverse effects to human health and the environment.

The above actions will provide early recognition for potential emergency situations, and allow Tetra Tech to instigate necessary control measures. However, if the FOL/SSO determines that control measures are not sufficient to eliminate the hazard, Tetra Tech will withdraw from the site and notify the appropriate response agencies.

2.3.2 Prevention

Tetra Tech and subcontractor personnel will minimize the potential for emergencies by following the HSGM and ensuring compliance with the HASP and applicable OSHA regulations. Daily site surveys of work areas, prior to the commencement of that day's activities, by the FOL/SSO will also assist in prevention of illness/injuries when hazards are recognized early and control measures initiated.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

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

In the event of an emergency requiring evacuation, personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the Tetra Tech FOL/SSO. Safe places of refuge will be identified prior to the commencement of site activities by the FOL/SSO and will be conveyed to personnel as part of the pre-activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the Tetra Tech FOL/SSO or the Facility's On-site Incident Commander of the Emergency Response Team. The FOL/SSO will perform a head count at this location to account for and to confirm the location of site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel. The FOL/SSO will document the names of personnel onsite (on a daily basis) in the site Health and Safety Logbook. This information will be utilized to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge 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) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

2.5 EMERGENCY CONTACTS

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

As soon as possible, Navy RPM and Navy Site Contact will be informed of any incident or accident that requires medical attention.

**TABLE 2-1
EMERGENCY CONTACTS
CRANE, INDIANA**

CONTACT	TELEPHONE
Base Emergency Numbers* (Fire Department, Base Security, Ambulance) <ul style="list-style-type: none"> • If dialing from an on-base phone: • If dialing from cell or off-base phone: 	9-1-1 (812) 854-1333
Base Environmental Office	(812) 854-3114
Bedford Ambulance	(812) 279-6545
Bloomington Hospital (Bloomington, Indiana)	(812) 336-9515
Bedford Medical Center (Bedford, Indiana)	(812) 275-1200
Indiana Utility One Call	811
Poison Control Center	(800) 222-1222
National Response Center	(800) 424-8802
Navy RPM, Howard Hickey	(847) 688-2600 x 243
Base Contact, Thomas Brent	(812) 854-6160
Tetra Tech Pittsburgh Office	(412) 921-7090
Tetra Tech Crane Activity Coordinator, Ralph Basinski	(412) 921-8163-office (412) 251-9736-cell
Project Manager, James Goerdts	(412) 921-8425
Tetra Tech FOL/SSO, TBD	
Tetra Tech Project Safety Officer, Clyde Snyder	(412) 921-8904 - office (724) 516-0907 - cell
CLEAN Health and Safety Manager, Matthew M. Soltis, CIH, CSP	(412) 921-8912

***NOTE:** On-base extensions 3300 and 1333 are the primary emergency phone numbers. From an NSA Crane phone, on Base extensions must be preceded by "854". Off-base numbers can only be reached by dialing "991" first. Furthermore, the emergencies involving site activities should subsequently be reported to the Environmental Protection Department (x -3114/1132/6160).

2.6 EMERGENCY ROUTE TO HOSPITAL

Bloomington Hospital

601 W. 2nd St.
 P.O. Box 1149
 Bloomington, Indiana 47402

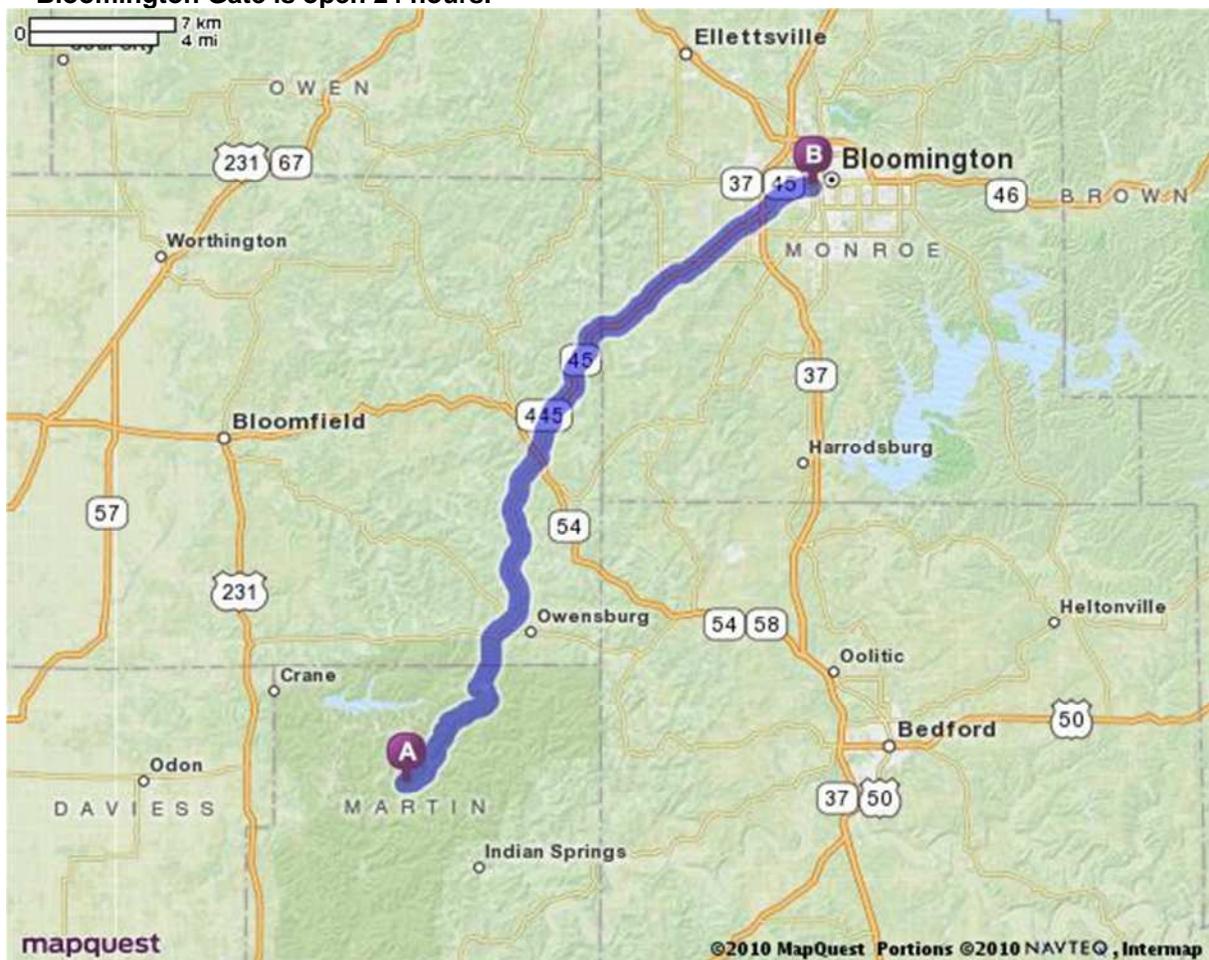
30.63 miles - about 54 minutes

- Exit NSA Crane on H-45 through the Bloomington Gate.
- Follow Highway 45 North to Bloomington at Highway 45 and Highway 37.
- Continue going straight over the overpass (Bloomfield Rd).
- Follow Bloomfield Road North; this road turns into 2nd St
- Follow 2nd Street, hospital will be on the right

FIGURE 2-1

BLOOMINGTON HOSPITAL ROUTE MAP VIA BLOOMINGTON GATE

Bloomington Gate is open 24 hours.



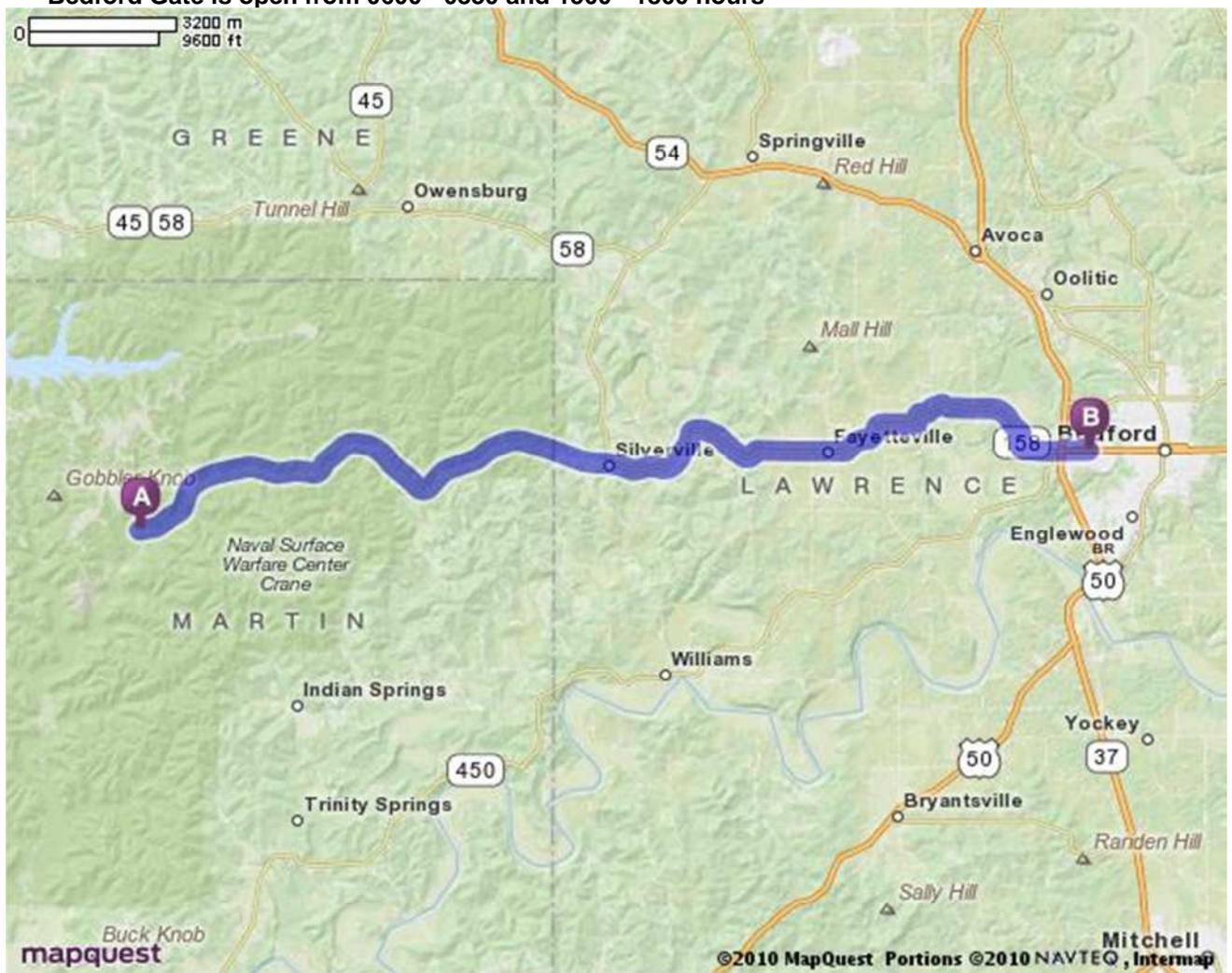
Bedford Medical Center
2900 16th Street
Bedford, Indiana 47421

19.2 miles - about 40 minutes

- Exit the base on H-58, through the Bedford Gate.
- Head East on State Highway 158.
- State Highway 158 becomes 16th Street upon entering the City of Bedford.
- The medical center is on the right shortly after Plaza Drive.

FIGURE 2-2
MAP TO
BEDFORD MEDICAL CENTER ROUTE MAP VIA BEDFORD GATE

Bedford Gate is open from 0600 - 0830 and 1500 - 1800 hours



2.7 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Tetra Tech personnel will be working in close proximity to each other at NSA Crane. As a result, hand signals, voice commands, and line of site communication will be sufficient to alert site personnel of an emergency. When project tasks are performed simultaneously on different sites, vehicle horns will be used to communicate emergency situations.

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

- Initiate the evacuation via hand signals, voice commands, or line of site communication
- Report to the designated refuge point where the FOL/SSO will account for site personnel
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the FOL/SSO (who will serve as the Incident Coordinator) pertinent incident details.

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

Call the emergency contacts listed in Table 2-1 and report the incident. 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.

- Call the appropriate emergency contacts (Table 2-1) and report the emergency.
- Give the emergency operator the:
 - Location of the emergency
 - Type of emergency
 - Number of injured
 - Brief description of what occurred
- Stay on the phone and follow the instructions given by the operator.
- The operator will then notify and dispatch the proper emergency response agencies.

2.8 PPE AND EMERGENCY EQUIPMENT

A first-aid kit, eye wash units (or bottles of disposable eyewash solution) and fire extinguishers (strategically placed) will be maintained onsite and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office as well as in each site vehicle. At least

one first aid kit supplied with equipment to protect against bloodborne pathogens will also be available on site.

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 be postponed 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.

Tetra Tech personnel will perform rescue operations from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid" level support, and only within the limits of training obtained by site personnel. Basic First-Aid is considered treatment that can be rendered by a trained first aid provider at the injury location and not requiring follow-up treatment or examination by a physician (for example; minor cuts, bruises, stings, scrapes, and burns).

Personnel identified within the field crew with bloodborne pathogen and first-aid training will be the only personnel permitted to offer first-aid assistance. A CPR/First Aid trained person will be on-site during the times when work is being conducted. Medical attention above First-Aid level support will require assistance from the designated emergency response agencies.

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 (see Attachment I).

2.10 INJURY/ILLNESS REPORTING

If any Tetra Tech personnel are injured or develop an illness as a result of working on site, the Tetra Tech "Incident Report Form" (Attachment II) must be followed. Following this procedure is necessary for documenting of the information obtained at the time of the incident.

2.10.1 TOTAL Incident Reporting System

TOTAL is Tetra Tech's new online incident reporting system. Site employees can use TOTAL to directly report health and safety incidents, notify key personnel, and initiate the process for properly investigating and addressing the causes of incidents, including near-miss events. An incident is considered any unplanned event. It may include several types of near misses, events where no loss was incurred, or incidents that resulted in injuries or illness, property or equipment damage, chemical spills, fires, or damage to motor vehicles.

TOTAL looks like the incident reporting form in Attachment II. TOTAL is an intuitive system that will guide you through the necessary steps to report an incident within 24 hours of its occurrence. Behind the scenes, TOTAL is a tool for Tetra Tech to better track incidents, analyze root causes, implement corrective action plans, and share lessons learned.

TOTAL is maintained on the Tetra Tech Intranet site at <https://my.tetrattech.com/>

Once on the "My Tetrattech" site, TOTAL can be found under the Health and Safety tab, Incident Reporting section, select "Report an Incident (TOTAL)". This will connect you directly to TOTAL. TOTAL can also be accessed directly from the internet using the following web address: <http://totalhs.tetrattech.com/>

Note: When using the system outside the Tetra Tech intranet system or when operating in a wireless mode, a VPN connection will be required. The speed of the application may be affected dependent upon outside factors such as connection, signal strength, etc. Enter the system using your network user name and password. The user name should be in the following format - TT\nickname.lastname.

2.11 DRILL/INCIDENT AFTER ACTION CRITIQUE

The FOL/SSO will conduct a drill or exercise prior to the beginning of site work to test the Emergency Action Plan. A critique with the site personnel after each drill or incident will be conducted. This critique provides a mechanism to review the incidents and exercises or drills to determine where improvements can be made. For incidents recorded in TOTAL, the FOL/SSO will utilize the Lessons Learned component for the critique.

3.0 SITE BACKGROUND

3.1 SITE HISTORY

NSA Crane is located in Crane, Indiana approximately 75 miles southwest of Indianapolis and 71 miles northwest of Louisville, Kentucky. The facility encompasses approximately 100 square miles (64,463 acres) in Daviess, Greene, Lawrence, and Martin Counties. It is located in a rural, sparsely populated area. The acreage surrounding the base is either wooded or farmed land. The facility, originally called Naval Ammunition Depot (NAD) Burns City, was opened in 1941 to serve as an inland ammunition production and storage center. Today NSA Crane's mission is to "provide quality and responsive engineering, technical and material support to the Fleet for combat subsystems, equipment and components, microelectronic technology, microwave components, electronic warfare, acoustic sensors tests, engineering pyrotechnics, small arms, electronic module test and system command." Under the Single Service Management Program, a segment of the Center's mission is to provide support (including environmental protection) to the Crane Army Ammunition Activity (CAAA). The Army is tasked with the production and renovation of conventional ammunition and related items, the performance of manufacturing, engineering, and product quality assurance to support production; and the storage, shipment, demilitarization, and disposal of conventional ammunition and related components. Because of the nature of the Army's operations, CAAA contributes significant financial support for the environmental program through an Inter-Service Support Agreement. The nearest residences are approximately 5 miles northwest of the Site in the village of Crane, which is located just west of NSA Crane.

3.1.1 SWMU 23 Battery Shop (Building 36)

SWMU 23 is located in the north-central portion of NSA Crane and encompasses approximately 6.5 acres. SWMU 23, is bounded on the north and west by heavily wooded areas with steep hillsides. Nearby Building 34 is located approximately 240 feet to the east, and presumed to be hydraulically upgradient, of SWMU 23 based on topography. Approximately 2,000 gallons of battery acid (presumably sulfuric acid) per year, from about 1940 to 1975, were discharged onto the sloped area behind the Battery Shop (Building 36). The specific points of discharge are unknown; therefore, the entire edge of the ridge near SWMU 23 and the downslope areas are considered to be potentially affected by these discharges. In addition, miscellaneous debris and waste oils containing lead, sulfates, and oily water were also discharged in the same area. This debris area was situated north of Building 36. The debris area covered an area approximately 400 feet wide and 125 feet long and extended to the bottom of the ravine. A small intermittent stream is located at the bottom of the ravine. The area is rugged and densely wooded, with rock formations protruding from the slope causing sudden drops in elevation of 12 to 14 feet. The debris was unevenly scattered throughout the Site.

3.2 PREVIOUS INVESTIGATIONS

The Initial Assessment Study (IAS), identified the Battery Shop as Site 1. It states that Battery Shop personnel performed maintenance operations on electric vehicles, primarily forklifts, for use at NSA Crane. Approximately 150 gallons per month (approximately 2,000 gallons per year) of spent battery acid, from 1940 to 1975, were discharged onto a hillside behind the Battery Shop (Building 36). Based on the nature of this operation, it is assumed the battery acid was sulfuric acid. After 1975, the practice was to neutralize the acid in a tank, then discharge the neutralized acid into the sewer system. Visual inspection of the disposal area at the time of the study identified approximately ten 10-gallon barrels and 50 5-gallon barrels at the base of the hill. The report did not state whether the barrels were empty, nor did it identify the nature of actual or potential contents.

Wastewater containing oil originating from the maintenance of non-electric forklifts is processed through an oil/water separator adjacent to the building. Approximately 50 gallons per month of oil is removed from the separator for disposal/recycling.

The report indicated that one small solvent tank of unknown size and type of solvent stored was located in Building 36 at the time of the IAS. It states that prior to 1980, 10 to 20 gallons of solvent were drained out of the tank twice per year and dumped down the hillside behind the building. The specific areas of dumping are unknown.

Surface water drainage from the hillside flows into surface water pathways, which discharge to Lake Greenwood, located approximately 3,200 feet to the north. The report stated that the potential for lead salts to migrate to Lake Greenwood existed. Lake Greenwood is the local drinking water source for NSA Crane.

4.0 SCOPE OF WORK

This section describes the project tasks that will be performed at NSA Crane under this task order. If new tasks are to be performed at the site this section will be modified accordingly.

Specific tasks to be conducted at NSA Crane include the following:

- Utility Clearance
- Mobilization/Demobilization
- Geophysical Investigation
 - Well Survey
 - GPS Locating
- Multi Media Sampling
 - Surface and Subsurface Soil Sampling
 - Surface Water Sampling
 - Sediment Sampling (Surface Water Pathways and Subsurface Structures)
 - Groundwater Level Measurements
 - Low Flow Purging and Sampling of Monitoring Wells
 - Well Development
- Monitoring Well Drilling and Installation via Direct Push Technology (DPT)
- Investigation-Derived Waste (IDW) Management
- Vegetation Management
- Decontamination Procedures

For more detailed description of the associated tasks refer to the Project Manager. If additional tasks are determined to be necessary, this HASP will need to be amended and a hazard evaluation of the additional tasks performed.

5.0 IDENTIFYING AND COMMUNICATING TASK-SPECIFIC HAZARDS AND GENERAL SAFE WORK PRACTICES

The purpose of this section is to identify the anticipated hazards and appropriate hazard prevention/hazard control measures that are to be observed for each planned task or operation. These topics have been summarized for each planned task through the use of task-specific Activity Hazard Analysis (AHAs), see Attachment III, which are to be reviewed in the field by the FOL/SSO with the task participants prior to initiating any task. Additionally, potential hazard and hazard control matters that are relevant but are not necessarily task-specific are addressed in the following portions of this section.

Section 6.0 presents additional information on hazard anticipation, recognition, and control relevant to the planned field activities.

5.1 GENERAL SAFE WORK PRACTICE

In addition to the task-specific work practices and restrictions identified in the AHAs attached to this HASP, the following general safe work practices are to be followed when conducting work on-site.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists is prohibited.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area.
- The use of waterless hand cleaning products is acceptable if followed by actual hand-washing as soon as practicable upon exiting the site.
- Avoid contact with potentially contaminated substances including puddles, pools, mud, or other such areas.
- Avoid, kneeling on the ground or leaning or sitting on equipment.
- Keep monitoring equipment away from potentially contaminated surfaces.
- Plan and mark entrance, exit, and emergency evacuation routes.
- Rehearse unfamiliar operations prior to implementation.

- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Establish appropriate safety zones including support, contamination reduction, and exclusion zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone).
- Non-essential vehicles and equipment should remain within the support zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the FOL/SSO.
- Observe co-workers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DPT SAFE WORK PRACTICES

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

- Identify underground utilities and buried structures before commencing any DPT operations. Follow the Tt Utility Locating and Excavation Clearance Standard Operating Procedure.
- DPT rigs will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. Repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist for DPT rigs provided in Attachment IV. After the initial inspection and release for use on site, additional inspections will be performed at least at the beginning of every 5 or 10-day shift, or following any repairs or significant maintenance activities.
- Ensure that all machine guarding is in place and properly adjusted.
- Block the DPT rig and use levelers to prevent inadvertent movement.

- The work area around the point of operation will be cleared to the extent possible to remove any trip hazards near or surrounding operating equipment.
- The driller's helper will establish an equipment staging and laydown plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as DPT flights will be provided to avoid the collapse of stacked equipment.
- Minimize contact to the extent possible with contaminated tooling and environmental media. Potentially contaminated tooling will be placed on polyethylene sheeting for storage and wrapped for transport to the centrally located equipment decontamination area
- Support functions (sampling and screening stations) will be maintained a minimum distance from the DPT rig of the height of the mast plus five feet , but not less than 25 feet around the rig.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT rig.
- During maintenance, use only manufacturer provided/approved equipment (i.e. auger flight connectors, etc.)
- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should be used to move auger flights and other heavy tooling.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone.
- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the FOL and/or the SHSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.
- Motorized equipment will be fueled prior to the commencement of the day's activities.
- When not in use DPT rig will be shutdown, and emergency brakes set and wheels will be chocked to prevent movement.
- Investigative areas will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be immediately removed, the area will be barricaded to limit access.

5.3 HEAVY EQUIPMENT SAFETY

Operation of heavy equipment such as excavators, loaders, graders, rollers, and bulldozers, will be done by operators who have demonstrated the ability and necessary skills to operate safely. Ground-based workers will be trained in how to work safely around the equipment, and how to stay clear. Unsafe practices by site personnel can create dangerous situations. Serious injuries can occur if the equipment strikes a worker, or if the equipment is rolled over. Here are a few common safety rules for operators and ground based workers to consider:

- Establish good communication system.
 - A standardized set of hand signals will be used by the operator and signal person.
 - Operators will always know exactly where all ground based workers are located,
 - High visibility vests will be worn to help the operator to locate personnel quickly
 - Back-up warning alarms must be functional so that it can be heard by all nearby workers.
 - Two-way radios are also valuable communication tools.

- Heavy equipment must have a rollover protective structure (ROPS) meeting OSHA requirements.
 - ROPS is designed to protect the operator if the machine tips over.
 - A seat belt must be worn so that the operator will not be thrown out of the seat during a rollover or upset situation.
 - When working on slopes, avoid moving across the face of the slope.
 - o Operate up and down the slope face if possible.
 - o Use extreme caution when operating near open excavations.

- Wear hearing protection when required.
 - When you have to shout to be heard from 2 feet or less, use protective plugs or muffs.

- Never jump onto or off the equipment.
 - Operators will use the handles and steps following the three-point contact rule when climbing onto or off heavy equipment.
 - o The three-point rule means having both feet and one hand, or one foot and both hands in contact with the ladder access at all times.

- Inspect and service the equipment regularly.
 - Complete equipment service in accordance with the manufacturer's recommendation.
 - Periodic safety inspections on all components of the equipment will be conducted by qualified personnel.
 - Use the heavy equipment inspection checklist found in Attachment IV of this HASP

- Perform pre-work area walk around inspection.
 - The operator will preview terrain in work area, place pin flags around boundary of equipment travel area or roadway boundaries.
 - Use a spotter to observe equipment movement and to alert operator to dangerous situations.
- Make sure the safety guards and covers are secure and in place.
- Only operate machine when site personnel and obstructions are cleared from area.
- Only the operator will ride on the machine.
- The operator must know the proper traffic pattern and obey the spotter.
- Park on level ground as much as possible with parking brake set when not in motion.
- Avoid operating too close to ditch banks or building overhangs
- When using machines equipped with elevating portions, such as forklift, dump truck, or backhoe, stay at least 10 feet away from high-voltage power lines.
- Be aware of color coded indicator flags for buried telephone and utility lines:

Red	electric power lines, cables, conduit, and lighting cables
Orange	telecommunication, alarm or signal lines, cables, or conduit
Yellow	natural gas, oil, steam, petroleum, or other gaseous or flammable material
Green	sewers and drain lines
Blue	drinking water
Violet	reclaimed water, irrigation, and slurry lines
Pink	temporary survey markings, unknown/unidentified facilities
White	proposed excavation limits or route

6.0 HAZARD ASSESSMENT AND CONTROLS

This section provides reference information regarding the chemical and physical hazards which may be associated with activities that are to be conducted as part of the scope of work.

6.1 CHEMICAL HAZARDS

Previous site data, which was collected in 1995, indicates lead and volatile organic compounds (VOCs) were detected at concentrations that may present unacceptable ecological and/or human health risks at SWMU 23 Building 36 and the area behind Building 36. Metals, primarily lead from sulfuric acid, and various VOCs are the primary constituents of concern for soil and water. All detected data is from previous investigations in 1995 conducted by a previous firm.

Table 6-1 shows the Chemicals of Potential Concern (COPCs) in comparison to current Occupational Exposure Limits (OELs) from the OSHA Personal Exposure Limits (OSHA PEL) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values.

**TABLE 6-1
COMPARISON OF CONTAMINANT CONCENTRATIONS
WITH CURRENT OCCUPATIONAL EXPOSURE LIMITS**

Metals			
Contaminant of Concern	Highest Concentration Previously Detected (in soils)	Amount of Dust-in-Air that would have to be generated before PEL/TLV would be reached	Current OSHA PEL And ACGIH TLV
Lead	776 mg/kg in soil	16.11 mg/m ³	0.05 mg/m ³ , TWA ₈
Contaminant of Concern	Highest Concentration Previously Detected (in Water)	Worst-Case Air Concentration Possible	Current OSHA PEL And ACGIH TLV
1,1 Dichloroethene	5 µg/L in water	1.35 ppm	ACGIH 1 ppm OSHA 1 ppm

Table Notes:

TWA₈: Time-weighted average exposure concentration for a conventional 8-hour work period that is not to be exceeded.

mg/m³: milligrams per cubic meter

As indicated in this table, in order for metals (lead) to reach current OSHA, ACGIH and/or NIOSH values to be exceeded, workers would have to be exposed to visibly dusty conditions. Exposure level calculations indicate that airborne dust concentrations would have to reach 16.11 mg/m³ before sufficient

airborne lead concentrations are achieved to support inhalation exposure. This is well within the range of particle size that is visible to the naked eye, which is greater than 2.5 mg/m^3 . Therefore this hazard will be monitored visually. Dust suppression (i.e. clean water application) will be used to control dust generation, if necessary.

6.1.1 Metals

The physical effects of poisoning from the heavy metals tend to be a very slow process and occur over a long period of continued exposure to the source of the toxic metal. The physical symptoms which are typically induced by the presence of toxic metals in the body tend to be very vague and can include symptoms such as persistent fatigue, the appearance of splitting and blinding headaches, the presence of an upset stomach, disorders such as colic and even anemia in some cases. The central nervous system is the main part of the human body likely to be affected by the presence of toxic metals. Symptoms of a disrupted central nervous system include the appearance of muscular tremors, the development of spells of dizziness, the presence of insomnia, the poor concentration abilities in the person and a sudden lack of muscular coordination in the body.

6.1.1.1 Lead

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High level exposure in men can damage the organs responsible for sperm production.

6.1.2 Volatile Organic Compounds

Volatile organic compounds (VOCs) refers to organic chemical compounds which have significant vapor pressures and which can affect the environment and human health. VOCs are numerous, varied, and ubiquitous. Although VOCs include both man-made and naturally occurring chemical compounds, it is the anthropogenic VOCs that are regulated, especially for indoors where concentrations can be highest. VOCs are typically not acutely toxic but have chronic effects. Because the concentrations are usually low and the symptoms slow to develop, analysis of VOCs and their effects is a demanding area.

Health effects include: Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, dizziness.

The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect. As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics. At present, not much is known about what health effects occur from the levels of organics usually found in homes. Many organic compounds are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans.

6.1.2.1 1,1-Dichloroethene

1,1-Dichloroethylene (1,1-DCE) is a highly flammable, colorless liquid with a sharp, harsh odor. It is insoluble in water, but soluble in ethanol, diethyl ether, acetone, benzene, and chloroform. 1,1-DCE is used as a comonomer in the polymerization of vinyl chloride, acrylonitrile, and acrylates. 1,1-DCE is used in semiconductor device fabrication for growing high purity silicon dioxide (SiO₂) films.

The health effects from exposure to 1,1-DCE are primarily on the central nervous system, including symptoms of sedation, inebriation, convulsions, spasms, and unconsciousness at high concentrations.

Acute Exposure

Vinylidene chloride is toxic by ingestion, inhalation and intravenous exposure routes. It is irritating to the eyes, skin, respiratory tract and gastrointestinal tract.

Signs and symptoms of exposure may include dizziness, drowsiness, headache, dyspnea and pneumonitis. Exposure to high concentrations can produce central nervous system depression and unconsciousness. Hepatic and renal dysfunction may result from chronic exposure. Eye contact may cause conjunctivitis and transient corneal injury. It is considered a potential carcinogen and mutagen.

6.1.3 Potential Routes of Exposure

Inhalation: It is important to keep in mind that the planned work area is outdoors, with ample natural ventilation that will reduce any airborne particulates through dilution and dispersion and the work being conducted is non-intrusive.

As a result of this, although possible, it is very unlikely that workers participating in these activities will encounter any airborne concentrations of the above COPCs that would represent an occupational exposure concern. Examples of onsite practices that are to be observed that will protect workers from exposure via inhalation include wearing the proper PPE and practicing good hygiene.

Ingestion and Skin Contact: Potential exposure concerns to these COPC may also occur through ingesting or coming into direct skin contact with contaminated soils. However, the likelihood of worker exposure concerns through these two routes is also considered very unlikely, provided that workers follow good personal hygiene and standard good sample collection/sample handling practices, and wear appropriate PPE as specified in this HASP. Examples of onsite practices that are to be observed that will protect workers from exposure via ingestion or skin contact include the following:

- No hand-to-mouth activities on site (eating, drinking, smoking, etc.)
- Washing hands upon leaving the work area and prior to performing any hand to mouth activities
- Wearing proper gloves whenever handling potentially-contaminated media, including soils, hand tools, and sample containers.

6.2 **PHYSICAL HAZARDS**

The following is a list of physical hazards that may be encountered at the site or may be present during the performance of site activities.

- Slip, trips, and falls
- Strain/muscle pulls from heavy lifting
- Ambient temperature extremes (heat/cold stress)
- Pinch/compression points
- Vehicular and equipment traffic
- Inclement weather
- Power Tool equipment hazards (pinch/compression points, rotating equipment, etc.).
- Natural hazards (snakes, ticks, poisonous plants, etc.)

These hazards are discussed further below, and are presented relative to each task in the task-specific AHAs. The Power Tool Equipment Checklist (Attachment IV) should be completed for all hand tools used during well repair activities.

6.2.1 Slips, Trips, and Falls

During various site activities there is a potential for slip, trip, and fall hazards associated with wet, steep, or unstable work surfaces. To minimize hazards of this nature, personnel required to work in and along areas prone to these types of hazards will be required to exercise caution, and use appropriate precautions (restrict access, guardrails, life lines and/or safety harnesses) and other means suitable for the task at hand. Site activities will be performed using the buddy system.

6.2.2 Ambient temperature extremes (heat/cold stress)

Because of the geographical location of the planned work, the likely seasonal weather conditions that will exist during the planned schedule, and the physical exertion that can be anticipated with some of the planned tasks, it will be necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent heat or cold stress. This is addressed in detail in section 4.0 of the Tetra Tech HSGM, which the FOL/SSO is responsible for reviewing and implementing as appropriate on this project.

6.2.3 Pinch/Compression Points

Handling of tools, machinery, and other equipment on site may expose personnel to pinch/compression point hazards during normal work activities. Where applicable, equipment will have intact and functional guarding to prevent personnel contact with hazards. Personnel will exercise caution when working around pinch/compression points, using additional tools or devices (e.g., pinch bars) to assist in completing activities.

6.2.4 Inclement Weather

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, tornadoes, etc.) conditions arise, the FOL/SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, inclement weather, and other natural hazards must be considered given the location of activities to be conducted. In general, avoidance of areas of known

infestation or nesting will be the preferred exposure control. Use of additional PPE with joints (ankles and wrists) taped, such as long pants tucked into boots or coveralls, is also recommended. Specific discussion on principle hazards of concern follows:

6.3.1 Insect/Animal Bites and Stings

Ticks, insect/animal bites, and stings are difficult to control given the climate and environmental setting of NSA Crane. However, in an effort to minimize this hazard the following control measures will be enacted where possible.

Commercially available bug sprays and repellents will be used whenever possible. This product should be applied over clothing articles. Loose fitting light colored clothing with long sleeves, where possible should be worn. This also aids in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be secured to the work-boots using duct tape to prevent access by ticks. Mosquito nets can also be used.

Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting heavily vegetated areas. Workers should perform a more detailed check of themselves when showering. Ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations.

The FOL/SSO will preview the access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to the site personnel.

Tick and Mosquito Transmitted Illnesses and Diseases

Ticks and mosquitoes have been identified in the transmission of diseases including Lyme's disease and malaria. Warm months (spring through early fall) are the most predominant time for this hazard. However, due to the climate and environmental setting of NSA Crane, this hazard may occur year round. Information concerning transmitted Lyme's Disease including recognition, evaluation, tick removal, and control is provided in Section 4.0 of the HSGM.

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

Conditions such as this should not be taken for granted and should be reported to the FOL/SSO immediately.

Snakes and Other Wild Animal Encounters

Indigenous animals including snakes (poisonous and non-poisonous varieties), raccoons, and other animals native to the region may have to be contended with. These animals may be encountered if work locations encroach on nesting or territories claimed by these animals.

To avoid the obvious hazards conveyed as part of a direct encounter, the following actions will be taken to minimize impact on the field crews and/or operations.

FOL/SSO will preview access routes and work locations for nesting areas or signs of animal activities (tracks, foraging areas, etc.). The identified suspect areas will be communicated to the field crews. To the extent possible, suspected nesting/habitat areas are to be avoided. Otherwise, snake chaps will be required as a precaution.

6.3.2 Poisonous Plants

Various plants that can cause allergic reactions may be encountered during fieldwork. These include, but may not be limited to, poison ivy, poison oak, and poison sumac. Contact of field personnel with previous plants may occur when clearing vegetation for access to work areas, or through movement through these plants. An irritating, allergic reaction can occur when direct contact is achieved between the plant and the bare skin of a field person, or the plant and some piece of equipment or clothing article that then later comes in contact with the bare skin of a field person. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next. Protective measures to control and minimize the effects of this hazard may include, but not limited to, the following:

- Identify plants for field personnel.
 - Poison Ivy - Characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.
 - Poison Sumac - Characterized as a tall bush of the sumac family bearing compound leaves (7 to 13 entire leaflets), branched from a central axis, drooping, with auxiliary clusters of white fruit. These white fruits and berries may exist only during pubescent stages.

- Poison oak - Characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters (1 to 13 feet) tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.
- Protective measures may include wearing disposable garments such as Tyvek when clearing brush. These may be carefully removed and disposed of along with any oils accumulated from the plants.

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

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

6.3.3 Heat Stress

It is always necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent heat/cold stress. Because of the geographical location of the planned work, the seasonal weather conditions, and the physical exertion that can be anticipated with some of the planned tasks, it is necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent heat stress. If such conditions are encountered use the following information on heat stress recognition, prevention and control.

Ambient temperature extremes during this task will (hot working environments) may occur during performance of hazardous waste work depending on the project schedule. Work performed when ambient temperatures exceed 70°F may result in varying levels of heat stress such as heat rash, heat cramps, heat exhaustion, and/or heat stroke.

In either case, these conditions can be debilitating and, when extreme, they can be fatal. An understanding of the importance in preventing heat/cold stress, coupled with the worker's awareness of the signs and symptoms of overexposure, can significantly reduce the potential for adverse health effects. If this hazard is present during site operations, each worker will be provided with information necessary to protect them, and site management will be instructed to permit frequent breaks in mild temperature rest areas having hot/cold fluids available for consumption. In extreme cases, biological monitoring may be performed and

data compared to the most recent recommendations of the American Conference of Governmental Industrial Hygienists (ACGIH).

6.3.3.1 Heat Related Disorders

There are four heat related disorders to monitor while performing work on site.

6.3.3.1.1 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.

6.3.3.1.2 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.

6.3.3.1.3 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 result in partial or complete temporary loss of respiration and 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.

6.3.3.1.4 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%. It can also occur from 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.

6.3.3.1.5 Controlling Heat Stress

The following control measures are only guidelines for heat related emergencies. Actual training in emergency medical care or basic first aid is recommended. Employees will monitor one another for signs of heat stress. If indications of heat stress occur, the following corrective measures will be performed

- Inform affected workers of the signs and symptoms of heat stress and encourage co-worker observations.
- Schedule tasks that are physically-demanding in early morning and late afternoon timeframes when heavy loads would be less of an issue.
- Notify the SSO who may perform biological monitoring to determine the extent of the heat related condition.
- The SSO may alter the work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- The SSO may also recommend cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- When conditions of heat related disorders may be experienced the SSO through site-specific training and safety briefing informed of the importance of adequate rest, acclimation, and proper diet in the prevention of 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.
- Approximately 1 cup of cool water every 20 minutes is recommended.
- Replacement fluids can be commercial mixes such as Gatorade®.
- Move affected persons into a shaded cool rest area (below 77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.

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%), 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%.

- The length of the initial work period will be determined by using the table below.

TABLE 6-2
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%), 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%. 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.

6.3.3.1.6 Temperature Extremes – Heat Stress Indication

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

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

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

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

TABLE 6-3
HEAT STRAIN SYMPTOMS

Stop Work If Any Worker Demonstrates Any Of The Following

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

Individuals May Be at Greater Risk of Heat Stress If:

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

7.0 AIR MONITORING

The primary COCs (1,1-DCE and lead) although not expected, could be present in concentrations that would cause an inhalation hazard during planned site activities. The breathing zone will be monitored as a precaution against any possible unknown chemical hazards that may be present at the site. A Photoionization Detector (PID) using lamp energy of 10.6 eV will be used to detect airborne off gas emissions. . . If airborne dusts are observed, use area wetting methods.

7.1 INSTRUMENTS AND USE

The PID will be used primarily to monitor source points and worker breathing zone areas for 1,1-DCE, while observing instrument action levels. The SSO shall obtain and document the daily background (BG) reading at an upwind, unaffected area and observe for readings above that BG level. The SSO shall monitor source areas (e.g., sampling areas, monitoring wells) for the presence of any reading above the daily-established BG level. If elevated readings above background are observed, the SSO shall monitor the workers breathing zone (BZ) areas with the PID. If the appropriate instrument Action Level is exceeded (see below), the following process will be followed:

- The SSO shall order all personnel to stop work and retreat upwind to a safe, unaffected area, where they will remain until further directed by the SSO.
- The SSO shall allow at least 5 minutes to pass so that the work area can ventilate, and will then re-approach the work area while continuously monitoring the BZ areas.
- Only when BG levels are regained in BZ areas will work be permitted to resume.
- If BG levels are not regained, the SSO will contact the HSM for additional direction.

For metals (Lead) generation of dusts should be minimized. If airborne dusts are observed, use area wetting methods. Site contaminants may adhere to or be part of airborne dusts or particulates. Although unlikely to be present, the generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates.

Instrument Action Levels: The use of either a PID will be acceptable, provided that the following action levels are observed:

- PID Action Level: 95 ppm above BG in BZ areas for 4 exposures of no more than 5 minutes in any one work day.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the equipment provider (i.e., rental agency used). Operational checks (bump tests) and field calibration will be performed on site instruments each day prior to their use. The instrument will be exposed to the calibration gas and the result will be recorded. If the result is within 5% of the designated concentration no field calibration will be required. Field calibration will be performed on instruments according to manufacturer's recommendations. These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (which the SSO must assure are included with the instrument upon its receipt onsite). Field calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

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

7.3 DOCUMENTING INSTRUMENT READINGS

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

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used (e.g., PID, FID, etc.)
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SSO (such as weather conditions, possible instrument interferences, etc.)

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 Tetra Tech personnel participating in on site activities. Tetra Tech personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at NSA Crane. Tetra Tech personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. In addition, 8-hour supervisory training will be required for site supervisory personnel.

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

8.2 SITE-SPECIFIC TRAINING

Tetra Tech FOL/SSO will provide site-specific training to Tetra Tech employees who will perform work on this project. Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation will identify personnel who through record review and attendance of the site-specific training are cleared for participation in site activities. This document shall be maintained at the site to identify and maintain an active list of trained and cleared site personnel.

The Tetra Tech FOL/SSO will also conduct a pre-activities training session prior to initiating site work. This will consist of a brief meeting at the beginning of each day to discuss operations planned for that day, and a review of the appropriate AHAs with the planned task participants. A short meeting may also be held at the end of the day to discuss the operations completed and any problems encountered.

8.3 MEDICAL SURVEILLANCE

Tetra Tech personnel participating in project field activities will have had a physical examination meeting the requirements of Tetra Tech's medical surveillance program. Documentation for medical clearances will be maintained in the Tetra Tech Pittsburgh office and made available, as necessary, and will be documented using Figure 8-1 for every employee participating in onsite work activities at this site.

9.0 SITE CONTROL

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

9.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of active operations plus an established safety zone depending on the task. The following represent the exclusion zone boundaries for the following identified tasks:

- Excavation with a backhoe or excavator Soil Boring (DPT) – 35-feet
- Surveying and surface soil sampling – 15-feet
- Low pressure decontamination activities – 10-feet
- High Pressure washing and heavy equipment decontamination operations – 35-feet
- IDW Storage area – Authorized personnel only

Exclusion zones will be delineated using barrier tape, cones and/or drive poles, and postings to inform and direct facility site personnel and visitors, as necessary.

A pre-startup site visit will be conducted to identify proposed subsurface investigation locations, conduct utility clearances, and provide notices concerning scheduled activities.

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 marked using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. 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. The support zones will be established at areas of the site where away from potential exposure to site contaminants during normal working conditions or foreseeable emergencies.

9.4 ACTIVITY HAZARD ANALYSIS

Work conducted in support of this project will be performed using AHAs to guide and direct field crews on a task by task basis. See Attachment III. It is the FOL/SSO's responsibility to review the AHAs with the task participants as part of a pre-task tail gate briefing session.

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
- Regulatory personnel (i.e., DoD, EPA, OSHA)
- Authorized Navy Personnel
- Other authorized visitors

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

Site visitors will be escorted and restricted from approaching any work areas where they could potentially be exposed to hazardous chemicals. If a visitor has authorization from the client and from the Tetra Tech Project Manager to approach our work areas, the FOL must assure that the visitor first provides documentation indicating that he/she/they have successfully completed the necessary OSHA introductory training, receive site-specific training from the FOL/SSO, and that they have been physically cleared to work on hazardous waste sites.

9.6 SITE SECURITY

Site security will be accomplished using Tetra Tech field personnel. Tetra Tech will retain complete control over active operational areas. As this activity takes place at a Navy facility open to public access, the first line of security will take place using exclusive zone barriers, site work permits, 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 Base Contact. The Base Contact will serve as a focal point for base personnel, interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 BUDDY SYSTEM

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

9.8 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

Tetra Tech and subcontractor personnel will provide MSDSs for chemicals brought on site. The contents of these documents will be reviewed by the FOL/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 the chemicals used on site will be developed using the HSGM. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.9 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary.

External communication will be accomplished by using cellular telephones at approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities at the site, it is strongly recommended that cell signal strength be checked in the work areas and the relevant project phone numbers are programmed on site worker cell phones. Emergency numbers listed in Table 2-1 should be entered into site cell phones prior the beginning of work. The FOL will determine and arrange for telephone communication procedures.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that quantities of bulk potentially hazardous materials (greater than 55-gallons) will be handled during some of the site activities conducted as part of the scope of work (including IDW). It is also not anticipated that spillage of these materials would constitute a significant danger to human health or the environment. Further, it is possible that as the job progresses disposable PPE and other non-reusable items will be generated. As needed, 55-gallon drums will be used to contain waste waters, IDW, and other unwanted items generated during investigatory activities. It is not anticipated that significant volumes of solid or semi-solid IDW (i.e., soil, sediment, etc.) will be generated during field activities.

If gross contamination is encountered then intrusive activities will cease. Any grossly contaminated material that is brought to the surface will not be returned to the excavation but will be segregated from other excavated soil and placed on a plastic liner. The grossly contaminated material will be securely staged until arrangements are made for proper off-site disposal.

If IDW is generated, the material will be handled in accordance with SOP-10 (Management of Investigation-Derived Waste) located in the Tetra Tech HSGM. Used personal protective equipment (PPE) and other IDW such as DPT plastic sleeves will be bagged and disposed of as regular trash in an appropriate facility waste container.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, there are various areas vulnerable to this hazard including the areas used for central staging and decontamination activities. Additionally, areas designated for handling, loading, and unloading of potentially contaminated soils, waters, and debris present limited potential for leaks or spills. It is anticipated that the IDW generated as a result of this scope of work will be disposed of on-site.

10.3 PERSONNEL TRAINING AND SPILL PREVENTION

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

10.4 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

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

- Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry);
- Drums (55-gallon U.S. Department of Transportation DOT 1A1 or 1A2)
- Shovels, rakes, and brooms
- Labels

10.5 SPILL CONTROL PLAN

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

- Notify the FOL/SSO immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove non-essential personnel.
- Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.
- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.
- Re-containerize spills, including 2-inch of top cover 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/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 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, manholes, sewers, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

Additionally, a Permit-Required Confined Space must also have one or more of the following characteristics:

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

For further information on confined space, consult the HSGM 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 Tetra Tech FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (Attachment V)
- Training/Medical Surveillance Documentation Form
- First-Aid Supply Usage Form
- Emergency Reference Form
- Directions to the Hospital

12.1 MATERIALS TO BE POSTED AT THE SITE

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

- **Chemical Inventory Listing (posted)** - This list represents the chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc. This list should be posted in a central area.
- **MSDSs (maintained)** - The MSDSs should also be in a central area accessible to the site personnel. These documents should match the listings on the chemical inventory list for the substances employed on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.
- **The OSHA Job Safety & Health Protection Poster (posted)** - This poster should be conspicuously posted in places where notices to employees are normally posted, as directed by 29 CFR 1903.2 (a)(1). Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. The law also states that reproductions or facsimiles of the poster shall be at least 8½ by 14 inches with 10 point type.

- **Site Clearance (maintained)** - This list is found within the training section of the HASP (Figure 8-1). This list identifies the site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance, but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.
- **Emergency Phone Numbers and Directions to the Hospital(s) (posted)** - This list of numbers and directions will be maintained at the phone communications points and in each site vehicle.
- **Medical Data Sheets/Cards (maintained)** - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility.
- **Personnel Monitoring (maintained)** - The results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.
- **Placards and Labels (maintained)** - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable [Hazard Communication 29 CFR 1910.1200(f)] labels.

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

13.0 ACRONYMS / ABBREVIATIONS

ACGIH	American Conference of Governmental and Industrial Hygienists
AHA	Activity Hazard Analysis
BG	Background
BZ	Breathing Zone
CAAA	Crane Army Ammunition Activity
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Contaminants of Concern
CPR	Cardio Pulmonary Resuscitation
CSP	Certified Safety Professional
CTO	Contract Task Order
dBA	decibels
DoD	Department of Defense
DOT	Department of Transportation
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDW	Investigation Derived Waste
mg/m ³	milligrams per cubic meter
N/A	Not Available
NSA	Naval Support Activity
NIOSH	National Institute for Occupational Safety and Health
OELs	Occupational Exposure Limits
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Personal Exposure Limit
PHSO	Project Health and Safety Officer
PM	Project Manager
PPE	Personal Protective Equipment
RPM	Remedial Project Manager
SOP	Standard Operating Procedure
SSO	Site Safety Officer
STEL	Short term exposure limit
SWMU	Solid Waste Management Unit

TBD	To be determined
TLV	Threshold Limit Values
TWA	Time Weighted Average

ATTACHMENT I

MEDICAL DATA SHEET

MEDICAL DATA SHEET

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

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Person to notify in the event of an emergency: Name: _____

Phone: _____

Drug or other Allergies: _____

Particular Sensitivities : _____

Do You Wear Contacts? _____

What medications are you presently using? _____

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

Note: Health Insurance Portability and Accountability Act (HIPAA) Requirements

HIPAA took effect April 14, 2003. Loosely interpreted, HIPAA regulates the disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on this Medical Data Sheet), provision of health care, or other information. HIPAA also requires Tetra Tech to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form will not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that they can accompany an injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

Name (Print clearly)

Signature

Date

ATTACHMENT II

INCIDENT REPORT FORM

Report Date	Report Prepared By	Incident Report Number
INSTRUCTIONS:		
All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.		
Complete any additional parts to this form as indicated below for the type of incident selected.		
TYPE OF INCIDENT (Check all that apply)		Additional Form(s) Required for this type of incident
Near Miss (No losses, but could have resulted in injury, illness, or damage)	<input type="checkbox"/>	Complete IR Form Only
Injury or Illness	<input type="checkbox"/>	Complete Form IR-A; Injury or Illness
Property or Equipment Damage, Fire, Spill or Release	<input type="checkbox"/>	Complete Form IR-B; Damage, Fire, Spill or Release
Motor Vehicle	<input type="checkbox"/>	Complete Form IR-C; Motor Vehicle
INFORMATION ABOUT THE INCIDENT		
Description of Incident		
<hr/> <hr/> <hr/>		
Date of Incident	Time of Incident	
	_____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/>	
Weather conditions at the time of the incident	Was there adequate lighting?	
	_____ Yes <input type="checkbox"/> No <input type="checkbox"/>	
Location of Incident		
_____ Was location of incident within the employer's work environment? Yes <input type="checkbox"/> No <input type="checkbox"/>		
Street Address	City, State, Zip Code and Country	
Project Name	Client:	
Tetra Tech Supervisor or Project Manager	Was supervisor on the scene?	
	Yes <input type="checkbox"/> No <input type="checkbox"/>	
WITNESS INFORMATION (attach additional sheets if necessary)		
Name	Company	
Street Address	City, State and Zip Code	
Telephone Number(s)		

CORRECTIVE ACTIONS				
Corrective action(s) immediately taken by unit reporting the incident:				
<hr/> <hr/> <hr/>				
Corrective action(s) still to be taken (by whom and when):				
<hr/> <hr/> <hr/>				
ROOT CAUSE ANALYSIS LEVEL REQUIRED				
Root Cause Analysis Level Required: Level - 1 <input type="checkbox"/> Level - 2 <input type="checkbox"/> None <input type="checkbox"/>				
Root Cause Analysis Level Definitions				
Level - 1	<p>Definition: A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office.</p> <p>The following events may trigger a Level 1 RCA:</p> <ul style="list-style-type: none"> ▪ Work related fatality ▪ Hospitalization of one or more employee where injuries result in total or partial permanent disability ▪ Property damage in excess of \$75,000 ▪ When requested by senior management 			
Level - 2	<p>Definition: A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided.</p> <p>The following events will require a Level 2 RCA:</p> <ul style="list-style-type: none"> ▪ OSHA recordable lost time incident ▪ Near miss incident that could have triggered a Level 1 RCA ▪ When requested by senior management 			
Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause identified within each area of inquiry.				
NOTIFICATIONS				
Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other: _____				

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

INSTRUCTIONS:

Complete all sections below for incidents involving injury or illness.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)			
EMPLOYEE INFORMATION			
Company Affiliation			
Tetra Tech Employee? <input type="checkbox"/>		Tetra Tech subcontractor employee (directly supervised by Tetra Tech personnel)? <input type="checkbox"/>	
Full Name		Company (if not Tetra Tech employee)	
Street Address, City, State and Zip Code		Address Type	
_____		Home address (for Tetra Tech employees) <input type="checkbox"/>	
_____		Business address (for subcontractors) <input type="checkbox"/>	
Telephone Numbers			
Work: _____	Home: _____	Cell: _____	
Occupation (regular job title)		Department	
Was the individual performing regular job duties?		Time individual began work	
Yes <input type="checkbox"/> No <input type="checkbox"/>		_____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/>	
Safety equipment			
Provided? Yes <input type="checkbox"/> No <input type="checkbox"/>		Type(s) provided: <input type="checkbox"/> Hard hat <input type="checkbox"/> Protective clothing	
Used? Yes <input type="checkbox"/> No <input type="checkbox"/> If no, explain why		<input type="checkbox"/> Gloves <input type="checkbox"/> High visibility vest	
_____		<input type="checkbox"/> Eye protection <input type="checkbox"/> Fall protection	
_____		<input type="checkbox"/> Safety shoes <input type="checkbox"/> Machine guarding	
_____		<input type="checkbox"/> Respirator <input type="checkbox"/> Other (list)	

NOTIFICATIONS			
Name of Tetra Tech employee to whom the injury or illness was first reported		Was H&S notified within one hour of injury or illness?	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
Date of report		H&S Personnel Notified	
Time of report		Time of Report	
If subcontractor injury, did subcontractor's firm perform their own incident investigation?			
Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, request a copy of their completed investigation form/report and attach it to this report.			

INJURY / ILLNESS DETAILS

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

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

Describe the object or substance that directly harmed the individual: Examples: "Concrete floor"; "Chlorine"; "Radial Arm Saw". If this question does not apply to the incident, write "Not Applicable".

MEDICAL CARE PROVIDED

Was first aid provided at the site: Yes No If yes, describe the type of first aid administered and by whom?

Was treatment provided away from the site: Yes No If yes, provide the information below.

Name of physician or health care professional

Facility Name

Street Address, City State and Zip Code

Type of Care?

Was individual treated in emergency room? Yes No

Was individual hospitalized overnight as an in-patient? Yes No

Telephone Number

Did the individual die? Yes No If yes, date: _____

Will a worker's compensation claim be filed? Yes No

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

SIGNATURES

I have reviewed this report and agree that all the supplied information is accurate

Affected individual (print)

Affected individual (signature)

Telephone Number

Date

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



INSTRUCTIONS:

Complete all sections below for incidents involving property/equipment damage, fire, spill or release.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)

TYPE OF INCIDENT (Check all that apply)

Property Damage [] Equipment Damage [] Fire or Explosion [] Spill or Release []

INCIDENT DETAILS

Results of Incident: Fully describe damages, losses, etc.

Response Actions Taken:

Responding Agency(s) (i.e. police, fire department, etc.)

Agency(s) Contact Name(s)

DAMAGED ITEMS (List all damaged items, extent of damage and estimated repair cost)

Table with 3 columns: Item, Extent of damage, Estimated repair cost

SPILLS / RELEASES (Provide information for spilled/released materials)

Table with 3 columns: Substance, Estimated quantity and duration, Specify Reportable Quantity (RQ)

FIRES / EXPLOSIONS (Provide information related to fires/explosions)

Firefighting equipment used? Yes [] No [] If yes, type of equipment: _____

NOTIFICATIONS

Table with 4 columns: Required notifications, Name of person notified, By whom, Date / Time

Who is responsible for reporting incident to outside agency(s)? Tetra Tech [] Client [] Other [] Name: _____

Was an additional written report on this incident generated? Yes [] No [] If yes, place in project file.



INSTRUCTIONS:

Complete all sections below for incidents involving motor vehicle accidents. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)							
INCIDENT DETAILS							
Name of road, street, highway or location where accident occurred				Name of intersecting road, street or highway if applicable			
County		City			State		
Did police respond to the accident?				Did ambulance respond to the accident?			
Yes <input type="checkbox"/> No <input type="checkbox"/>				Yes <input type="checkbox"/> No <input type="checkbox"/>			
Name and location of responding police department				Ambulance company name and location			
Officer's name/badge #							
Did police complete an incident report? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, police report number: _____ Request a copy of completed investigation report and attach to this form.							
VEHICLE INFORMATION							
How many vehicles were involved in the accident? _____ (Attach additional sheets as applicable for accidents involving more than 2 vehicles.)							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
Vehicle Owner / Contact Information				Vehicle Owner / Contact Information			
Color				Color			
Make				Make			
Model				Model			
Year				Year			
License Plate #				License Plate #			
Identification #				Identification #			
Describe damage to vehicle number 1				Describe damage to vehicle number 2			
Insurance Company Name and Address				Insurance Company Name and Address			
Agent Name				Agent Name			
Agent Phone No.				Agent Phone No.			
Policy Number				Policy Number			



DRIVER INFORMATION							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
Driver's Name				Driver's Name			
Driver's Address				Driver's Address			
Phone Number				Phone Number			
Date of Birth				Date of Birth			
Driver's License #				Driver's License #			
Licensing State				Licensing State			
Gender		Male <input type="checkbox"/> Female <input type="checkbox"/>		Gender		Male <input type="checkbox"/> Female <input type="checkbox"/>	
Was traffic citation issued to Tetra Tech driver? Yes <input type="checkbox"/> No <input type="checkbox"/>				Was traffic citation issued to driver of other vehicle? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Citation #				Citation #			
Citation Description				Citation Description			
PASSENGERS IN VEHICLES (NON-INJURED)							
<p>List all non-injured passengers (excluding driver) in each vehicle. Driver information is captured in the preceding section. Information related to persons injured in the accident (non-Tetra Tech employees) is captured in the section below on this form. Injured Tetra Tech employee information is captured on FORM IR-A</p>							
Vehicle Number 1 – Tetra Tech Vehicle				Vehicle Number 2 – Other Vehicle			
How many passengers (excluding driver) in the vehicle? ____				How many passengers (excluding driver) in the vehicle? ____			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
Non-Injured Passenger Name and Address				Non-Injured Passenger Name and Address			
INJURIES TO NON-TETRATECH EMPLOYEES							
Name of injured person 1				Address of injured person 1			
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male <input type="checkbox"/> Female <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Injured <input type="checkbox"/> Died <input type="checkbox"/>	
Name of injured person 2				Address of injured person 2			
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male <input type="checkbox"/> Female <input type="checkbox"/>			Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Injured <input type="checkbox"/> Died <input type="checkbox"/>	
OTHER PROPERTY DAMAGE							
Describe damage to property other than motor vehicles							
Property Owner's Name				Property Owner's Address			



TETRA TECH, INC.

Safety Excellence

TETRA TECH, INC.
INCIDENT FORM IR-C

COMPLETE AND SUBMIT DIAGRAM DEPICTING WHAT HAPPENED

A large, empty rectangular area with a thin black border, intended for drawing a diagram depicting what happened during an incident.

ATTACHMENT III

ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<p>used. If you receive a call, let it go to voice mail or pull over and answer it.</p> <ul style="list-style-type: none"> • Ensure you have an Orange Vest and a Reflective Triangle in your vehicle at all times, a disposable camera, Tetra Tech Incident Form (IR-C). • Practice defensive driving whenever traveling in a vehicle. Always permit adequate room between you and the driver in front of your vehicle. Use the 4-second rule. • Follow the direction of posted signs (speed limits, etc.). You will be responsible for all moving and parking violations. • Exercise extra caution when moving through school and work zones. • All items in and on your vehicle should be secured to prevent movement or loss from the vehicle potential causing an accident. <p>If you are in an accident:</p> <ul style="list-style-type: none"> • Move you vehicle if possible from the travel lanes. • Turn on your emergency flashers. • Do not step into traffic when exiting your vehicle. • Place your warning triangle (100-feet behind your vehicle) and put on your Orange vest. • Contact the FOL and the SSO. • Be respectful to the Local authorities. • Do NOT attempt to argue whose fault. • DO NOT admit to fault. • Secure all valuables. Take the keys from the ignition if you leave your vehicle for any reason. (Be aware there will be a fee for towing, traffic citations, etc.). • Complete the IR-C form to make sure you have gathered all pertinent information 	
<p>2. Preparatory tasks, such as: Assembling, packing, unpacking equipment and supplies.</p>	<p>2. Minor cuts, abrasions or contusions handling equipment and tools</p>	<p>2. Wear cut-resistant gloves when handling items with sharp or rough edges or when using knives to cut open packages. A cut resistant glove should at least be worn on the non-knife hand:</p> <ul style="list-style-type: none"> • Exercise caution when unpacking boxes. Make sure you can see clearly into the box and do not reach in and contact broken glass (possibly damaged in shipment) or sharp articles. • Always cut away from yourself and others. • Do not place items to be cut on your hand and/or knee • Always use a sharp cutting instrument. Many accidents result from struggling with dull cutting implements. • Secure work pieces to be cut. • Carry and transport glassware in a hard sided container. That way if you fall, you will not fall on broken glass. 	<p>L</p>

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> If there is broken glass place, it in a hardsided container for disposal. Placement in a soft sided container may result in cuts and lacerations if the bag is penetrated by shards of glass during carrying. <p>See Section 4.13 of the HSGM for additional safe work practices as it pertains cuts/lacerations.</p>	
<p>3. Unpacking; assembling; inspecting equipment before use</p>	<p>3. Strains or sprains during manual lifting and carrying activities</p>	<p>3. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible), and plan each lift:</p> <ul style="list-style-type: none"> Inspect/clear the intended path of travel and areas where loads will be deposited, test lift each object to ensure you can without injuring yourself, ensure good grasp is obtainable on object, keep back straight and lift with legs not back, obtain help when needed to lift large, bulky, or heavy items. <p>Remember: Your muscles, tendons, and ligaments are not as flexible in the early morning hours. Stretch before physical taxing activities. In the later afternoon, your muscles, tendons, and ligaments maybe stressed from fatigue. Take breaks as necessary to avoid injury.</p> <p>See Section 4.4 of the HSGM for additional safe lifting practices.</p>	L
<p>3A. Performing Equipment inspections of vehicles and equipment arriving/preparing to depart the site</p> <ul style="list-style-type: none"> Equipment Inspection DPT drill rig(s); excavation – heavy equipment; and hand tools 	<p>3A. The following potential hazards may be encountered during the equipment inspection process</p> <ul style="list-style-type: none"> Flying projectiles – Pressurized systems –High pressure hydraulics Cuts and lacerations Pinch/compressions Struck by Injuries due to faulty equipment <p>As part of this effort, compressed nitrogen will be secured, brought onto, and most likely stored on base. The nitrogen will be employed for groundwater sampling.</p>	<p>3A. The purpose of the following inspections is to prevent possible injury from faulty equipment. However, as the equipment has to operate to test personnel may also be exposed to inherent hazards such as those described.</p> <p>DPT Drill Rigs:</p> <ul style="list-style-type: none"> Complete Equipment Inspection Checklist for the Drill Rigs and associated drilling components using Attachment IV. All emergency stop devices will be tested initially, then daily from that point on. Do not place hands or fingers within pinch or compression points. If this is necessary (which it should never be) use blocking or tools intended for that purpose to secure potential energy sources. <p>Inspector or selected Qualified person should employ hardhat, safety glasses, and leather work gloves during the inspection activity. All potential and kinetic energy sources will be secured or controlled during inspection.</p> <p>Sampling devices:</p> <ul style="list-style-type: none"> Threads of sampling devices will be examined. If they are washed out difficult to assemble and disassembled have them replaced. Connectors, pins, associated attachments will not show signs of excessive wear. This will also pertain to wrenches employed to construct/disassemble pump assemblies. Check teeth and gripping surfaces to minimize the potential for slip. 	L

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> Exercise caution when handling machine (drive tubes, drive rods, cutting shoes, etc.) components due to the potential for sharp edges 	
Equipment Inspection (continued)	3B. High pressure air lines – Struck by hazards	3B. Struck by hazards – To prevent hazards of this nature the following measures will be employed: <ul style="list-style-type: none"> All high pressure air lines that do not have mechanical threaded connections will have connections pinned and will be equipped with a whip check to minimize the lines thrashing should they become disconnected. 	L
Equipment Inspection (continued)	3C. Spills Prevention – <ul style="list-style-type: none"> Hydraulic fluid release – A hydraulic line that ruptures can release hydraulic fluid Thermal Burns 	3C. During the Equipment Inspection additional attention will be focused to the condition of the hydraulic lines to avoid a potential rupture and/or release. This will include: <ul style="list-style-type: none"> Attention will be focused on connection points Condition of the hoses <ul style="list-style-type: none"> Damaged steel braids Areas of friction wear patterns Damage or deterioration to the rubber protective outer coating (indicative of overheating) In all cases, suspect hoses will be replaced. It is recommended where possible, that plastic be placed on the ground in the area under the rig to capture incidental spills and releases should they occur. Care should be taken not to extend the plastic beyond the rig proper as such creating a slip trip and fall hazard.	L
4. Hazard Communication - Receiving chemicals, storing chemicals, preparing to use chemicals, collecting Material Safety Data Sheets completing chemical Inventory;	4. Chemical Exposure	4. Chemical hazards – It is not anticipated that site personnel will encounter chemical hazards as it pertains to mobilization as no direct encounter is planned. However, it will be the responsibility of the FOL and/or the SSO to implement the Onsite Hazard Communication Program (See Section 5.0 of the HSGM). In this effort all chemicals brought onsite (compressed gases (calibration gases), decontamination fluids; sample preservatives, well construction supplies, etc.) will: <ul style="list-style-type: none"> All chemicals will have an accompanying Materials Safety Data Sheet (MSDS) that has been reviewed and approved for use by the SSO. <ul style="list-style-type: none"> The SSO will review the HASP to ensure emergency equipment and/or associated PPE necessary to ensure the safety of the workers are equal or better than that listed in the MSDS. All incoming containers will be properly labeled, will be in English and not defaced. If the materials will be transferred to temporary containers, these too will be appropriately labeled by the SSO or the person using the materials. All materials received onsite will be added to the Chemical Inventory List. Included in this information is the volume and location stored and primary hazards. All materials will be stored as prescribed with compatible chemicals. 	L

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
<p>5. Initial Site Surveys - Access/egress into Controlled areas</p> <p>Initial site survey of the intended work areas</p>	<p>5. Coordinate efforts with facility personnel</p> <ul style="list-style-type: none"> • Inherent hazards or restrictions <p>Emergency Prevention – This component will be critical in identifying potential emergencies that may be task associated. These are as follows:</p> <ul style="list-style-type: none"> • Utility strike – Overhead power lines; buried utilities; gas, sewage, and/or water. • Physical hazards – Steep embankments, sink holes; poisonous vegetation. <p>Determining site control boundaries</p>	<ul style="list-style-type: none"> • As necessary employ spill prevention pans or like equipment to capture or contain spills within the storage area. <p>5. In order to address the potential hazards associated with the initial entry:</p> <ul style="list-style-type: none"> • The FOL and/or the SSO will meet with the restricted area personnel/operators to ensure they are aware of planned activities. • As part of these discussions Inquire of the potential hazard in the area and areas to avoid. • Inquire as to what the facilities Emergency Action Requirements are should there be an emergency and where you should go as an assembly point. • What security measures are required • PPE requirements for location (such as flame retardant clothing) • Restriction boundaries • If persons must enter the restricted area local requirements will prevail. These include: <ul style="list-style-type: none"> ○ Signing in ○ PPE minimum requirements for the location • The FOL and/or the SSO will survey the area to ensure areas prone to slip, trip, and fall hazards are flagged or removed. <ul style="list-style-type: none"> ○ Entry/access routes will be determined as well as schedules. <p>All workers are to wear sturdy work shoes that are outfitted with slip resistant aggressive tread and steel toe and shank when foot hazards exist.</p> <p>All exits and selected access pathways will be maintained free of obstructions to allow free movement of site personnel, equipment, and if necessary emergency equipment.</p> <p>Utility strikes –</p> <ul style="list-style-type: none"> • Overhead power lines – In the areas in which the mast will be raised will be examined for the existence of overhead power lines or obstructions. • Personnel will perform walkovers to examine the surface for surface monuments including: <ul style="list-style-type: none"> ○ Valve or meter boxes ○ Manhole covers ○ Direction cable boxes ○ Utilities entering or exiting buildings. <p>The FOL/SSO will determine the necessary boundary at each work location:</p> <ul style="list-style-type: none"> • DPT drilling operations – 35-feet or the height of the mast + 10-feet, whichever is greater. During this time, the FOL and/or the SSO will 	<p>L</p>

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
	<p>Emergency preparation</p> <ul style="list-style-type: none"> Selecting evacuation routes and assembly points; determining emergency equipment requirements 	<p>determine if physical hazards exists, terrain challenges and the necessary amount of vegetation to be removed (where applicable) to allow access and a sufficient size work area.</p> <ul style="list-style-type: none"> High pressure decontamination 35-feet surrounding the point of operation. Low pressure decontamination 10-feet surrounding point of operation. <p>The Emergency Evacuation point will be selected as part of the initial site survey. Tentatively this location is at the driveway intersection where emergency response crews will approach from. Dependent on the location of the hazard escape may have to occur in the opposite direction. A secondary point will be determined in the field and communicated as part of the Daily Tail-Gate meeting.</p>	
<p>6. Preparing the site for work activities.</p>	<p>6. Site set up hazards:</p> <ul style="list-style-type: none"> Struck By Tip Over Backing Electrocution / Explosion Slips, Trips, Falls 	<p>6. Struck by/ Tip Over:</p> <ul style="list-style-type: none"> All equipment, augers, rods and tools will be properly secured during transport. All vehicles and equipment to be employed on roads and highways will comply with DOT requirements. Never move the drilling rig with the mast upright. Set hydraulic leveling jacks before raising the mast. Ensure the drilling site foundation is stable and as level as possible. Use a ground guide along with a functioning back-up alarm during equipment backing to avoid striking objects or backing into pits and/or ditches. This is especially critical as this is within a process area and movement is tight. <p>Utility damage prevention:</p> <ul style="list-style-type: none"> Inspect for buried and overhead utilities in the vicinity of the drilling location. A drilling clearance permit shall be obtained from base personnel or utility companies prior to initiating intrusive operations. <p>Slip, trips, and falls:</p> <ul style="list-style-type: none"> Practice good housekeeping to keep the ground around the drilling site clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. 	<p>L</p>

ACTIVITY HAZARD ANALYSIS
Site Mobilization/Demobilization
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EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>DPT Drill Rig; Sampling attachments; Hand tools (dollies, hand carts, hand knives, carpenter tools, fixed and portable ladders, etc.)</p>	<p>Visual inspection of hand and power tools will be performed by the SSO. Tools will be tagged with colored electrical tape. Green tape ok for use. Red tape do not use. All red taped items should be repaired or removed from the site. Each time a tool is used it will undergo a cursory inspection by the user. Noted damage (mushroomed head, splintered handle, etc.) will require removal from service.</p> <p>FOL and SSO to perform regular (e.g., daily) inspections for housekeeping issues. The results of these efforts will be documented in the Field Logbook</p>	<p>All personnel:</p> <ul style="list-style-type: none"> • 40-Hour General Site Worker Training [OSHA 29 CFR 1910.120 (e)] • 8-Hour General Site Worker Refresher Training [OSHA 29 CFR 1910.120 (e)(8)] • Site Specific Training – All personnel shall review this Abbreviated Health and Safety Plan prior to the commencement of on-site activity. • Participate in a Medical Clearance/Surveillance Program as described in OSHA 29 CFR 1910.120 (f). • Complete a Medical Data Sheet • Review applicable MSDSs if you are unaware of the hazards and recommended control measures for diesel fuel and grout. <p>Supervisory personnel: 8-Hour General Site Worker Supervisory Training [OSHA 29 CFR 1910.120 (e)(4)]</p>
<p>Personal Protective Equipment: <u>Minimum</u>: Steel toed work boots; hardhats, safety glasses, work gloves; suitable work attire (long pants; sleeved shirts. <u>Optional items:</u> High visibility vest, Hearing protection and flame retardant protective clothing; may be required in the area the work will be conducted. <u>HTRW</u>: None anticipated for this task. Note: Personnel may be required to meet location specific PPE requirements.</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>	<p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.</p> <p>The SSO will be responsible for the implementation of the following Site Specific Health and Safety Programs:</p> <ul style="list-style-type: none"> • Hazard Communication • Hearing Conservation <p>AHA Assessment - During the initial walk through the FOL and/or the SSO shall review the AHA to determine applicability or information that will need added given site specific conditions.</p>



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Soil boring with DPT	Overall Risk Assessment Code (RAC) (Use highest code)				L	
Project Location: : NSA Crane, Crane, Indiana						
Contract Number: CTO F27Q	Severity	Probability				
Site: Building 36 (SWMU 23)		Frequent	Likely	Occasional	Seldom	Unlikely
Date: July 2012						
Prepared by: Clyde Snyder	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
Reviewed by: Jennifer Carothers, PhD.	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.)	Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.				RAC Chart	
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E= Extremely High Risk	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				H= High Risk	

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
1. DPT Drill rig - Unit Mobilization / Site Set Up) Tetra Tech personnel vehicle operation and mobilization.	<ul style="list-style-type: none"> • Accidents and injuries resulting from the transport of the drill rig and associated equipment to the site. • Materials falling from the drill rig during transport. • Equipment failure – leading to a potential accident or hazardous situation. • Improper operation • Unqualified operator 	1. The vehicle operator will perform a walk around inspection to ensure <ul style="list-style-type: none"> • All equipment, augers, rods and tools will be properly secured for/during transport. • Vehicle components – Turn signals brake lights, etc. all function properly. • There are no materials carried or stored in the cab that will interfere with the safe operation of this motor vehicle on the highways (garbage in and around the pedals). • All critical fluid levels (brake fluid, motor oil, anti-freeze) are at their recommended levels. • Seat belts are functioning properly. • Mirrors are properly adjusted. • Cell phone use during driving is prohibited unless a hands free device is used. • If the vehicle GVWR is greater than 26,001 pounds, the operator will have a Commercial Driver's License (CDL). • If the vehicle has air brakes, the CDL will have an air brake endorsement. • The vehicle will be operated within DOT or facility specific guidelines including adhering to the speed limit obeying all posted signs. 	L

ACTIVITY HAZARD ANALYSIS
Soil Boring with DPT
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
	Vehicle accidents	<ul style="list-style-type: none"> • Where necessary, use escort vehicles with flashing lights to warn and control local traffic when moving large equipment to support area. • Practice defensive driving whenever traveling in a vehicle • Ensure you have an Orange Vest and a Reflective Triangle in your vehicle at all times along with an Incident Reporting Form IR-C and a disposable camera (phone cameras are acceptable). • Keep a safe distance between cars (Use the 4-second rule). 	
2. Preparing the Drill Rig for Use	2. Injury due to the failure of faulty equipment	2. Injury due to the failure of faulty equipment – To combat this hazard, the FOL, SSO, and/or a designated “Qualified Person” will determine the operating integrity of the drill rig through the completion of an Equipment Inspection Checklist for Drill Rigs provided in Attachment IV Site mobilization/demobilization AHA. These checklists will be used to ensure that back-up alarms are functional, that all moving parts are guarded if such parts are exposed, that all emergency stop controls on equipment have been tested and are functional. These checklists provide a consistent platform to examine these types of equipment. While not all lists cannot be all inclusive, expertise in these areas can add additional categories as needed.	L
3. Personnel qualifications/ equipment integrity	3. Injury due to Improper operation	3. Injury due to control improper operation - Ensure the driller or driller's helper responsible for the transport and/or operation are qualified to do so. This will be determined through the examination of <ul style="list-style-type: none"> • Licenses or certification indicating they are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. • Oversight and monitoring of active operations. Where deficiencies are noted, these will be identified, and corrected immediately. If necessary these conditions will also be reviewed during the Tail-Gate Training sessions conducted periodically. • If consistent poor work habits are employed personnel will be removed and replaced as determined to be necessary to protect onsite personnel, property, and the environment. 	M
4. Positioning Unit (engaging outriggers. etc.)	4. Struck by/ Rig stability	4. Struck by – When moving the drill rig into place: <ul style="list-style-type: none"> • Prior to committing personnel and/or resources, the FOL and/or the SSO will examine the intended work area to select travel route, placement of the drill rig, and to ensure any potential hazards within the designated work area are eliminated or at least demarcated. • The operator in concurrence with the FOL and/or the SSO should select the best possible approach vantages to move the unit up the slope or around physical obstructions to the selected boring location. 	M

ACTIVITY HAZARD ANALYSIS
Soil Boring with DPT
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> • Preview travel paths and set up location for subsurface utilities, soft spots, curbs, etc. These items may affect the stability of the rig during operation. Use pads for outriggers to avoid potentially damaging subsurface utilities or to control subsidence during drilling. • Operate the unit at a suitable rpm for the terrain and conditions. Furthermore, • Ground spotters will be used to move the rig into place to avoid damaging subsurface process lines or overhead power lines. • During the time of directing equipment into place <ul style="list-style-type: none"> ○ Do not place yourself between the rig and an immovable object. ○ Stay within the operator's line of sight. ○ Keep all non-essential personnel out of the area. ○ Do not create distractions when placing the rig by requesting information or the attention of the spotter. ○ Only one person will direct the actions of the operator. <p>5. The DPT Drill Rig Outriggers (where applicable – depending on manufacturer) that is equipped with outriggers to provide stability to the unit during drilling operations. There are a number of factors that can influence the outriggers ability to provide this stability including:</p> <ul style="list-style-type: none"> • Are the outriggers fully extended? • Are outrigger pads used to increase the area in which the outriggers are applying pressure? If not cribbing can be used to increase the foot print size. • Is the ground surface in the area of the outrigger placement adequately compacted to support the drill rig? If not materials can be haul in and compacted to add additional stability. This may be prevalent where soil borings and test pitting locations overlap. • Ensure the drilling site foundation is stable and as level as possible. • The drill rig is never to be moved unless the mast is fully down and the outriggers are fully retracted. 	
<p>5. Emergency Preparation - Assembling equipment and supplies</p>	<p>5. Emergency preparation - Fire Spill Response Injury Response</p>	<p>5. A number of measures will be employed to prepare for potential emergency conditions. These include:</p> <p>Fire -</p> <ul style="list-style-type: none"> • Portable Fire Extinguisher(s) – 2A:10 lb. B:C extinguisher will be made available for all general support activities. Travel distances greater than 50-feet will require additional fire extinguishers. If portable extinguishers are provided then training in their use must be provided for the employees who are to use them. Fire extinguishers will be initially inspected then monthly thereafter. Fire extinguishers will be immediately accessible. If they are stored in tool boxes, the box will be labeled as such. 	<p>L</p>

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Soil Boring with DPT
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<p>Spill Response -</p> <ul style="list-style-type: none"> • Spills – As we recognize the release of hydraulic lines associated with the drill rig operation can cause environmental damage, then rapid response through having spill kit provisions at the ready at the rig. Prophylactic measures such as placing plastic under the drill rig that would be effected by a spill and/or release but not extending into the work area in which it would create a slip, trip, and fall hazard. Additional measures include: <ul style="list-style-type: none"> ○ Having spill pads at the ready. ○ Using spill pads during incidental fueling operations. ○ Use of safety cans and ○ Periodic monitoring of potential spill or release areas such as IDW management marshaling areas. <p>Injury Response -</p> <ul style="list-style-type: none"> • Responding to Injury – Per 1910.151 in the absence of an infirmary, clinic. Or hospital a person or persons will be made available and trained to provide first-aid. Adequate first aid supplies will be provided to render assistance. Within these provisions, additional supplies to support Blood Borne Pathogen Universal precaution (CPR Masks; surgeons gloves, safety glasses; dust masks to offer shielding against potentially contaminated body fluids. <p>Note: During normal working hours, the use of the facility medical clinic is permitted. See Figure 2-1.</p>	
6. Pre – Drilling Excavation clearance	6. Utility Damage – Injury, property damage	<p>6. Utility Damage - An excavation or dig permit will be required anytime the ground surface is broken using a mechanized piece of equipment. To obtain a Dig Permit</p> <ul style="list-style-type: none"> • Mark the areas to be drilled in White Paint – Also identify it as the area for One-Call or whatever the clearance designation is for that state. • Contact the Indiana Underground Plant Protection Service at (800) 382 - 5544 or use 811 that is the National Clearinghouse contact point. • Where possible provide drawings and/or coordinates. • The typical timeline required is 2-3 days. • Upon receipt of your permit, make sure all utility owners in the area have responded back. If not, contact them. This is especially critical when dealing with electrical and gas lines. • During site preparation the discussion was provided concerning the site walk over to inspect for surface monuments that would be indicative of buried utilities • During this site walk over you are also examining the area for overhead utilities. The dig permit has NOTHING to do with overhead power lines. DO NOT approach overhead power lines closer than 20-feet. 	L

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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> Follow NSA Crane Utility Clearance Procedures. The Tetra Tech SOP Utility Location and Excavation Clearance can be found in Section 7.0 of the HSGM. 	
7. Tool and material handling (cont.)	7. Lifting – Due to the weights of the various drill tooling the potential for back related injuries are significant.	<p>7. Lifting hazards – The auger flights weigh in excess of 100 lbs. Due to the physically demanding nature of handling these devices back injuries as well as smashed fingers often result. To control these hazards</p> <ul style="list-style-type: none"> Use proper lifting techniques when manually handling rods, augers and tools. Use mechanical equipment during lifting whenever possible (hoisting devices). Use the buddy system when lifting tools and supplies. Stretch in the morning to limber your muscles, tendons, and ligaments prior to engaging in heavy lifting activities. Take more breaks in the afternoon to guard against fatigue related injuries. Review Section 4.4 of the HSGM for additional safe lifting practices. 	L
8. Drill Rig Operation	8. Excessive Occupational Noise	<p>8. Excessive Occupational Noise – Noise levels associated with DPT drilling rigs have ranged from 92 to 107dBA during percussion hammering. Due to the magnitude of these levels provisions for hearing protection is required. These measures are as follows:</p> <ul style="list-style-type: none"> Unit operator and helper(s) are to wear hearing protection. Other persons who must be nearby (within the 35-foot exclusion zone) to perform their job duties are to also wear hearing protection. Onsite personnel may use the general rule of thumb when determining if noise levels are excessive <i>If noise levels are such that they must raise their voice in order to communicate with someone who is within arm's reach (approx. 2') of them then noise levels are becoming excessive and hearing protection should be employed.</i> <p>Based on accumulated data, operations requiring hearing protection will be specified in the site specific health and safety plan.</p> <ul style="list-style-type: none"> The SSO responsible for monitoring the use of hearing protection, ensuring the hearing protection selected have a sufficient noise reduction rating (at least 25 dB). Implementing the site specific Hearing Conservation Program found in Section 6.0 and posting 29 CFR 1910.95 when hearing protection is required. 	L
9. Drill Rig Operations	9. Exposure to site	9. The concentrations associated with lead and 1,1-DCE and Lead including	L

ACTIVITY HAZARD ANALYSIS
Soil Boring with DPT
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<p>Smoking will only be permitted in designated areas.</p> <ul style="list-style-type: none"> • Fuel containers will not be stored within 10' of the unit motor or other elevated temperature application. Fuel will be stored in UL approved safety containers with contents clearly labeled. • Fire suppression devices including <ul style="list-style-type: none"> ○ Water source ○ Portable fire extinguisher(s) – 2:A-B-C fire extinguisher must be maintained onsite and on associated motorized equipment. The number of fire extinguishers will be determined by the SSO. <p>All combustible materials will be removed from the intended work area.</p>	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS	
<p>Drill Unit Sampling tools and attachments Hand tools</p> <p>Work Areas</p>	<p>Drill Rig Inspection</p> <ul style="list-style-type: none"> • Inspect unit as part of site mobilization, after maintenance/repair. • Visual examination daily. • Test all Kill switches daily, where applicable <p>FOL and/or the SSO will conduct initial site surveys of all work areas prior to committing personnel and/or equipment. Hazards will be eliminated or demarcated. All hazards identified will be discussed at the Tail Gate training session prior to entering the work site.</p>	<p>SSO or designated "Qualified Person" must be sufficiently experienced and familiar with units to conduct a detailed inspection concerning the unit's operating integrity. The Driller will carry the necessary certification or licensing as required by the Commonwealth of Pennsylvania. This license/certification will be maintained onsite.</p> <p>For drilling activities employed to determine levels of contamination in the soils and/or groundwater</p> <ul style="list-style-type: none"> • 40-Hour General Site Worker Hazardous Waste Operations Training • 8-Hour General Site Worker Refresher Training - If it has been greater than 12 months since receiving the 40-hour training or last refresher training. • 8-Hour Supervisory Training [29 CFR 1910.120 (e)(4)] for all personnel operating within the supervisory capacity. • Site-Specific Training – All personnel performing work within designated exclusion zones will have gone through site specific training including <ul style="list-style-type: none"> ○ Reviewing the contents of the site specific Health and Safety Plan ○ Applicable sections of the HSGM. ○ Work Plan • Tail Gate Training Sessions 	
<p>Hand tools (dollies, hand carts, hand knives, shovels, etc.)</p> <p>Emergency Equipment –</p> <p>Fire Extinguishers</p> <p>First Aid (with Bloodborne Pathogen provisions)</p>	<p>Visual inspection prior to use by user.</p> <p>Upon receipt then monthly thereafter</p> <p>The SSO will be responsible for insuring the first aid kits are fully stocked and replenished as supplies are used.</p>	<p>None required</p> <p>All personnel will have received fire extinguisher training for the types of extinguishers to be employed. This will be through their respective companies or as part of the site-specific training.</p> <p>All personnel designated as first aid providers will have had formal training in first aid and CPR as well as in Bloodborne Pathogen (BBP) control and program elements.</p>	

ACTIVITY HAZARD ANALYSIS
Soil Boring with DPT
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EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Eye wash units	The SSO will be responsible for inspecting the onsite Emergency Eyewash units upon receipt then weekly thereafter.	
<p>Personal Protective Equipment: <u>Minimum</u>: Steel toe boots, safety glasses, hardhat, hearing protection cotton or leather gloves when handling drill tooling; Nitrile with grip support for handling contaminated tooling.</p> <p><u>HTRW</u>: Nitrile gloves when handling samples or other potentially-contaminated media.</p>	<p>Initial PPE inspection will be performed by the user (prior to each use). The SSO will monitor use/application of PPE by the users. The SSO will address any deficiencies noted at the occurrence then at Tail Gate Safety Meetings.</p> <p>PID</p>	<p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.</p> <p>SSO trained in proper calibration, use, and care of air monitoring devices used (PID). This is a general component of 40 hour HAZWOPER training, and SSO must become very familiar with the Operator's Manual for any instrument used.</p>

All persons working within the operational will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Multi Media Sampling including Surface water and Groundwater, Sediment, Surface and Subsurface Soil	Overall Risk Assessment Code (RAC) (Use highest code)					
Project Location: NSA Crane, Crane, Indiana	Risk Assessment Code (RAC) Matrix Low					
Contract Number: CTO F27Q	Severity	Probability				
Site: Building 36 SWMU 23		Frequent	Likely	Occasional	Seldom	
Date Prepared: July 2012		Catastrophic	E	E	H	H
Prepared by: Clyde Snyder		Critical	E	H	H	M
Reviewed by: Jennifer Carothers, PhD.		Marginal	H	M	M	L
	Negligible	M	L	L	L	
Notes: (Field Notes, Review Comments, etc.)	Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.			RAC Chart		
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible			E= Extremely High Risk		
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.			H= High Risk		
				M= Moderate Risk		
				L = Low Risk		

JOB STEPS	HAZARDS	CONTROLS	RAC
Set up equipment well	1. Slips, Trips, Falls 2. Insect bites, snake bites, and contact with poisonous plants.	1. Clear intended work areas and walking paths of roots, weeds, limbs and other ground hazards. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. Ensure that work boots have adequately-aggressive sole design. Use caution when working on uneven and wet ground. 2. Shake out boots before donning. Use insect repellants (products containing DEET should be applied to exposed skin, products containing Permethrin should be applied to clothing only. Follow manufacturer's recommendations. Tape up pants leg to work boot joints with duct tape. Wear light-colored clothing to better see and remove any insects. Perform close body inspections at least daily upon leaving the site. Avoid potential nesting areas (brush, deadfall, etc.) where insects or snakes may be present. Review Natural Hazards information in section 4.0 of the Tetra Tech H&S Guidance Manual with	L

ACTIVITY HAZARD ANALYSIS
Multimedia Sampling
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JOB STEPS	HAZARDS	CONTROLS	RAC
		field team as appropriate based on site observations and conditions.	
Measure depth to water	1. Employee Exposure	1. Use PID or FID as indicated in the site-specific HASP to monitor well head and ambient air 2. Wear safety glasses and nitrile gloves to protect against splash	L
Measure and insert tube into well	2. Laceration	1. Only use retractable safety blade to cut tubing 2. Cut in a direction away from the face/body	L
Begin extracting water from well	3. Employee exposure	1. Wear safety glasses and nitrile gloves	L
Fill sample bottles with sample material; load coolers and IDW (if appropriate) into vehicle	Laceration	1. Handle all glass containers carefully 2. Have a first-aid kit available on site for small cuts 3. Dispose of all broken shards immediately	L
Store sample containers in coolers and load onto vehicles	Slip/trip/fall Back strain/sprain	1. Ensure all debris has been removed from the path of travel 2. Use proper lifting techniques, including obtaining help with heavy coolers	L
Soil and groundwater sampling	1. Chemical exposure	2. Wear surgeons' gloves when handling potentially-contaminated media and samples. Avoid contact with potentially-contaminated media to the extent possible. 3. Practice good personal hygiene (hands and face washing) when exiting work area. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). 4. Exposure via dermal contact and ingestion represent some limited concern during this task. 5. Periodically screen sample with monitoring equipment. If readings above daily-established background levels (BGLs) are noted in borehole, monitor worker breathing zone (BZ) areas. If readings in worker BZ areas exceed the action level: <ul style="list-style-type: none"> • After at least 5 minutes, SSO will approach from upwind direction screening BZ areas. 3. Work may resume when readings in the BZ return to BGLs.	

ACTIVITY HAZARD ANALYSIS

Multimedia Sampling

EQUIPMENT	INSPECTION	TRAINING
<ul style="list-style-type: none"> • Bailer, sampling pump, plastic tube • Retractable safety blade knife • Portable eye wash kit. • First Aid Kit 	<p>Visual inspection prior to use by user.</p>	<p>Training/experience in proper sample collection, handling and chain of custody requirements.</p>
<p>Personal Protective Equipment: Minimum: Level D PPE nitrile surgeon's type gloves, safety toe boots, safety glasses Optional items: Hardhat, hearing protection. Reflective safety vest if in areas of vehicle traffic HTRW: VOCs and metals Monitoring Instruments</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users. PID PID or FID must be calibrated as per the manufacturer's recommendations and documented on each use.</p>	<p>OSHA 40 Hazardous Waste Operations and Emergency Response (HAZWOPER) training, plus appropriate 8-hour annual refresher training for all task participants. Supervisors must have completed additional 8 hours of HAZWOPER training. ALSO: Review of AHA during pre-task tailgate safety briefing with all intended task participants.</p>

I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Decontamination – Hand tools and associated equipment. This is a low pressure application		Overall Risk Assessment Code (RAC) (Use highest code)			L			
Project Location NSA Crane, Crane, Indiana		Risk Assessment Code (RAC) Matrix						
Contract Number: CTO F27Q		Severity	Probability					
Site: Building 36 SWMU 23								
Date Prepared: July 2012			Frequent	Likely	Occasional	Seldom	Unlikely	
Prepared by: Clyde Snyder			Catastrophic	E	E	H	H	M
Reviewed by: Jennifer Carothers, PhD			Critical	E	H	H	M	L
		Marginal	H	M	M	L	L	
		Negligible	M	L	L	L	L	
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (See above)						
		“Probability” is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.				RAC Chart		
		“Severity” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E= Extremely High Risk		
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on AHA. Annotate the overall highest RAC at the top of AHA.				H= High Risk		
						M= Moderate Risk		
						L=Low Risk		
ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS				RAC		
1. Site set up Decontamination of non-dedicated hand tools and equipment can take place onsite or at a centralized location.	1. Slips trips and fall 1A. Struck by	1. Slips trips and falls – To prevent these types of hazards the following measures will be incorporated: <ul style="list-style-type: none"> Station placement – Keep the decon station far enough back from the operation to allow room to work. Practice Good housekeeping – Keep tubing and tools gathered and organized to prevent a tripping hazard. Do not lay items around on the floor or ground where someone could step on them and go down. Clear other obstructions in the area that may present trip hazards. 1A. Allow sufficient room to handle tooling without inadvertently striking someone.				L		
2. Washing and rinsing process	2. Contaminant accumulation -	2. Based on reported source concentrations the contaminant levels are not anticipated to be extremely elevated. To minimize exposure				L		

ACTIVITY HAZARD ANALYSIS
Multimedia Sampling
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
	Contaminant exposure <ul style="list-style-type: none"> • Particulates – Metals and VOC's 	The concentrations associated with lead and 1,1-DCE including VOC's and Metals are considered relatively low. <ul style="list-style-type: none"> • For lead and metals area wetting methods will be employed to suppress dust. • For 1,1-DCE and VOC's a PID with a 10.6ev lamp will be used to monitor the breathing zone. PID Action Level: 95 ppm above BG in BZ areas for 4 exposures of no more than 5 minutes in any one work day. • Wear nitrile gloves, safety glasses, and an impermeable apron to prevent saturation of clothing. • Change out the wash water frequently to insure adequate decontamination but also protect from overloading contaminants. • Personnel involved in the decontamination process will themselves wash reusable garments (impermeable aprons); Follow good decontamination practices (work from top down and outside in). Surgeon's gloves are to be the last item of PPE removed; change gloves regularly and wash hands and face before any hand to mouth activities. • Keep decon areas orderly, maintain good housekeeping. 	
3. Decon procedure Decontamination will include: a) Flushing tubing using a soap/water solution prior to disposal as general refuse.	4. Hazard Communication a., b. - Incidental spills - Slips, Trips, Falls c. Contaminant exposure	4. The SSO will complete the Site Specific Hazard Communication Program. This includes <ul style="list-style-type: none"> • Recording chemicals employed onsite for decontamination onto a Chemical Inventory List • MSDSs are available to all personnel and they are aware of the hazards associated with each. • The SSO has reviewed the documents for completeness and have also determined if there are additional equipment (PPE and/or Emergency equipment) that is needed. a., b. - Incidental spills - Slips, Trips, Falls - The decontamination will employ 5 gallon buckets with soap and water and rinse water contained in mortar tubs to serve as secondary containment to control incidental spills. Wash waters will be containerized in buckets with the lids on to control spills and off gassing into the transport vehicles.	L
Decontamination – High Presssure			
Decontamination of heavy equipment and large tooling (e.g.,	1. Noise	1. Pressure washer operator must wear hearing protection (muffs or plugs with NRR of at least 25 dB)	L
	2. Flying	2. Control measures include	M

ACTIVITY HAZARD ANALYSIS

Multimedia Sampling

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
vehicles, etc.) using pressure washer	projectiles/water lacerations	<ul style="list-style-type: none"> Restrict other personnel from decon pad or over the test pit where decontamination is occurring during pressure washing operations. Pressure washer operator must exercise care when directing the wand so that it is not pointing at himself/herself or at any other worker. Restrict pressure washer to 3000psi with not less than 15° deflection tip Pressure washer operator must wear full face shield over safety glasses with side shields, hardhat, rainsuit, apron, and or boot covers may be required during heavy equipment decon operations 	
	3. Falling objects	3. Control measures include: <ul style="list-style-type: none"> Place items to be decontaminated on ground or on washing/drying racks in a manner that they are secure and will not fall. Wear safety toe safety footwear. 	L
	4. Slips, trips, and falls	4. To control slips , trips, and falls <ul style="list-style-type: none"> Keep hoses gathered when not in use. Configure decon pad so the hoses maybe be run in an area not employed by pedestrian (employee) traffic. As a tarp or plastic containment will be placed on the ground to serve as a containment, this may become slippery. Where necessary apply a light coating of sand to enhance traction. Keep waters collected in the pad pumped to a minimal level as not to disguise trip hazards. 	L
EQUIPMENT TO BE USED		INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (hand brushes, garden sprayers, hoses, etc.) Pressure washer Monitoring Instrument		When decontaminating equipment check equipment for deficiencies report to the SSO PID.	All personnel participating in this activity must be current with HAZWOPER training requirements as specified in Mobilization/Demobilization.
Personal Protective Equipment: <u>Minimum</u>: <ul style="list-style-type: none"> Nitrile gloves. Safety glasses Rain suit or moisture-repellant disposable coveralls or impermeable apron, When there is a potential for the saturation of work clothing. 		Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.

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Multimedia Sampling
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EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<u>Optional items</u> : As determined by the SSO based on site specific conditions.		

All persons working within the operational will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Decontamination – high pressure		Overall Risk Assessment Code (RAC) (Use highest code)			L		
Project Location NSA Crane, Crane, Indiana							
Contract Number: CTO F27Q		Severity					
Site: Building 36 SWMU 23		Probability					
Date Prepared: July 2012		Catastrophic	E	E	H	H	M
Prepared by: Clyde Snyder		Critical	E	H	H	M	L
Reviewed by: Jennifer Carothers PhD		Marginal	H	M	M	L	L
Notes: (Field Notes, Review Comments, etc.)		Negligible	M	L	L	L	L
		Step 1: Review each “ Hazard ” with identified safety “ Controls ” and determine RAC (See above)					
		“ Probability ” is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.				RAC Chart	
		“ Severity ” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E= Extremely High Risk	
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “ Hazard ” on AHA. Annotate the overall highest RAC at the top of AHA.				H= High Risk	
						M= Moderate Risk	
						L= Low Risk	
JOB STEPS	HAZARDS	CONTROLS				RAC	
Decontamination of large tools (e.g., vehicles, etc.) using pressure washer	1. Noise	1. Pressure washer operator must wear hearing protection (muffs or plugs with NRR of at least 25 dB)				L	
	2. Flying projectiles	1. Restrict other personnel from decon pad during pressure washing operations. 2. Pressure washer operator must exercise care when directing the wand so that it is not pointing at himself/herself or at any other worker. 3. Pressure washer operator must wear full face shield over safety glasses with side shields and brow protection. 4. At SSO discretion, additional PPE consisting of hardhat, rainsuit, apron, and or boot covers may be required during decon operations - depending on observations indicating that significant contact with decon overspray and/or windy conditions during washing activities.				L	
	3. Falling objects	1. Place items to be decontaminated on ground or on washing/drying racks in a manner that they are secure and will not fall. 2. Wear safety toe safety footwear.				L	
	4. Strains/sprains from heavy lifting	1. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, perform "test lift" to gauge ability to safely make the lift, lift with				L	

ACTIVITY HAZARD ANALYSIS

Decontamination

JOB STEPS	HAZARDS	CONTROLS	RAC
		legs not back, obtain help when needed to lift large, bulky, or heavy items).	
	5. Slips/trips/falls	1. Keep decon areas orderly, maintain good housekeeping, spread light coating of sand on decon pad liner to increase traction.	L
	6. Exposure to contaminated media	1. Follow good decontamination practices (work from top down and outside in). Surgeon's gloves are to be the last item of PPE removed. 2. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.	L
EQUIPMENT	INSPECTION	TRAINING	
Hand tools (hand brushes, garden sprayers, etc.) Pressure washer	Visual inspection prior to use by user. Check wooden handles for cracks or splinters. Inspect pressure washer prior to putting into service to ensure that it is in good working order, and ensure that fittings are secure.	None required. Review manufacturer's instructions and safety guidelines prior to use.	
<p>Personal Protective Equipment: <u>Minimum:</u> Safety toe boots, safety glasses <u>Optional items:</u> Hardhat, hearing protection. Decontamination pad pressure washer operators are to wear full face shield over safety glasses with side shields and brow protection, hearing protection, and nitrile gloves. If contact with overspray cannot be avoided, rain suit or moisture-repellant disposable coveralls may be specified by the SSO. <u>HTRW:</u> VOCs and lead</p>	Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.	<p>Initial site specific H&S training to cover review of the APP and SSHP. Daily tail-gate and pre-task briefings to review appropriate AHAs and other relevant topics. OSHA 40 hour HAZWOPER training, plus appropriate 8-hour annual refresher training for the task participants. Supervisors must have completed additional 8 hours of HAZWOPER training. Also Review of AHA during tailgate safety briefing with the intended task participants.</p> <p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees' 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.</p>	

ACTIVITY HAZARD ANALYSIS

Decontamination

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I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: IDW Management		Overall Risk Assessment Code (RAC) (Use highest code)			L		
Project Location: NSA Crane, Crane, Indiana		Risk Assessment Code (RAC) Matrix					
Site: Building 36 SWMU 23							
Contract Task Number: CTO F27Q		Severity					
Date Prepared: July 2012		Probability					
Prepared by: Clyde Snyder		Frequent	Likely	Occasional	Seldom	Unlikely	
Reviewed by: Jennifer Carothers, PhD.		Catastrophic	E	E	H	H	M
		Critical	E	H	H	M	L
		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
		"Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.			RAC Chart		
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible			E= Extremely High Risk		
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.			H= High Risk		
					M= Moderate Risk		
					L = Low Risk		
ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS			RAC		
1. Storage Area set up	1. Traffic hazards; Material handling hazards	<p>1. Traffic hazards/Material Handling hazards – This area should be easily accessible in order to place and remove the drums accumulated.</p> <p>To further reduce material handling hazards, support spill containment and control, and sampling when necessary, the IDW storage area should be structured as follows:</p> <ul style="list-style-type: none"> • Maximum 4-drums to a pallet with retaining ring bolt and label on the outside for easy access/reference. • Maintain a minimum of 4-feet between each row of pallets. This is the minimum distance necessary to wheel drums on a drum dolly. • If the site is not secured, the satellite storage area shall be fenced and signs placed indicating the following: <ol style="list-style-type: none"> a. Primary Point of Contact (make sure they know they been identified as the primary point of contact). 			L		

ACTIVITY HAZARD ANALYSIS

IDW Management

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> b. Phone Number c. Emergency Contact (If different from the primary) • Provide a Drum/Container Inventory to the Primary Point of Contact and to Emergency Services, if they deem it necessary. The inventory should contain: <ul style="list-style-type: none"> a. Each drum shall be assigned a unique identification number. This number shall be placed on the label and drum shell using a paint marker (Note: Do not paint the number on the lid as these have a tendency to get exchanged from time to time.) b. Types of waste materials (decontamination waters; purge waters, etc.) c. Volumes (Full or level associated with the container after completion of the project location) d. Where it was derived from (The site and/or wells) e. Dates (When filling began) f. Contact – For more information <p>Ensure all lids are secured.</p>	
2. Material Handling	2. Lifting (strain/muscle pulls)	2. Lifting (strain/muscle pulls): <ul style="list-style-type: none"> • Use mechanical means (i.e. dollies, etc.) to move and handle containers. Use proper lifting techniques described in Section 4.4 of the Health and Safety Guidance Manual (HSGM). • Fill drums and buckets only to 80% to minimize some of the weight and incidental spill issues. • Use help to move and place drums <p>Reminder: The drums you are attempting to move, lift and/or relocate may weigh on the average of</p> <ul style="list-style-type: none"> • 55-Gallon container of purge or decontamination waters = ~500 lbs. (including the container) 	L
3. Placing the drums	3. Pinches and compressions	3. Pinches and compressions – During placement of drums/containers on pallets use machinery or assistance from another person where possible. Keeps hand out of the area between drums during placement. It is best to place the drums and pallets then transport buckets to fill the drums already placed. Wear steel toed shoes with adequate lug to support traction when moving heavy containers.	L

ACTIVITY HAZARD ANALYSIS

IDW Management

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		Use machinery where possible to place drums.	
4. Spill prevention and protection <ul style="list-style-type: none"> • Staging and Labeling Containers. 	4. Chemical contaminants exposure	4) Chemical hazards – Generally encountering contaminants during this activity is low unless the contents of a container must be transferred due to a faulty container [leak(s)]. The outside of containers should be cleaned of residual waters (e.g. splashes, etc.) to avoid potentially exposing all who come in contact. The FOL and/or the SSO will: <ul style="list-style-type: none"> • Ensure the outsides of all drums moved to the staging area are washed/wiped clean. 	L
<p>Spill Containment - Within this scope of work the primary area of concern regarding spills and/or releases are associated with</p> <ul style="list-style-type: none"> • Collection point – This is being addressed through using mortar tubs as secondary containment. • Moving/Handling the drums/containers of waste materials. This can be minimized based on the method of picking these drums up and the method of transport. <ul style="list-style-type: none"> ○ Use the proper lifting appliances such as drum grapplers, drum dollies, etc. Secure containers for movement over long distances. ○ Care should also be exercised when using a backhoe or similar device to lift the drums. This sometimes results in a bucket tooth into the drum again resulting in a release. ○ Place the drums onto a lift gate and flat bed with removable sides for transport to the staging area. <p>This section describes the procedures the Tetra Tech field personnel will employ upon the detection of a spill or leak.</p> <ul style="list-style-type: none"> • Initiate incidental response measures, including <ul style="list-style-type: none"> ○ Employ the personal protective equipment (see below). 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 (for containers). Spread the absorbent material in the area of the spill, covering it completely. ○ Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options. • Re-containerize spills, including 2-inch of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options. • Notify the SSO or FOL immediately upon detection of a leak or spill and actions taken or employed. <ul style="list-style-type: none"> • Personal Protective Equipment <ul style="list-style-type: none"> - Nitrile outer gloves - Splash Shield - Impermeable over-boots - Rain suits 			
Hazard Monitoring Required: Visual observation of work practices by the		Decontamination Procedures: Not required, unless spill containment protocol is	Permits/Requirements: <ul style="list-style-type: none"> • Complete IDW Inventory List

ACTIVITY HAZARD ANALYSIS

IDW Management

<p>FOL and/or the SSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.). Monitoring will only be employed if Spill Containment is implemented. Periodic visual inspection for leaks when filling drums or those at the staging area.</p>	<p>implemented. Then the following will apply</p> <ul style="list-style-type: none"> • Once the spill is secured and all of the spill equipment has been through a soap and water wash and rinse. • Personnel will wash/rinse outer protective garment with soap and water. • Remove outer protective garments. • Wash hands and face. 	
<p>Training Required</p> <ul style="list-style-type: none"> • 29 CFR 1910.120 (e) Site Specific Training, See Figure 8-1 <p>Medical Clearance/Surveillance Required</p> <ul style="list-style-type: none"> • Completed a Medical Data Sheet (See Attachment I) 	<p>Emergency Equipment</p> <ul style="list-style-type: none"> - First Aid Kit - Fire Extinguisher - Map to Hospital and Emergency Contact List (Posted and a copy placed in your First-Aid Kit. - Spill Kit (Oil dry, wood shavings, or other absorbent materials, Shovels, brooms, Oil absorbent pads 	<p>H&S Supporting Program Requirements</p> <p>None required.</p>

All persons upon review will sign off on this AHA prior to participating in these activities.

Name (Printed)	Signature	Occupation	Date of Review or Training



ACTIVITY HAZARD ANALYSIS (AHA)

		<h2 style="margin: 0;">ACTIVITY HAZARD ANALYSIS (AHA)</h2>				
Activity/Work Task: Geophysical and Land Surveying		Overall Risk Assessment Code (RAC) (Use highest code)				
Project Location: NSA Crane, Crane, Indiana		Risk Assessment Code (RAC) Matrix				
Site: Building 36 SWMU 23		Severity	Probability			
Date Prepared: July 2012			Frequent	Likely	Occasional	Seldom
Prepared by: Clyde Snyder		Catastrophic	E	E	H	H
Reviewed by: Jennifer Carothers, PhD		Critical	E	H	H	M
Reviewed by: Jennifer Carothers, PhD		Marginal	H	M	M	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each " Hazard " with identified safety " Controls " and determine RAC (See above)	RAC Chart			
"Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.		E= Extremely High Risk				
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible		H= High Risk				
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.		M= Moderate Risk				
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.		L = Low Risk				
ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS				RAC
Geographical Surveying will utilize Handheld GPS to mark the final coordinates on each sample location. In this practice, the handheld GPS will also annotate a fixed known survey position such as a monitoring well or similar point as a reference. Professional Surveyors will survey the horizontal position and vertical	1) Flying projectiles/Struck by	1) Flying projectiles/Struck by: <ul style="list-style-type: none"> When hammering wooden hubs into the ground there is a possibility that shards may break off. To protect from potential eye injury during this activity personnel will wear safety glasses. Crack or damage hubs will not be used. Use a suitable hammer to drive the hubs. The hammer shouldn't be so heavy that and additional person must hold the hub while you drive it into the ground. Inspect the hammer to ensure the head is attached tightly and there are no indication of mushrooming head that could also become a flying projectile should it break off. Use a hub cover to eliminate this hazard while also removing 				L

ACTIVITY HAZARD ANALYSIS
Geophysical and Land Surveying
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
<p>elevations of the monitoring wells tying to established benchmarks/control points.</p> <p>Steps include Mobilization to the site. Parking/placement of the vehicle. Location of control points Incidental vegetation removal to obtain line of sight. Shooting points. Carry control to benchmarks or control points.</p>	<p>2) Slips/Trips/Falls</p> <p>3) Poisonous Plants/Insect Bites</p>	<p>hands and fingers from the potential strike area.</p> <p>2) Slips, trips, and falls:</p> <ul style="list-style-type: none"> • Remove/identify trip hazards from the work area so they may be avoided. • Maintain good housekeeping within the work area. • Place the hubs in a bucket or similar device. That way should you fall you are less likely to impale yourself. <p>3) Poisonous plants/Insect Bites – There are areas that are not well maintained (Grass is cut, etc.) and therefore poisonous plants and insects may be encountered. The following measures should take place when this hazard is imminent:</p> <ul style="list-style-type: none"> • Poisonous Plants – Within the work area we have Poison Ivy, Poison Oak, and Poison Sumac. An irritating, allergic reaction can occur after direct contact with the plant or indirect contact through some piece of equipment or clothing article. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritation or allergic reaction can vary significantly from one person to the next. To control exposure to these plants <ul style="list-style-type: none"> ○ Know the plants. Avoid if at all possible. If not wear protective clothing that maybe thrown away when the task is complete. ○ Wear barrier creams or PPE, prior to entry into heavy brush. ○ Wash with cool water and soap or an over the counter solutions to remove these oils from the skin. Wash your contaminated clothes separate from your other clothes. • Insects – Use repellants applied liberally to skin and clothing per the Manufacturers requirements. <ul style="list-style-type: none"> ○ Wear light colored clothing – This will assist in controlling heat stress as well as seeing crawling insects on your body easier to detect. ○ Tape pant legs to boots to control insect (Ticks) access into clothing. ○ See Section 4.0 of the HSGM regarding biological hazards and the removal of ticks as well as conducting close body 	

ACTIVITY HAZARD ANALYSIS
Geophysical and Land Surveying
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
<p>4. Removal of Vegetation – Cutting site lines</p> <p>5. Traffic hazards</p>	<p>4. Cuts/lacerations; Struck by</p> <p>5. Traffic hazards – Struck by</p>	<p>inspection.</p> <ul style="list-style-type: none"> • Snake chaps should be worn in heavy vegetation or areas of reported stings. <p>4. Cuts/lacerations; Struck by:</p> <ul style="list-style-type: none"> • See Hand tool use for removal of vegetation – Cutting site lines • Wear Hard hat, safety glasses, and leather gloves when cutting and removing vegetation. • Keep cutting tools within their sheath during periods of travel or non-use. • Keep a 15-foot boundary during vegetation removal (by hand). <p>5. To minimize potential Vehicle Traffic Hazards:</p> <ul style="list-style-type: none"> • Be extremely cautious around heavy and/or fast-moving equipment. • DO NOT place obstructions along the sides of the service or access roads that may cause personnel to move into the flow of traffic. Provide a required Free Space of Travel. • Required “Free Space”: Maintain at least 6-feet of space between you and moving traffic. • Where this is not possible, use flaggers and/or signs to warn oncoming traffic of activities near or within the travel lanes. • Face Traffic: Whenever feasible, if you must move within the 6-feet of required space, or into traffic attempt to face moving traffic at all times. Always leave yourself an escape route. • Wear High Visibility Vests to increase visual recognition by motorist. • Do not rely on the operator’s visibility, judgment, or ability. Make eye contact with the driver. • Carefully and deliberately use hand signals so they will not startle or confuse motorists or be mistaken for a flagger’s direction before moving into traffic. • Move Deliberately: Do not make sudden movements that might confuse a motorist. • Avoid where possible interrupting Traffic Flow: Minimize crossing traffic lanes. 	

ACTIVITY HAZARD ANALYSIS
Geophysical and Land Surveying
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ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<ul style="list-style-type: none"> • People can't stand it they have to look to see what is going on, what you are doing. As a result many fender benders occur within work areas. Where possible move traffic through the work area but keep them separated to the extent possible that they do not collide with the car in front of them. • Warning signs shall be placed indicating surveyors working from all approach venues where applicable. <p>Distraction – One of the most hazardous conditions persons will encounter during this activity is distraction. Drivers take their eyes and mind off of the task or hazard at hand. Surveyors place themselves into traffic in some instances by mistake when they become wrapped in their job.</p> <p>In situations due to the complexity of the task; multiple concurrent information points utilize traffic control to protect those individuals involved. Restrict flow and reduce speed associated with traffic. Minimize activities during high traffic periods or when visibility maybe affected such as early morning and near dusk.</p>	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS	
Machetes; brush axes; sledge hammers; Survey equipment.	Inspect handles; heads; cutting implements	General operating/demonstrated skill of the survey personnel.	
<p>Personal Protective Equipment: <u>Minimum:</u> Safety Glasses; footwear with adequate Lug and ankle support; leather/canvas work gloves.</p> <p><u>Optional items:</u> High visibility vests are recommended for these activities in high traffic areas.</p> <p>Emergency Equipment</p> <ul style="list-style-type: none"> - First Aid Kit - Fire Extinguisher - Map to Hospital - Emergency Contact List 	Inspect PPE to ensure it is in adequate condition	<p>All personnel:</p> <ul style="list-style-type: none"> • Site Specific Training – All personnel shall be instructed and attest to the review and understanding of this SSHP prior to the commencement of on-site activity. • Periodically, Tailgate Training Sessions will be conducted to review activities in progress, results of site surveys, and upcoming tasks. It is recommended that AHAs be reviewed prior to conducting the identified task. • Complete a Medical Data Sheet <p>Survey License and/or Certification Proof</p> <p>Decontamination Procedures: Not required. Good personal hygiene practices are to be employed prior to breaks lunch or other period when hand to mouth contact occurs. This will minimize potential ingestion exposures.</p>	

ACTIVITY HAZARD ANALYSIS

Surveying

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EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
		Inclement Weather – Use the 30/30 Rule – If there is 30 seconds or less between thunder and lightning go inside for 30 minutes or more since the last thunder.

All persons working within the operational will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training



ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Vegetation Management	Overall Risk Assessment Code (RAC) (Use highest code)	M
Project Location: NSA Crane, Crane, Indiana	Risk Assessment Code (RAC) Matrix	
Site: Building 36 SWMU 23		
Contract Number: CTO F27Q		
Date Prepared: July 2012		
Prepared by: Clyde Snyder	Severity	Probability
		Frequent Likely Occasional Seldom Unlikely
Reviewed by: Jennifer Carothers, PhD.	Catastrophic	E E H H M
	Critical	E H H M L
Notes: (Field Notes, Review Comments, etc.)	Marginal	H M M L L
	Negligible	M L L L L
Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above) "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.		RAC Chart
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible		E= Extremely High Risk
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on JHA. Annotate the overall highest RAC at the top of JHA.		H= High Risk
		M= Moderate Risk
		L = Low Risk

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
Vegetation Management	Chemical hazards: Physical hazards:	Chemical hazards are anticipated as part of this activity. All equipment will be: <ul style="list-style-type: none"> - Inspected in accordance with Federal safety and transportation guidelines, OSHA and manufacturers design and documented as such using Equipment Inspection Checklist provided in Attachment IV. - Only manufacturer approved parts may be used in repair of site equipment. - Operated by knowledgeable ground crew. - Restrictions at the operation (All personnel not directly supporting this clearance activity will remain at least 50-100 feet from the point of this operation). - Hand signals will be established by both the chipper operator and backhoe operator prior to the commencement of clearing 	L

ACTIVITY HAZARD ANALYSIS

Vegetation Management

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS	RAC
		<p>All personnel working among equipment traffic are required to wear reflective vests.</p> <p>Secure all loose clothing articles to avoid possible entanglement.</p> <p>Boundaries will be established based on the size of trees give sufficient space to keep personnel away from hazards (noise, flying projectiles, etc.)</p>	
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS	
<p>tools (Chainsaws, hand tools/knives, backhoes, chippers etc.)</p> <p>Equipment Inspection</p>	<p>Visual inspection of hand and power tools will be performed by the SSO. Tools will be tagged with colored electrical tape. Green tape ok for use. Red tape do not use. All red taped items should be repaired or removed from the site.</p> <p>Each time a tool is used it will undergo a cursory inspection by the user. Noted damage (mushroomed head, splintered handle, etc.) will require removal from service.</p> <p>FOL and SSO to perform regular (e.g., daily) inspections for housekeeping issues. The results of these efforts will be documented in the Field Logbook</p> <p>Hazards from faulty equipment</p>	<p>All personnel</p> <ul style="list-style-type: none"> • 40-Hour General Site Worker Training [OSHA 29 CFR 1910.120 (e)] • 8-Hour General Site Worker Refresher Training [OSHA 29 CFR 1910.120 (e)(8)] • Site Specific Training – All personnel shall review this Abbreviated Health and Safety Plan prior to the commencement of on-site activity. • Participate in a Medical Clearance/Surveillance Program as described in OSHA 29 CFR 1910.120 (f). • Complete a Medical Data Sheet • Review applicable MSDSs if you are unaware of the hazards and recommended control measures for diesel fuel and grout. <p>Supervisory personnel:</p> <p>8-Hour General Site Worker Supervisory Training [OSHA 29 CFR 1910.120 (e)(4)]</p> <ol style="list-style-type: none"> 1. Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. 2. Ensure that back-up alarms are functional on equipment. 3. The equipment operators and Site Supervisors are responsible to ensure that the equipment is properly inspection prior to being permitted onsite. (see Equipment Inspection Checklist Attachment IV) <p>Ensure that all moving parts are guarded if such parts are exposed. Check/test all emergency stop controls.</p>	
<p>Personal Protective Equipment: <u>Minimum</u>: Steel toed work boots;</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>	<p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to</p>	

ATTACHMENT IV

EQUIPMENT INSPECTION CHECKLISTS

Power Tools Checklist

Inspector _____ Date _____

Facility and Area _____

Electric Power Tools	OK	Action Required	Date Corrected
Is the plug and insulation on the cord intact so that live wires are not exposed?			
Is the tool approved for use in hazardous atmospheres? (as required)			
For tools to used in tanks or wet areas, is the tool low voltage or battery powered? Is there ground fault circuit interrupter protection for the circuit to be used?			
Is the tool motor in good condition?			
Is the ground prong in good condition (for three-wire grounded tools)?			
If the tool isn't three-wire ground protected, is it double insulated?			
Are there any visible cracks or defects in the tool housing?			
Is there a trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for all moving parts of saws, grinders, and similar tools?			
Is there a blade brake on lawn mowers, hedge trimmers, and similar tools?			
Do moveable guards operate freely?			
Pneumatic Power Tools			
Is the compressed air hose in good condition with no visible cracks, bubbles, or kinks?			
Do the hose connections to the tool and to the compressor fit snugly so there are no noticeable air leaks?			
If the air hose is recoilable, does it pull out and retract freely?			
Are there pressure reduction devices (to less than 30 psig) on all fittings designed to blow compressed air for cleaning?			
Is there a safety chain at all hose fittings to prevent whipping of the hose if a connection comes loose?			

Pneumatic Power Tools (continued)	OK	Action Required	Date Corrected
Is there a safety check valve in the air hose at or near the compressor connection that will shut off or bypass the air flow if a break occurs in the air hose?			
Are there any visible cracks or defects in the tool housing?			
Is there a trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for all moving parts of saws, grinders, and similar tools?			
Do moveable guards operate freely?			
Gasoline Power Tools			
Are there signs of fuel leakage around the gasoline tank or fuel line?			
Is the tool motor in good conditions?			
Are there any visible cracks or defects in the tool housing?			
Is there a handle or trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for all moving parts of saws, trimmers, edgers, and similar tools?			
Is there a blade brake on lawn mowers, hedge trimmers, and similar tools?			
Is there a tip guard on chain saws?			
Do moveable guards operate freely?			
Are there fire extinguishers or other fire suppression equipment nearby?			
Are mufflers in good condition?			
Are spark plugs and wire connections in good condition?			
Hydraulic Power Tools			
Are there signs of fluid leakage around hydraulic lines, cylinders, reservoirs, pumps, or other system components?			
Are hydraulic lines in good condition with no visible cracks, bubbles, or kinks?			
Are all hydraulic line connections secure?			
Are there any visible cracks or defects in the tool housing?			

Powder-Actuated Tools	OK	Action Required	Date Corrected
Are you properly trained and qualified to operate powder-actuated tools in accordance with the manufacturer's instructions?			
Are there any unprotected people in the immediate area?			
Have you informed all nearby people what you will be doing?			
Are there any visible cracks or defects in the tool housing?			

Comments:

Heavy Equipment Inspection Checklist

Company: _____

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Time: _____ :

Equipment Type: _____

(e.g., earthmoving - tractors backhoes, bulldozers, etc.)

Project Name: _____

Project No#: _____

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Seat Belts <ul style="list-style-type: none"> Are available for intended operator and passengers (where applicable) Seat Belts are operational? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Roll-Over Protection (ROPS) <ul style="list-style-type: none"> Roll-over protection structures (ROPS) are provided on vehicles and heavy equipment (including scrapers, tractors, loaders, bulldozers, carryalls, etc.) 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Brakes <ul style="list-style-type: none"> Brake systems capable of stopping and holding fully loaded equipment Parking Brake functions properly Wheel Chocks available (where and as applicable) 	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Access <ul style="list-style-type: none"> Non-slip steps Grab Handles (3-Point Grab/Step Mounting Points) 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Audible Alarms <ul style="list-style-type: none"> Audible alarms –Bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. <ul style="list-style-type: none"> - Back up Alarms – Self-propelled equipment with an obstructed view to the rear will be equipped with a reverse gear signal alarm distinguishable from the surrounding noise level. Horn functioning properly 	

Yes	No	NA	Requirements	Comments
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Highway Use</p> <ul style="list-style-type: none"> • Fenders for equipment that can exceed 15mph • Fire Extinguisher • Are exhaust emissions directed away from the Operator? • Cab <ul style="list-style-type: none"> - Clean, free from debris, tools or equipment that can interfere with foot Control. - Free from storage of flammable material/solvents • Mirrors, • Safety glass <ul style="list-style-type: none"> - Equipped with defrosters - Windshield wipers • Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use? • Gauges functioning properly • Tires (Tread) or tracks • Steering (standard and emergency) • Are tools and material secured to prevent movement during transport? 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Fluid Levels:</p> <ul style="list-style-type: none"> • Engine oil • Transmission fluid • Brake fluid • Cooling system fluid • Hoses and belts • Hydraulic oil 	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Fueling</p> <ul style="list-style-type: none"> • Fueling of vehicles and heavy equipment is done with the engine off. • No smoking is permitted at or near the fuel storage or refueling area. A sign is posted stating: NO SMOKING WITHIN 50 FEET. • No sources of ignition are present near the fuel storage or refueling area. • A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area, no closer than 50-feet. • Safety cans available? 	

Yes	No	NA	Requirements	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Safety Guards – <ul style="list-style-type: none"> • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) the points of operations protected from accidental contact? • Hot pipes and surfaces are protected from accidental contact? • High pressure pneumatic lines have safety cable to prevent thrashing should it become disconnected? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attachments <ul style="list-style-type: none"> • Have the attachments designed for use (as per manufacturer’s recommendation) with this equipment been inspected and are considered suitable for use? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Operator Qualifications <ul style="list-style-type: none"> • Does the operator have proper licensing where applicable, (e.g., CDL)? • Does the operator, understand the equipment’s operating instructions? • Is the operator experienced with this equipment? • Is the operator 21 years of age or more? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PPE Required <ul style="list-style-type: none"> • Hardhat • Safety glasses • Work gloves • Chemical resistant gloves_____ • Steel toed Work Boots • Chemical resistant Boot Covers • Apron • Coveralls Tyvek, Saranex, cotton)_____ 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Key(s)? Operating Manual?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other Hazards <ul style="list-style-type: none"> • Excessive Noise Levels _____ dBA • Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.) - MSDSs available? 	

Approved for Use Yes No See Comments

 Site Health and Safety Officer

 Operator

ATTACHMENT V

OSHA POSTER

Job Safety and Health

It's the law!



Occupational Safety
and Health Administration
U.S. Department of Labor

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health



Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 3165-12-06R