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HEALTH AND SAFETY PLAN FOR RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY INVESTIGATION AT SOLID WASTE MANAGEMENT UNIT 18 LOAD AND FILL
AREA NSA CRANE IN
10/01/2011
TETRA TECH NUS

Health and Safety Plan

For

Resource Conservation and Recovery Act Facility Investigation

SWMU 18 – Load and Fill Area Naval Support Activity Crane, Indiana



Naval Facilities Engineering Command Midwest

Contract Number N62472-03-D-0057

Contract Task Order F201

October 2011

**HEALTH AND SAFETY PLAN
FOR
RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY INVESTIGATION**

**SWMU 18 – LOAD AND FILL AREA
NAVAL SUPPORT ACTIVITY
CRANE, INDIANA**

Prepared for:

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Prepared under:

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October 2011

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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 NUS, Inc. (Tetra Tech) personnel during the Resource Conservation And Recovery Act Facility Investigation (RFI) at SWMU 18 – Load And Fill Area at the Naval Support Activity Crane (NSA Crane), located in Crane, Indiana.

The objective of this project is to provide sufficient data to support decisions regarding potential remedial action if contamination is identified above conservative, risk-based screening criteria; or conversely, no further action if concentrations of contaminants are determined not to be present at significant levels.

This HASP is to be used in conjunction with the Tetra Tech 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. N62472-03-D-0057; Contract Task Order Number F201.

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 onsite 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: RCRA Facility Investigation at SWMU 18 – Load and Fill Area

Proposed Start-up Date: October 2011 until completion

Project Team:

Tetra Tech Personnel:

Discipline/Tasks Assigned:

Timothy Evans

PM

Keith Simpson

FOL

TBD

SSO

Matthew M. Soltis, CIH, CSP

HSM

James K. Laffey

PHSO

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

Prepared by:

James K. Laffey

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. Tetra Tech personnel are not authorized to participate in any emergency response activities. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/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 SSO and/or the FOL):

- 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 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 and/or the SSO will be 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 and/or the SSO in the Site Health and Safety logbook, however, site personnel will be responsible for reporting hazardous situations. Where potential hazards exist, 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 and the SSO determine 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 and/or the 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. Safe places of refuge will be identified prior to the commencement of site activities by the SSO and will be conveyed to personnel as part of the pre-activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the Tetra Tech FOL 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 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 Crane Activity Coordinator, Ralph Basinski	(412) 921-8308
Project Manager, Timothy Evans	(412) 921-7281
Tetra Tech FOL, Keith Simpson	(412) 921-8131 - office (412) 352-2264 - cell
Tetra Tech Office, Cincinnati	(513) 251-2730
CLEAN Health and Safety Manager, Matthew M. Soltis, CIH, CSP	(412) 921-8912
Tetra Tech Project Safety Officer, James K. Laffey	(412) 921-8904 - office (412) 370-6668 - cell

***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

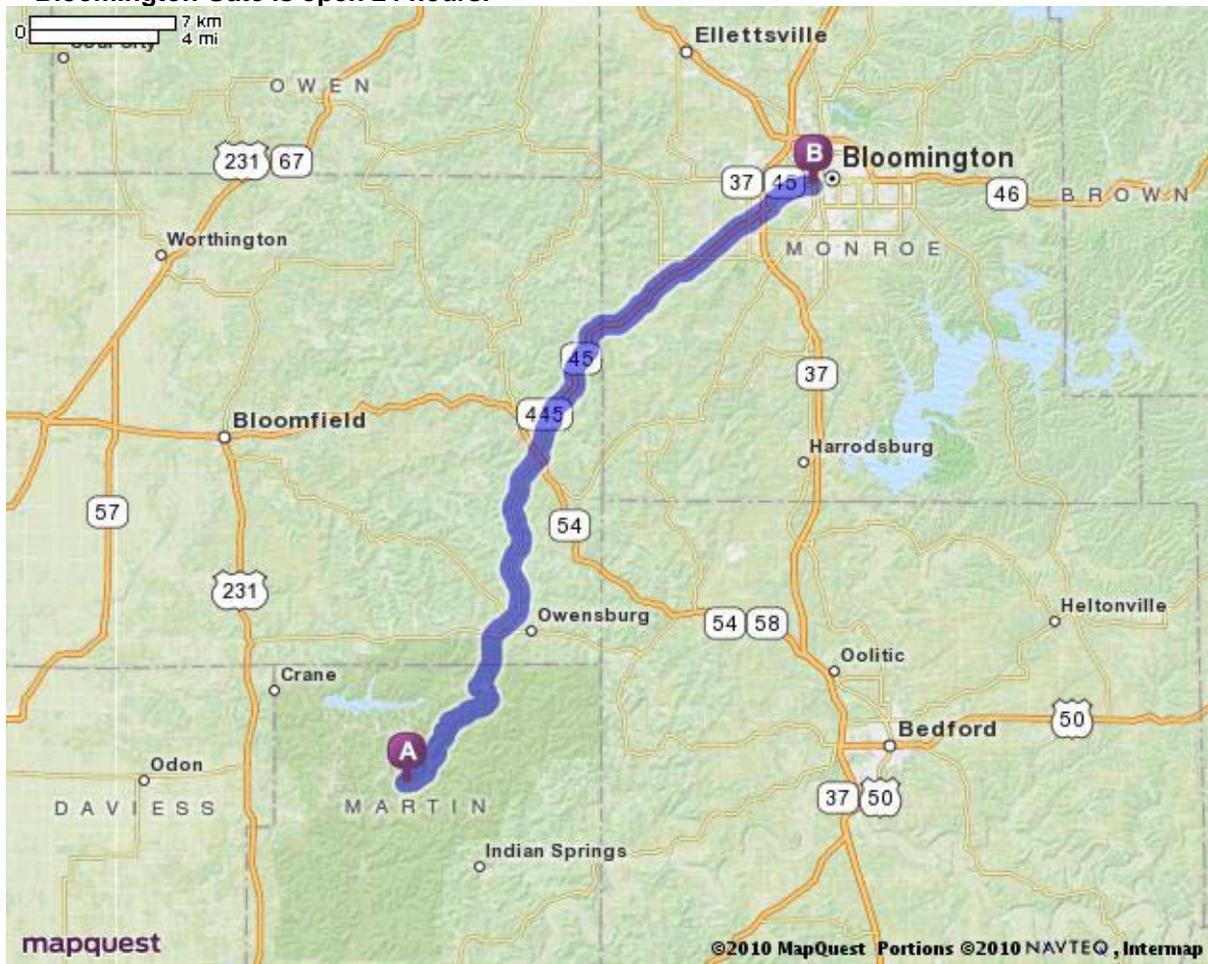
30.63 miles - about 54 minutes

- 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.



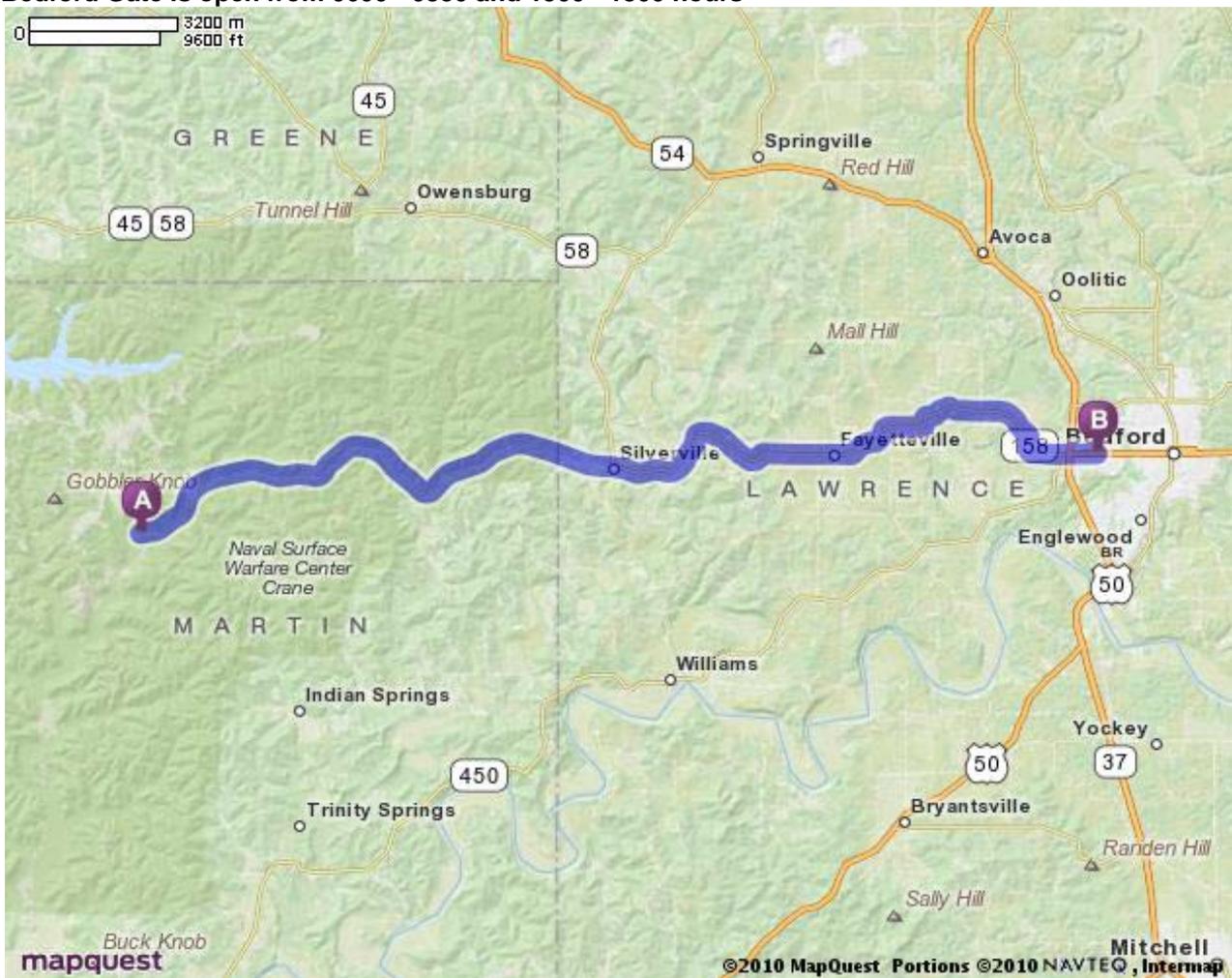
Bedford Medical Center
2900 16th Street
Bedford, Indiana 47421

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 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 (FOL will serve as the Incident Coordinator) pertinent incident details.

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

- 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 can be accomplished while safely maintaining 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. At least two CPR/First Aid trained persons 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. TOTAL is a tool for Tetra Tech H&S professionals use to better track incidents, analyze root causes, implement corrective action plans, and share lessons learned. The ultimate result is a more safe and healthy working environment.

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 (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 will conduct a drill or exercise 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 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 18 – Load and Fill Area

The Load and Fill Area is located in the east-central portion of NSA Crane. It encompasses approximately 1 square mile. SWMU 18 is bounded on the north and south by drainages to Boggs Creek, on the east by Boggs Creek, and on the west by Highway 101. Buildings used by Crane Army Ammunition Activity (CAAA) (and not included in SMWU 18) are located west of Highway 101. Highway 45, which parallels a surface water tributary to Boggs Creek, generally bisects the site into northern and southern areas along two east-west ridges. Access to the southern portion of the site is from Highway 45, and access to the northern portion is from Highway 101. Surface elevations range from approximately 700 feet above mean sea level (msl) along western areas of the ridges to approximately 515 feet above msl along Boggs Creek on the southeastern side of the site. Buildings within SWMU 18 are generally situated along the two east-west trending ridges. The tops of the ridges are generally cleared and level, whereas the slopes are wooded and steep, with relief of 150 to 200 feet.

Projectile load and fill operations, powder operations, and propellant testing have been conducted at SWMU 18 throughout its operational history, beginning in the early 1940s. Load and fill operations were conducted in the northern portion of SWMU 18, principally in Buildings 101, 102, 103, 104, 105, and 189 and also in Buildings 200 and 198 in the southern portion of SWMU 18. The remaining area of the southern portion of SWMU 18 was related to research and development and testing and was referred to as the ASD Complex.

Due to the large size of SWMU 18 (one-square mile with over 100 buildings), it has been divided into ten subareas, based on similar operations or use and geographic proximity, to facilitate more efficient and effective investigation. The following are brief summaries of each subarea. Where known, the chemical release and/or potential contamination is described:

Subarea A - Building 105 Area: Subarea A is located in the northern portion of SWMU 18, off Highway 101 and consists of Building 105 and several other buildings (Buildings 184, 1959, 1987, and 2518). Building 105 was designed and constructed during World War II (WWII) as a medium-caliber loading facility and included press loading of Explosive D (ammonium picrate) operations. In the late 1960s through 1980s, Building 105 was used for press loading missile warheads, specifically Sidewinder and Sparrow missiles. In the late 1990s the facility was converted to demilitarize Explosive D-loaded projectiles and continues to the present. The demilitarization process includes accessing/recovery of the ammonium picrate and converting it to picric acid and ammonium nitrate.

Release/Contamination: Potential contaminants at Building 105 include explosives [polymer bonded-explosive (PBX), Explosive D, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), and octahydro-1,3,5,7-tetranitro-1,3,5-triazine (RDX)] and metals. Other chemicals reportedly used or stored at the site include toluene, acids, and oils. Three recorded releases of Explosive D slurry occurred in 2003 at Building 105. The releases involved discharges of Explosive D slurry to a drainage ditch on the exterior of Building 105 and spills on the interior of the building to drains.

Subarea B – Buildings 101, 102, and 103 Area: Subarea B is located in the northern portion of SWMU 18 along Highway 10 and includes Buildings 101, 102, and 103 and associated structures. This area was developed in 1942 for the purpose of supporting Navy gun ammunition activities during WWII, principally black powder and smokeless powder operations. Black powder and smokeless powder operations were conducted in Building 101, including cartridge tanking and assembly. Bag charge and assembly operations were conducted in Building 102, and ignition filling and packing activities were conducted in Building 103 from approximately 1942 to the late 1980s/early 1990s. Building 101 is currently identified as the Underwater Sound Signal Assembly building, and Building 102 is used for

demilitarization of 30mm depleted uranium ammunition and high-explosive rounds. Building 103 has been designated for demolition.

Release/Contamination: No contaminant releases have been reported for this subarea, but NSA Crane public works drawings state that hazardous explosive particles may have accumulated in the ceiling insulation of Buildings 101 and 102.

Subarea C - Inert Operation Area: Subarea C is located in the western portion of SWMU 18, off Highway 101 and within the area operated by CAAA. It consists mainly of Buildings 115, 119, 226, 227, and 3331. Buildings 119, 226, and 227 were originally used for inert processing and storage of projectile tanks and cases. Building 3331 was built in 1999 and is used for Army Strategic Mobility Program container maintenance.

Release/Contamination: No recorded releases have been identified for this subarea. Trichloroethene (TCE) was detected in a monitoring well installed near the southeastern corner of Building 227 at concentrations of 0.7 and 1.7 micrograms per liter ($\mu\text{g/L}$) in 2005.

Subarea D – Special Programs (SP) Area: Subarea D is located in the center of SWMU 18 and is accessible from Highway 10 via Highway 11 and includes former Building 108, Buildings 109, 142, 143, and 2707, and the surrounding area. This area was designed and constructed during WWII as a 20mm caliber ammunition loading and assembly plant. The original plant consisted of Building 143 as the projectile loading building and Building 142 as the final assembly building for the cartridges. Two inert warehouses (Buildings 108 and 109) were built in this area in the early 1940s. Building 142 was used in the late 1960s and early 1970s by the Marine Corps for mortar assembly. Following WWII, Building 143 was reworked to support the Navy's Special Programs Office in charge of ballistic missiles. Several additions were constructed to house the engineering staff required by the program. The building and an area to the south were also used in the late 1960s in support of the Rockeye II process, where bomblet penetration tests were conducted to support production conducted by the Navy Ordnance Department. Building 142 was converted to house electronic test equipment for testing various types of small ordnance items following the Vietnam War. Building 2707 was constructed in the early 1950s as a lunch and locker room for the 20mm line and was converted to a Quality Evaluation Chemistry Laboratory in the 1970s. Building 109 was converted from an inert warehouse to an explosive operating building in the late 1970s. Most of the building was altered to better support the SP program efforts in Building 143. The only remaining unused portion of the building was converted to support the long-term explosive aging program efforts in Building 2707. The aging program is still in place, but the work that was in the portion of Building 109 has been transferred to Building 143. Building 109 is currently scheduled for demolition.

Release/Contamination: Potential sources of contamination at Subarea D are primarily explosives (smokeless powder and C4), related to historical operations for 20mm loading and mortar assembly. Other chemicals that may have been used or stored at the site include paints, degreasers, and those associated with flares. Although no releases were identified, releases may have occurred through deposition of explosive dusts or powder from site operations to roofs or the surrounding ground via roof vents and drains.

Subarea E - Building 104 Area: Subarea E is located in the east-central portion of SWMU 18 and includes Buildings 104, 189, and 2081 and the surrounding area. In addition, two cleared or sparsely vegetated areas were identified as areas of interest within the western portion of Subarea E, based on historical aerial photographs. Buildings 104 and 189 were designed and constructed during WWII as a medium-caliber loading facility. Press loading operations in the early-1940s involved loading Explosive D. As part of the loading process, the projectiles were cleaned in a degreaser tub, then painted. One of the two center bays was converted in 1974 to hold an x-ray facility, which was to be used to examine the press-loaded projectiles for cracks in the explosive. The substitution of PBX-106 for Composition A3 occurred in the 1990s, ending the use of Building 104 for press loading. Building 104 operates as a main line operating building for CAAA work. Building 189, located north of Building 104, was originally constructed to prepare Explosive D for press loading in Building 104. Sifting operations were conducted in Building 189 to eliminate large particles and agglomerations from the explosives powder. The facility was last used to prepare Composition A3 for press loading. A steel crib in the rear (Building 2924) was designed and constructed in the late 1960s as a projectile check-out facility. The building is currently inactive and has been designated for demolition. Building 2081, constructed in 1946 and located northwest of Building 104, has been used as a warehouse to store inert materials. Two cleared or sparsely vegetated areas were identified within the western portion of Subarea B. One suspect area (identified as Area 1) is located approximately 785 feet northwest of Building 2081, and the other (identified as Area 2) is located approximately 990 feet west-northwest of Building 189. The history and past usage of these two areas is not documented; however, interviews with site personnel indicated that these areas were borrow pits during WWII at the facility.

Release/Contamination: Historical releases have been identified for the Building 104 area. Wastewater from Building 104 was discharged to storm drains that discharged to the slopes and ultimately flowed to Boggs Creek. The wastewater effluent reportedly contained runoff from cleaning projectile casings, phosphate coating of casings, paint booth operations, and the pressing operation vacuum system scrubber. An area of "explosive material seepage" on the slope south of Building 104 was noted. At Building 189, it was reported that "...a considerable amount of Explosive D was spilled on the driveway..." during WWII.

Subarea F - Buildings 2084, 2085, and 2540 Area: Subarea F is located in the southeastern portion of SWMU 18 and includes Buildings 2084, 2085, and 2540 and the surrounding area. Buildings 2084 and 2085 were built in 1946 and originally used for ammunition engineering and inert storage, respectively. Building 2084 has been used for a number of functions through the years, including housing inert materials loading (dummy loads), plastic molding, ordnance engineering and now serves a general storage function. Building 2085 remains a warehouse for inert storage. Building 2540 was built in 1945 and originally used for ordnance engineering and development. Other structures in the area include Building 3323 (research and development offices), Building 199 (boiler house) with two 30,000-gallon aboveground storage tanks (ASTs) in secondary containment, and Building 3317 (weather structure). Multiple small ancillary buildings (Buildings 2160, 2932, 2933, 2934, 2935, and 2938) supported operations in this subarea. These buildings have been demolished, and, according to former site personnel, did not handle explosives.

Release/Contamination: No recorded releases were identified for this subarea. However, five fuel oil underground storage tanks (USTs) were removed from behind Building 199 in 1997. Approximately 345 cubic yards of petroleum-impacted soil were removed for disposal at the Crane landfill. TPH concentrations in soil were “below levels that are usually indicative of environmental soil contamination.

Subarea G – ASD I: Subarea G is in the south-central portion of SWMU 18 and includes Buildings 190, 2947, 3115, 3347, and 3348, several support buildings or structures, and the surrounding land area. Building 190 was constructed during WWII to support loading and pressing operations in Building 198. Sifting operations were conducted in Building 198 to eliminate large particles and agglomerations from the explosives, similar to operations in Building 189 in Subarea E. The original facility for Building 198 included Building 190 as a preparation building, Building 2540 (Subarea F) as a lunch and locker facility, and Building 2084 (Subarea F) as an inert materials warehouse. A covered walkway formerly connected Buildings 2540, 190, and 198. In the late 1960s, the tunnel was converted for use as a burn chamber following an accident at Building 127, outside of SWMU 18. Building 2947 was constructed in 1972 and operated as an energetics laboratory in support of pyrotechnic research and development projects. The other buildings in the subarea were constructed between the late 1960s and 2002 for support of pyrotechnics projects. Subarea G is currently an active testing area.

Release/Contamination: No reports of contaminant releases have been identified for Subarea G other than a considerable amount of Explosive D was reportedly spilled on the driveway near Buildings 189 (Subarea E) and 190 during WWII.

Subarea H - Building 198 Area: Subarea H is located in the southeastern portion of SWMU 18 at the southern terminus of Highway 101 and includes Building 198 and several support buildings/structures).

Building 198 was constructed in 1944 as a medium-caliber projectile loading facility. Explosive D loading of 5-inch projectiles began in 1944, and Composition A3 processing began in Building 198 in 1945. Building 198 consisted of mechanical mix, chemical storage, press, experimental test, grit shop, machine, and paint areas. Building 198 is currently used primarily for the development of infrared (IR) decoy flares. Building 2507 is a pump house that contains the hydraulics used for the presses, and Building 2510 is an accumulator building that collects the vacuum explosive dust from Buildings 198.

Release/Contamination: Although no reported releases were identified, direct discharge of wastewaters containing explosives to surface drainages surrounding Buildings 198 is likely to have occurred, based on NSA Crane public works drawings showing the interior floor drains discharging to the stormwater conveyance system and to the southern hill slope.

Subarea I - Building 200 Area: Subarea J is located in the southwestern corner of SWMU 18. Highway 322 leads to the subarea from Highway 101. The area consists of Building 200 and multiple smaller outbuildings and adjacent land area. Building 200 was designed and constructed as a major-caliber loading building in 1944, and operations at Building 200 consisted of automatic loading and packing, assembly, and painting. The building was used for cast loading of insensitive munitions (PBX) until 1999 and also for loading of pyrotechnics, specifically IR flares. Building 2504 has been for loading of illuminating flares. Building 200 is currently an Army-operated facility involved in the manufacture of IR flares.

Release/Contamination: A fire suppression system release of water is the only documented release at Subarea I. No other reports of contaminant releases have been identified. NSA Crane public works drawings noted that the ceiling insulation in Building 200 may contain potentially hazardous accumulations of explosive particles.

Subarea J - ASD II Area: Subarea J is in the southern part of SWMU 18, at the southern end of Highway 335. Subarea I consists of Buildings 2082 and 2083, several smaller buildings, and the surrounding land area. The two main buildings (Buildings 2082 and 2083) were constructed in 1946 for use as inert materials warehouses. The other buildings in the subarea were constructed in the late 1970s to early 2000s for pyrotechnic testing. Flares extrusion occurred in Building 3338. The pyrotechnic testing area is currently active. The flare testing facility (Building 3008) is currently active, and Building 3087 currently houses flare testing.

Release/Contamination: No recorded releases were identified for this subarea.

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:

- Mobilization/Demobilization
- Multi media Sampling
 - Surface and Subsurface Soil
 - Surface Water
 - Sediment
 - Groundwater
- Soil boring
 - Direct push technology (DPT)
 - Air rotary/percussion drilling
 - Hand auger
- Monitoring Well
 - Development
 - Groundwater Level Measurements
 - Low Flow Purging
- Decontamination Procedures
- Land Surveying and Global Positioning System (GPS) Locating

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), which are to be reviewed in the field by the 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. The AHAs are found in Attachment III of this HASP.

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 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.
- Equipment used on site will be inspected by the SSO prior to beginning of work. (See Attachment III, DPT Equipment Inspection Checklist).
- Repairs will be corrected prior to use.
- 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.

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

The initial sampling in this task is to determine presence/absence of contamination. Based on historical information the likely sources at SWMU 18 are residual contamination from spills from material handling or accidents; direct discharge from drains or settling basins, leaks from underground storage tanks or piping, or transformers; or aerial deposition from exhaust fans, roof vents, or ventilators to the soil via roofs, road surfaces and downspouts or runoff.

The sites were primarily used for projectile load and fill operations, powder operations, and propellant testing. Therefore, the contaminants expected at the site are those related to energetics/explosives, such as residuals from 2,4,6-trinitrotoluene (TNT), RDX, 2,4- and 2,6-dinitrotoluene (DNT), Composition A3, Composition A5, C4, NG, HMX, PBX and Explosive D (ammonium picrate).

Other potential residual contaminants include certain volatile organic compounds (VOCs), SVOCs (limited to polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPHs), and metals such as lead, arsenic, and chromium.

Section 4.0 identifies the release/contamination information for each of the 10 subareas in SWMU 18.

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), the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and the US Army Environmental Hygiene Agency (AEHA).

TABLE 6-1
COPC WITH CURRENT OELs

Contaminant of Concern	Current OELs
Energetics/Explosives*	AEHA TWA ₈ : 0.1 mg/m ³ `
VOCs	varies
PAHs	OSHA TWA ₈ : 0.2 mg/m ³ `
PCBs	OSHA TWA ₈ : 1 mg/m ³ (skin)
TPHs	OSHA: 500 ppm
Metals	OSHA & ACGIH TWA ₈ : 0.05 mg/m ³

Table Notes:

* Energetic/Explosives is based on ammonium picrate the most conservative OEL

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

skin: Potential significant contribution of overall exposure by cutaneous route, including mucous membranes and eyes, from airborne exposure to gases, vapor, or liquid OR by direct skin contact.

6.1.1 Explosive/Contaminants:

Routes of exposure are inhalation, ingestion, skin and eye contact. Signs and symptoms of overexposure may include headaches, dizziness, nausea, hyperactivity, convulsions, seizures, fatigue, and irritability rashes, dry skin and itchy eyes, respiratory problems, joint pain, sore throat, and depression. These effects may be experienced quickly or several hours later. Some can be topically irritating to skin and eyes.

6.1.2 VOCs

The majority of VOCs are often related to chlorinated solvents and associated degradation products, paint thinners, dry cleaning solvents, constituents of petroleum fuels (e.g. gasoline and natural gas), and crude oil tanking. Symptoms of acute exposure to VOCs can include abdominal pain, irritation of the skin, eyes, nose, and throat, dizziness, tremors, vomiting, GI bleeding, enlarged liver, pallor of the extremities, and frostbite like-symptoms.

Short-term exposure to VOCs can cause irritation of the nose and throat and central nervous system (CNS) depression, with symptoms such as drowsiness, dizziness, giddiness, headache, loss of coordination. High concentrations have caused numbness and facial pain, reduced eyesight, unconsciousness, irregular heartbeat and death. Very high concentrations have produced death due to CNS effects, and, in rare cases, irregular heart beat. Permanent nervous system damage and/or liver injury have resulted from severe overexposure.

6.1.3 PAHs

PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 different PAHs. PAHs generally occur as complex mixtures (for example, as part of combustion products such as soot), not as single compounds. PAHs usually occur naturally, but they can be manufactured as individual compounds for research purposes; however, not as the mixtures found in combustion products. As pure chemicals, PAHs generally exist as colorless, white, or pale yellow-green solids. They can have a faint, pleasant odor. A few PAHs are used in medicines and to make dyes, plastics, and pesticides. Others are contained in asphalt used in road construction. They can also be found in substances such as crude oil, coal, coal tar pitch, creosote, and roofing tar. They are found throughout the environment in the air, water, and soil. They can occur in the air, either attached to dust particles or as solids in soil or sediment.

PAHs can be harmful to your health under some circumstances. Several of the PAHs, including benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene, have caused tumors in laboratory animals when they breathed these substances in the air, when they ate them, or when they had long periods of skin contact with them. Studies of people show that individuals exposed by breathing or skin contact for long periods to mixtures that contain PAHs and other compounds can also develop cancer.

6.1.4 PCBs

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful

health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage.

6.1.5 TPHs

Total petroleum hydrocarbons (TPH) is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of TPH at a site. Some chemicals that may be found in TPH are hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene, and fluorene, as well as other petroleum products and gasoline components.

TPH compounds can affect your central nervous system. One compound can cause headaches and dizziness at high levels in the air. Another compound can cause a nerve disorder called "peripheral neuropathy," consisting of numbness in the feet and legs. Other TPH compounds can cause effects on the blood, immune system, lungs, skin, and eyes.

6.1.6 Metals

Heavy metals are chemical elements with a specific gravity that is at least 5 times the specific gravity of water. Heavy metals become toxic when they are not metabolized by the body and accumulate in the soft tissues. Metal toxicity usually occurs from a sudden or unexpected exposure to a high level of the heavy metal (e.g., from careless handling, inadequate safety precautions, or an accidental spill or release of toxic material). Symptoms of metal toxicity include damaged or reduced mental and central nervous function, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs. Long-term exposure may result in slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease, Parkinson's disease, muscular dystrophy, and multiple sclerosis.

6.1.7 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.

6.1.8 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 III) 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 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 and/or the 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 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.

NOTE: 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.

7.0 AIR MONITORING

As a precautionary measure to assure that exposures to chemicals of potential concern (COPC) are avoided and documented, continuous monitoring will be conducted during the intrusive site activities using either a photoionization detector (PID) or a flame ionization detector (FID).

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, 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., bore holes, environmental samples) for the presence of any reading above the daily-established BG level. If elevated readings are observed, the SSO shall monitor the workers breathing zone (BZ) areas with the PID/FID. If the appropriate Instrument Action Level is exceeded (see below), the following process will be followed:

- The SSO shall stop work and move site personnel 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.

7.1.1 Instrument Action Levels

The use of a PID or a FID will be acceptable, provided that the following action levels are observed:

- PID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day.
- FID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Operational checks and field calibration will be performed on the instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations. 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. The 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 the 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
- 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 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 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:

- Soil boring using direct push technology (DPT) – 35-feet
- Surveying and sediment sampling vegetation removal – 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 IV. It is the 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 by Tetra Tech
- 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 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 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 cell phones. Workers should enter the emergency and important phone numbers from Table 2-1 into their cell phones prior to beginning work.

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, including installation of groundwater monitoring wells or collection of subsurface samples using DPT or HSA.

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 and the 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 SSO or FOL 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 or SSO in accordance with the procedures discussed in Section 2.0 of this HASP.

11.0 CONFINED-SPACE ENTRY

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

CORRECTIVE ACTIONS				
Corrective action(s) immediately taken by unit reporting the incident:				
Corrective action(s) still to be taken (by whom and when):				
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? [] TetraTech subcontractor employee (directly supervised by Tetra Tech personnel)? []

Full Name

Company (if not Tetra Tech employee)

Street Address, City, State and Zip Code

Address Type

Home address (for Tetra Tech employees) []

Business address (for subcontractors) []

Telephone Numbers

Work: [] Home: [] Cell: []

Occupation (regular job title)

Department

Was the individual performing regular job duties?

Time individual began work

Yes [] No []

[] AM [] PM [] OR Cannot be determined []

Safety equipment

Provided? Yes [] No []

Type(s) provided: [] Hard hat [] Protective clothing

Used? Yes [] No [] If no, explain why

[] Gloves [] High visibility vest

[] Eye protection [] Fall protection

[] Safety shoes [] Machine guarding

[] Respirator [] 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 [] No []

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 [] No [] 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"

Three horizontal lines for text 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"

Four horizontal lines for text entry.

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".

Two horizontal lines for text entry.

MEDICAL CARE PROVIDED

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

One horizontal line for text entry.

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?

Two horizontal lines for text entry.

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

Four horizontal lines for text entry.

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.

Form with sections: Incident Report Number, INCIDENT DETAILS (Name of road, County, City, State, Police/Ambulance response), and VEHICLE INFORMATION (Vehicle 1 and 2 details, Insurance, Agent info).



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-Tt employees) is captured in the section below on this form. Injured Tt 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 box with a black border, intended for drawing a diagram depicting the incident.

ATTACHMENT III

EQUIPMENT 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 o 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:

Equipment Inspection Checklist for Drill Rigs

Company: _____

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____ Time: ____ :

Equipment Type: _____
(e.g., Drill Rigs Hollow Stem, Mud Rotary, Direct Push, HDD)

Project Name: _____

Project No#: _____

Yes	No	NA	Requirement	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"/>	Emergency Stop Devices <ul style="list-style-type: none"> • Emergency Stop Devices (At points of operation) • Have all emergency shut offs identified been communicated to the field crew? • Has a person been designated as the Emergency Stop Device Operator? 	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Highway Use <ul style="list-style-type: none"> • Cab, mirrors, safety glass? • Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use? • Seat Belts? • Is the equipment equipped with audible back-up alarms and back-up lights? • Horn and gauges • Brake condition (dynamic, park, etc.) • Tires (Tread) or tracks • Windshield wipers • Exhaust system • Steering (standard and emergency) • Wheel Chocks? • Are tools and material secured to prevent movement during transport? Especially those within the cab? • Are there flammables or solvents or other prohibited substances stored within the cab? • Are tools or debris in the cab that may adversely influence operation of the vehicle (in and around brakes, clutch, gas pedals) 	
<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"/>	Fluid Levels: <ul style="list-style-type: none"> • Engine oil • Transmission fluid • Brake fluid • Cooling system fluid • Hoses and belts • Hydraulic oil 	

Equipment Inspection Checklist for Drill Rigs
Page 2

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Yes	No	NA	Requirement	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"/>	High Pressure Hydraulic Lines <ul style="list-style-type: none"> • Obvious damage • Operator protected from accidental release • Coupling devices, connectors, retention cables/pins are in good condition and in place 	
<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"/>	Mast Condition <ul style="list-style-type: none"> • Structural components/tubing • Connection points • Pins • Welds • Outriggers • Operational • Plumb (when raised) 	
<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"/>	Hooks <ul style="list-style-type: none"> • Are the hooks equipped with Safety Latches? • Does it appear that the hook is showing signs of wear in excess of 10% original dimension? • Is there a bend or twist exceeding 10% from the plane of an unbent hook? • Increase in throat opening exceeding 15% from new condition • Excessive nicks and/or gouges • Clips • Number of U-Type (Crosby) Clips (cable size 5/16 – 5/8 = 3 clips minimum) (cable size 3/4 – 1 inch = 4 clips minimum) (cable size 1 1/8 – 1 3/8 inch = 5 clips minimum) 	

Equipment Inspection Checklist for Drill Rigs

Page 3

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Yes	No	NA	Requirement	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Power cable and/or hoist cable <ul style="list-style-type: none"> Reduction in Rope diameter π (5/16 wire rope > 1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope > 1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope > 3/64 reduction nominal size-replace) 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Number of broken wires (6 randomly broken wires in one rope lay) (3 broken wires in one strand) 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Number of wire rope wraps left on the Running Drum at nominal use (≥ 3 required) 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Lead (primary) sheave is centered on the running drum	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	• Lubrication of wire rope (adequate?)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	• Kinks, bends – Flattened to > 50% diameter	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hemp/Fiber rope (Cathead/Split Spoon Hammer) <ul style="list-style-type: none"> Minimum $\frac{3}{4}$; maximum 1 inch rope diameter (Inspect for physical damage) 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Rope to hammer is securely fastened 	
<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) all points of operations protected from accidental contact? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Hot pipes and surfaces exposed to accidental contact? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> High pressure lines 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Nip/pinch points 	
<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)? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Does the operator, understand the equipment's operating instructions? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Is the operator experienced with this equipment? 	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> Is the operator 21 years of age or more? 	

Equipment Inspection Checklist for Drill Rigs
Page 4

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Yes	No	NA	Requirement	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PPE Required for Drill Rig Exclusion Zone <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"/>	Other Hazards <ul style="list-style-type: none"> • Excessive Noise Levels? _____ dBA • Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.) <ul style="list-style-type: none"> - MSDSs available? • Will On-site fueling occur <ul style="list-style-type: none"> - Safety cans available? - Fire extinguisher (Type/Rating - _____) 	

Approved for Use Yes No See Comments

 Site Health and Safety Officer

 Operator

Equipment Inspection Checklist for DPT Rigs

Page 2

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Yes	No	NA	Requirement	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"/>	Fluid Levels: <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"/>	High Pressure Hydraulic Lines <ul style="list-style-type: none"> • Obvious damage • Operator protected from accidental release • Coupling devices, connectors, retention cables/pins are in good condition and in place 	
<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"/>	Mast Condition <ul style="list-style-type: none"> • Structural components/tubing • Connection points • Pins • Welds • Outriggers • Operational • Plumb (when raised) 	
<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"/>	Safety Guards – <ul style="list-style-type: none"> • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? • Hot pipes and surfaces exposed to accidental contact? • High pressure lines • Nip/pinch 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"/> <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? 	

Equipment Inspection Checklist for DPT Rigs

Page 3

Unit/Serial No#: _____

Inspection Date: ____ / ____ / ____

Yes	No	NA	Requirement	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"/>	PPE Required for Drill Rig Exclusion Zone <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"/> <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"/>	Other Hazards <ul style="list-style-type: none"> • Excessive Noise Levels? _____ dBA • Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.) <ul style="list-style-type: none"> - MSDSs available? • Will On-site fueling occur <ul style="list-style-type: none"> - Safety cans available? - Fire extinguisher (Type/Rating - _____) 	

Approved for Use Yes No See Comments

Site Health and Safety Officer

Operator

ATTACHMENT IV

ACTIVITY HAZARD ANALYSIS



ACTIVITY HAZARD ANALYSIS (AHA)

Site Name: NSA Crane, SWMU 18 – Load and Fill Area Crane, Indiana

Task: Site Mobilization/Demobilization

Prepared by	J. K. Laffey	Date	April 25, 2011	FOL	Keith Simpson
Reviewed by	C.J. Snyder	Date	April 26, 2011	SSO	

JOB STEPS	HAZARDS	CONTROLS
<p>Mobilization / Demobilization</p> <ul style="list-style-type: none"> • Assembling equipment and supplies • Performing initial/exit inspections of the intended work areas • Arranging for utilities, site access, notifying appropriate client contacts • Performing equipment inspections of vehicles and equipment arriving/preparing to depart the site • Collecting and confirming applicable worker training and medical compliance documentation 	<ol style="list-style-type: none"> 1. DPT rig 2. Minor cuts, abrasions or contusions 3. Heavy lifting (muscle strains and pulls) 4. Vehicular traffic when moving large equipment to the support area 5. Intermittent high noise levels 	<ol style="list-style-type: none"> 1. Conduct DPT rig initial site acceptance inspection. This must be completed prior to performing any work at this site. Use the equipment inspection checklist for DPT rigs in Attachment III. Once the equipment passes inspection the AHA for Soil Boring with DPT will be followed. 2. Wear cut-resistant gloves when handling items with sharp or rough edges. 3. 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 legs not back, obtain help when needed to lift large, bulky, or heavy items). 4. Designate/demarcate vehicle and equipment staging areas. Inform all site personnel of heavy equipment areas and of their responsibility to stay clear of moving vehicles. In high traffic areas, wear high-visibility vests. 5. Operators/nearby personnel are to wear hearing protection 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. SSO is responsible for

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	<p>6. Equipment moving parts</p> <p>7. Striking overhead utility lines when moving or positioning large equipment.</p>	<p>determining and designating when hearing protection is required. Hearing protection is to consist of either ear muffs or plugs that have a noise reduction rating (NRR) of at least 25 dB.</p> <p>6. Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. Ensure that back-up alarms are functional on equipment. The equipment operators and on-site Supervisors responsible for the equipment are to ensure that the equipment has been inspected and accepted for onsite use. Check/test all emergency stop controls.</p> <p>7. Pre-inspect vehicle moving lanes noting overhead utilities. Do not approach within 20' of any overhead electric lines. Follow , Tetra Tech Standard Operating Procedures (SOP) Utility Location and Excavation Clearance located in Section 4.0 of the HSGM.</p>
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>Hand tools (dollies, hand carts, hand knives, etc.)</p>	<p>Visual inspection prior to use by user.</p>	<p>Review of AHA during pre-task tailgate safety briefing with all intended task participants.</p>
<p>Personal Protective Equipment: <u>Minimum:</u> Safety toe boots, safety glasses. <u>Optional items:</u> Hardhat, hearing protection. <u>HTRW:</u> None anticipated for this task.</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 any onsite activities, and will be confirmed by visual observations of worker activities.</p>

ACTIVITY HAZARD ANALYSIS

I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Site Name: NSA Crane, SWMU 18 – Load and Fill Area Crane, Indiana

Task: Soil Boring with DPT or HSA

Prepared by	J. K. Laffey	Date	April 25, 2011	FOL	Keith Simpson
Reviewed by	C.J. Snyder	Date	April 26, 2011	SSO	

JOB STEPS	HAZARDS	CONTROLS
<p>DPT/HSA rig set up and operation</p> <ul style="list-style-type: none"> • Positioning Unit (engaging outriggers. etc.) • Assembling equipment and supplies 	<ol style="list-style-type: none"> 1. Struck By 2. Tip Over 3. Slips, Trips, Falls 4. Minor cuts, or abrasions 5. Heavy lifting (muscle strains and pulls) 	<ol style="list-style-type: none"> 1. Hard hats and high visibility vests for all personnel in work area. Control work area (use flaggers, signage, barricades, and/or other means) and restrict all non-essential personnel from the area. Inspect rig and ensure that all equipment, augers, rods and tools will be properly secured during transport. 2. Do not permit rig to attempt to traverse severely sloping terrain. Use a ground guide along with a functioning back-up alarm during equipment backing. Once rig is sited, deploy outriggers to properly block and level the rig and secure parking brake. 3. Clear trees, roots, weeds, limbs and other ground hazards from the DPT/HSA location. Practice good housekeeping to keep the ground around the DPT/HSA 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. 4. When handling equipment and tools wear cut-resistant gloves when handling items with sharp or rough edges. 5. 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 legs not back, obtain help when needed to lift large, bulky, or heavy items).

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	<p>6. Insect bites</p> <p>7. Inclement weather</p>	<p>6. 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 for application). 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.</p> <p>7. The FOL and/or the SSO will temporarily suspend outside activities in the event of electrical storms or high winds. It is preferred that supported systems such as lightning detection devices or emergency weather broadcasts are employed. However, when this is not possible field personnel should use the 30/30 Rule:</p> <p><i>If there is less than 30 seconds between thunder and lightning go inside and stay inside for at least 30 minutes after the last thunder.</i></p>
DPT Operations	<p>1. Intermittent high noise levels</p> <p>2. Contact with equipment moving parts.</p> <p>3. Contact/striking underground or overhead utilities</p>	<p>1. Operators/nearby personnel are to wear hearing protection 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. SSO responsible for determining and designating when hearing protection is required. Hearing protection is to consist of either ear muffs or ear plugs that have an NRR of at least 25 dB.</p> <p>2. Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. Ensure that back-up alarms are functional on equipment. The equipment operators and on-site Supervisors responsible for the equipment are to ensure that the equipment is properly inspection prior to being permitted onsite. Ensure that all moving parts are guarded if such parts are exposed. Check/test all emergency stop controls.</p> <p>3. Movement of rig with mast raised will be strictly prohibited. Inspect for buried and overhead utilities in the vicinity of the</p>

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
		<p>DPT/HSA location. Verify the location of utility lines in accordance with ,the Tetra Tech SOP Utility Location and Excavation Clearance located in Section 4 of the HSGM. Pre-plan the move with the local utility companies if utility lines must be moved. Pre-survey the height of equipment and height of utility lines to determine which lines must be removed or raised. Equipment should not come within 20 feet of existing overhead utility lines.</p>
<p>DPT Rod / HS Auger / Tool Handling</p>	<ol style="list-style-type: none"> 1. Struck by/entanglement 2. Overhead hazards 3. Slips, Trips, Falls 4. Contusions, cuts, or abrasions 5. Heavy lifting (muscle strains and pulls). 	<ol style="list-style-type: none"> 1. Be prepared for sudden shifting when removing rod sections. Restrict non-essential personnel from approaching working area. 2. All personnel within the radius of the DPT/HSA rig must wear ANSI approved hard hats. 3. Clear trees, roots, weeds, limbs and other ground hazards from the location. Practice good housekeeping to keep the ground around the 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. Keep a wide base and assure secure footing while attempting to handler auger flights and tooling. 4. When handling auger flights and tools, wear cut-resistant heavy cotton or leather work gloves when handling items with sharp or rough edges. 5. 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 legs not back, obtain help when needed to lift large, bulky, or heavy items
<p>Subsurface soil sampling from DPT Micro core tubes and split spoons.</p>	<ol style="list-style-type: none"> 1. Chemical exposure to low concentrations of metals, pesticides, PCBs, SVOCs and VOCs. 	<ol style="list-style-type: none"> 1. Wear surgeons gloves when handling potentially-contaminated media and samples, avoid contact with potentially-contaminated media to the extent possible, follow good decontamination and practice good personal hygiene (hands and face washing) when exiting work area, hand-to-mouth activities in the work area will be prohibited (eating, drinking, smoking, etc.). NOTE: Inhalation exposure concerns are not an anticipated

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	<p>2. Cuts and lacerations – when cutting acetate liners without the proper material handling devices.</p>	<p>hazard. Exposure via dermal contact and ingestion represent some limited concern during this task.</p> <p>Exposure via dermal contact and ingestion represent some limited concern during this task. Periodically screen sample with PID or FID. 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:</p> <ul style="list-style-type: none"> • PID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day. • FID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day. <p>After at least 5 minutes, SSO will approach from upwind direction screening BZ areas. Work may resume when readings in the BZ return to BGLs.</p> <p>2. Always cut away from yourself and others. Do not place items to be cut in your hand or on your knee. Change blades as necessary to maintain a sharp cutting edge as many accidents result dull cutting attachments. Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife/saw hand, where possible. When cutting acetate liners use the tubing retention tub to secure the tube. Use the knife intended for that purpose. Geoprobe® makes a kit for this purpose.</p>
HSA Operations	<p>1. Start up of unit auger could cause workers to come into contact with auger causing injury or death.</p>	<p>1. In no case will the auger be engaged without a clear zone. Workers will not approach a rotating auger. Operator will announce augers being engaged and visually clear area prior to start-up. Operator cannot leave controls while rig is in operation.</p>
	<p>2. Workers could injure themselves by cleaning the augers while they are rotating.</p>	<p>1. Augers will be cleaned only when they are stopped and in neutral. They will not be restarted until the worker has given a verbal “all clear” to the operator, and the operator has visually determined that the worker is clear of the auger. Only long-handled shovels will be used to remove cuttings from the auger.</p>

ACTIVITY HAZARD ANALYSIS

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>HSA Drill and DPT Rig, bore rods, auger flights, acetate cutting device and sharp knives, hand tools (dollies, hand carts, etc.)</p> <p>Safety Equipment:</p> <ol style="list-style-type: none"> 1. A 20-pound dry chemical ABC fire extinguisher readily available. 2. Spill-control kit available at drilling location. 3. First-aid kit, eyewash, and an emergency air horn nearby. 4. Portable eye wash bottle <p>Monitoring Instruments: PID or FID</p>	<p>Visual inspection prior to use by user. PID or FID must be calibrated as per the manufacturer's recommendations and documented on each use.</p>	<ol style="list-style-type: none"> 1. Review of AHA during pre-task tailgate safety briefing with all intended task participants. 2. Personnel must be trained in use of drilling equipment. 3. The Drill/DPT operator must have current certifications to operate the equipment.
<p>Personal Protective Equipment: Minimum: Safety toe boots, safety glasses. Optional items: Hardhat, hearing protection. HTRW: nitrile surgeon's style gloves and Tyvek if there is a change to soil clothing.</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 any onsite activities, and will be confirmed by visual observations of worker activities.</p>

I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Site Name: NSA Crane, SWMU 18 – Load and Fill Area Crane, Indiana

Task: Soil and groundwater sampling, water level measurement, monitoring well development and purging.

Prepared by	J. K. Laffey	Date	April 25, 2011	FOL	Keith Simpson
Reviewed by	C.J. Snyder	Date	April 26, 2011	SSO	

JOB STEPS	HAZARDS	CONTROLS
Groundwater sampling, water level measurement	<ol style="list-style-type: none"> 1. Minor cuts, abrasions or contusions handling equipment and tools 2. Slips, Trips, Falls 3. Insect bites, snake bites, and contact with poisonous plants. 	<ol style="list-style-type: none"> 1. Wear cut-resistant gloves when handling items with sharp or rough edges. 2. 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. 3. 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 field team as appropriate based on site observations and conditions.
Taking samples using a small battery-operated pump and placing into sample containers	<ol style="list-style-type: none"> 1. Chemical exposure to low concentrations of metals, pesticides, PCBs, SVOCs and VOCs. 	<ol style="list-style-type: none"> 1. Wear surgeons gloves when handling potentially-contaminated media and samples, avoid contact with potentially-contaminated media to the extent possible, follow good decontamination and practice good personal hygiene (hands and face washing) when exiting work area, hand-to-mouth activities in the work area will be prohibited (eating, drinking, smoking, etc.).

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
		<p>NOTE: Inhalation exposure concerns are not an anticipated hazard. Exposure via dermal contact and ingestion represent some limited concern during this task.</p> <p>Exposure via dermal contact and ingestion represent some limited concern during this task. Periodically screen sample with PID or FID. 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:</p> <ul style="list-style-type: none"> • PID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day. • FID Action Level: 10 ppm above BG in BZ areas for no more than 4 exposures of 5 minutes in one work day. <p>After at least 5 minutes, SSO will approach from upwind direction screening BZ areas. Work may resume when readings in the BZ return to BGLs.</p>
Surface soil sampling via hand augering	<ol style="list-style-type: none"> 1. Muscle strains, tendon or ligament sprains, back or other soft-tissue injuries 2. Bruises, abrasions, cuts, foot or eye injuries, 3. Contact with utilities 	<ol style="list-style-type: none"> 1. Operating a hand auger can be physically demanding depending on the conditions of the soil, the auger tools, and the physical capabilities of the operator. Only personnel who are confident that they can physically perform this activity without injury should operate a hand auger. 2. Ensure that the hand auger tool is properly maintained. Avoid injury by stopping if strong resistance is encountered (such as if impassable rocky conditions are encountered). Secure assistance when needed. Wear appropriate PPE (work gloves, safety toe shoes, and safety impact eye protection) 3. Inspect for buried and overhead utilities in the vicinity of the augering location. Verify the location of utility lines in accordance with Tetra Tech SOP Utility Location and Excavation Clearance in the HSGM Section 7.0.
Well Development/ Redevelopment and purging	<ol style="list-style-type: none"> 1. Muscle strains, tendon or ligament sprains, back or other soft-tissue injuries 	<ol style="list-style-type: none"> 1. Developing a well can be physically demanding depending on the conditions of the well, the worker and water removal procedures. Only personnel who are confident that they can physically perform this activity without injury should develop a well. This task may involve carrying water for small distances.

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	2. Bruises, abrasions, cuts, foot or eye injuries,	2. Ensure that well development can be performed with minimal equipment and avoid carry equipment and water long distances. Avoid injury by stopping if water used for development cannot be drummed and moved easily. Secure assistance when needed. Wear appropriate PPE (work gloves, safety toe shoes, and safety impact eye protection)
Soil and groundwater sampling	1. Insect /animal bites 2. Inclement weather 3. Slips/tips/falls	1. Tape up joint between bottoms of pant legs and top of work boot with duct tape. Apply insect repellants containing at least 10 percent DEET. Follow manufacturer's label instructions for proper application and re-application. Perform close body inspections at the end of each day to detect/remove any insects. If walking through high grass or brush areas, wear snake chaps and avoid approaching or disturbing potential nesting areas. 2. If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the FLO/SSO will suspend outside activities. The 30-30 rule shall be applied, which is "if a time interval of 30 seconds or less is between lightning and its thunder, go inside (building/vehicle) and stay inside for at least 30 minutes." If no additional lightning and/or thunder is noted within this 30 minutes, work may resume at the SSO direction. Personnel will be directed to seek suitable shelter that will provide adequate protection from the elements 3. Footwear employed should have an adequate traction lug. Lace up work boots are preferred, where possible, as these provide better ankle support moving over uneven terrain such as the mound area and ungraded back lot. <ul style="list-style-type: none"> • Select the best approach route • Avoid where possible muddy, slippery, and steep terrain • Maintain good housekeeping. • Keep work area free of ground clutter.
Well Development/ Redevelopment and purging	1. Muscle strains, tendon or ligament sprains, back or other soft-tissue injuries 2. Bruises, abrasions, cuts,	1. Developing a well can be physically demanding depending on the conditions of the well, the worker and water removal procedures. Only personnel who are confident that they can physically perform this activity without injury should develop a well. This task may involve carrying water for small distances. 2. Ensure that well development can be performed with minimal equipment

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	foot or eye injuries,	and avoid carry equipment and water long distances. Avoid injury by stopping if water used for development cannot be drummed and moved easily. Secure assistance when needed. Wear appropriate PPE (work gloves, safety toe shoes, and safety impact eye protection)
EQUIPMENT	INSPECTION	TRAINING
Peristaltic pump, tubing, sample collection tools and containers (jars, spatulas, spoons, etc.)	Visual inspection prior to use by user.	Training/experience in proper sample collection, handling and chain of custody requirements.
<p>Personal Protective Equipment: Minimum: nitrile surgeon's type gloves, safety toe boots, safety glasses Optional items: Hardhat, hearing protection. If sampling done concurrently with DPT/HSA, observe DPT/HSA AHA PPE as well. HTRW: Nitrile gloves, PID/FID monitoring.</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p> <p>PID/FID to be subjected to calibration and operational checks in accordance with manufacturer's recommendations (but not less than daily).</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> <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/FID). SSO must become very familiar with the Operator's Manual for any instrument used.</p>

ACTIVITY HAZARD ANALYSIS

I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Site Name: NSA Crane, SWMU 18 – Load and Fill Area Crane, Indiana

Task: Surface water and sediment sampling

Prepared by	J. K. Laffey	Date	April 25, 2011	FOL	Keith Simpson
Reviewed by	C.J. Snyder	Date	April 26, 2011	SSO	

JOB STEPS	HAZARDS	CONTROLS
Surface water and sediment sampling	1. Uneven/unstable walking surface, steep embankments to access water sample locations.	1. Check walking surface before carrying any loads. Locate safest access point, be aware of any tripping hazards or steep embankments. Wear sturdy work boots with ankle protection and gripping soles. Select an access point where the embankment is shallowest
	2. Carrying awkward or heavy loads can cause back injury or make tripping hazards more significant	2. Carry smaller/lighter loads by making more trips. Ask for assistance on heavy loads. Carry loads in a way that allows you to watch your pathway.
	3. Insect bites, snake bites, other animal hazards.	3. Wear long sleeve clothing with sleeves buttoned/rolled down at cuff. Wear commercially available insect repellent. Check clothing often for the presence of spiders or ticks. Avoid walking in dense vegetation if it can be avoided. Make noises or shake the brush to scare off wildlife.
	4. Weather conditions can create heat or cold stress situations.	4. Dress appropriately for the weather conditions. Monitor yourself for the signs of heat stress/exhaustion or frost bite.
Collect water samples: <ul style="list-style-type: none"> • Stand on shore or in shallow water downstream from intended sample location (to avoid stirring up sediment) • Dip sample container or other sample collection device into 	1. Potential drowning hazard working around water.	1. Always work with a partner when working around water. Wear a floatation vest if the water is deeper than 2 feet or swift moving. Select a working area where the footing is stable. Do not stand in or attempt to cross swift moving water.
	2. Chemical burn when adding acid preservatives to samples.	2. Wear nitrile gloves when handling acid preservatives or use sample bottles that already contain preservative.
	3. Ergonomic issues due to bending	3. When possible, avoid bending over for long time periods and

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
<p>water,</p> <ul style="list-style-type: none"> • Pour water sample into sample container- • Add acid preservative (if required) • Label and fill out required paperwork • Place samples in sample cooler for transport 	<p>over, crouching or kneeling for long periods of time.</p> <p>4. Back injury from carrying heavy or awkward loads</p>	<p>use a small stool for sitting or knee pad for kneeling. Standup and stretch frequently</p> <p>4. Ask for assistance with heavy loads or make more trips with smaller loads.</p>
<p>Package samples for shipment:</p> <ul style="list-style-type: none"> • Package individual samples in shipping cooler • Protect containers from breakage • Add ice to cool samples for preservation (if required) • Fill out chain of custody form • Tape shipping cooler and apply exterior labels • Deliver cooler to shipping company 	<p>1. Breakage of glass containers (if used) can cause cuts to hands or glass splinters in eye.</p> <p>2. Back injury when lifting heavy shipping coolers.</p>	<p>1. Handle glass containers carefully, wrap in protective bubble wrap at time of collection. Wear safety glasses when handling glass containers.</p> <p>2. Use a dolly or get assistance when carrying loaded coolers, which can weigh up to 40+ pounds.</p>
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (dollies, hand carts,	Visual inspection prior to use by	Review of AHA during pre-task tailgate safety briefing with all

ACTIVITY HAZARD ANALYSIS

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
hand knives, etc.)	user.	intended task participants.
<p>Personal Protective Equipment: Minimum: Long sleeve shirt, safety toe boots, safety glasses. <u>Optional items:</u> Hardhat, hearing protection. HTRW: None anticipated for this task.</p>	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 any onsite activities, and will be confirmed by visual observations of worker activities.

I have read and understand this AHA:

Name (Printed)	Signature	Date



ACTIVITY HAZARD ANALYSIS (AHA)

Site Name: NSA Crane, SWMU 18 – Load and Fill Area Crane, Indiana

Task: Decontamination

Prepared by	J. K. Laffey	Date	April 25, 2011	FOL	Keith Simpson
Reviewed by	C.J. Snyder	Date	April 26, 2011	SSO	

JOB STEPS	HAZARDS	CONTROLS
Personal Decontamination <ul style="list-style-type: none"> • Equipment drop • Segregated removal of PPE (wash and rinse reusable items, dispose of non-reusable items) 	1. Slips, Trips, Falls 2. Exposure to contaminated media	1. Clear intended decon area location of roots, weeds, limbs and other ground hazards. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. 2. Follow good decontamination practices (work from top down and outside in). Nitrile gloves are to be the last item of PPE removed. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.
Decontamination of heavy equipment and large tooling (e.g., vehicles, etc.) using pressure washer	1. Noise 2. Flying projectiles 3. Falling objects	1. Pressure washer operator must wear hearing protection (muffs or plugs with NRR of at least 25 dB) 2. Restrict other personnel from decon pad 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. Pressure washer operator must wear full face shield over safety glasses with side shields and brow protection. At SSO discretion, additional PPE consisting of hardhat, rainsuit, apron, and or boot covers may be required during heavy equipment decon operations - depending on observations indicating that significant contact with decon overspray and/or windy conditions during washing activities. 3. 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.

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	CONTROLS
	<p>4. Strains/sprains from heavy lifting</p> <p>5. Slips/trips/falls</p> <p>6. Exposure to contaminated media</p>	<p>4. 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 legs not back, obtain help when needed to lift large, bulky, or heavy items).</p> <p>5. Keep decon areas orderly, maintain good housekeeping, spread light coating of sand on decon pad liner to increase traction.</p> <p>6. Follow good decontamination practices (work from top down and outside in). Surgeon's gloves are to be the last item of PPE removed. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.</p>
EQUIPMENT	INSPECTION	TRAINING
<p>Hand tools (hand brushes, garden sprayers, etc.)</p> <p>Pressure washer</p> <p>PID/FID for screening to ensure effective decontamination</p>	<p>Visual inspection prior to use by user. Check wooden handles for cracks or splinters.</p> <p>Inspect pressure washer prior to putting into service to ensure that it is in good working order, and ensure that fittings are secure.</p> <p>PID/FID to be calibrated and operated in accordance with manufacturer's recommendations (daily)</p>	<p>None required.</p> <p>Review manufacturers instructions and safety guidelines prior to use..</p> <p>SSO trained in proper calibration, use, and care of air monitoring devices used (PID/FID). 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. Review manufacturers operating and maintenance manual for monitoring instruments used.</p>

ACTIVITY HAZARD ANALYSIS

EQUIPMENT	INSPECTION	TRAINING
<p>Personal Protective Equipment: <u>Minimum</u>: Safety toe boots, safety glasses</p> <p><u>Optional items</u>: Hardhat, hearing protection.</p> <p><u>HTRW</u>: 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.</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</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 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>

I have read and understand this AHA:

Name (Printed)	Signature	Date

ATTACHMENT V

OSHA POSTER

Job Safety and Health

It's the law!



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

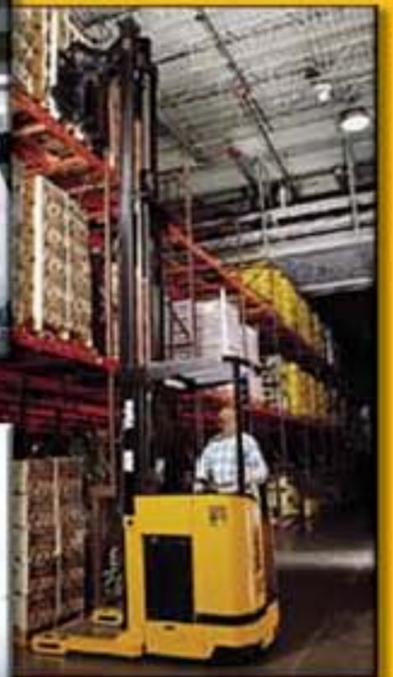
EMPLOYEES:

- 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 –
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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.

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