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FINAL ACCIDENT PREVENTION PLAN FOR TREATABILITY STUDY AT SITE 6 FORMER  
FIRE FIGHTING TRAINING AREA AT NCBC GULFPORT MS  
11/1/2014  
TETRA TECH

**ACCIDENT PREVENTION PLAN  
FOR  
TREATABILITY STUDY  
AT  
SITE 6 - FORMER FIRE FIGHTING TRAINING AREA**

**NAVAL CONSTRUCTION BATTALION GULFPORT  
GULFPORT, MISSISSIPPI**



**Submitted to:**

**NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST  
NAS JACKSONVILLE  
JACKSONVILLE, FLORIDA 32212**

**Submitted by:**

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**CONTRACT NUMBER N62470-08-D-1001  
CONTRACT TASK ORDER JM44**

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### **ATTACHMENTS**

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| I   | Site-Specific Training Documentation Form and Employee Training/Qualifications |
| II  | Material Safety Data Sheet/ Safety Data Sheets                                 |
| III | Utility Location and Excavation Clearance SOP                                  |
| IV  | Equipment Inspection Checklist   |
| V   | OSHA Poster  |

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## ACRONYMS

|         |  |
|---------|--|
| §       | Section  |
| ACGIH   | American Conference of Governmental Industrial Hygienists                |
| AHA     | Activity Hazard Analysis   |
| APP     | Accident Prevention Plan   |
| BBP     | Bloodborne Pathogen  |
| BLS     | Bureau of Labor Statistics   |
| C       | Centigrade or Celsius  |
| CESCO   | Certified Environmental and Safety Compliance Officer                    |
| CFR     | Code of Federal Regulations  |
| CIH     | Certified Industrial Hygienist   |
| CLEAN   | Comprehensive Long - Term Environmental Action Navy                      |
| CPR     | Cardiopulmonary Resuscitation  |
| CSP     | Certified Safety Professional  |
| DART    | Days Away/Restricted Duty/Transfer                                       |
| dB      | decibels   |
| DOT     | Department of Transportation   |
| EM      | Engineer Manual  |
| EPA     | Environmental Protection Agency  |
| F       | Fahrenheit   |
| FOL/SSO | Field Operations Leader/Site Safety Officer                              |
| HSM     | Health and Safety Manager  |
| NAICS   | North American Industry Classification System                            |
| NCBC    | Naval Construction Battalion Center                                      |
| NRR     | Noise Reduction Rating   |
| NSA     | Naval Support Activity   |
| OEL     | Occupational Exposure Limit  |
| OSHA    | Occupational Safety and Health Administration (U.S. Department of Labor) |
| PHSO    | Project Health and Safety Officer  |
| PM      | Project Manager  |
| PPE     | Personal Protective Equipment  |
| RAC     | Risk Assessment Code   |
| RCIR    | Recordable Case Incident Rate  |
| RPM     | Remedial Project Manager   |
| SOP     | Standard Operating Procedure   |
| USACE   | United States Army Corps of Engineers                                    |

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## 1.0 SIGNATURE SHEET

By their signature, the undersigned hereby certify that this Accident Prevention Plan (APP) has been prepared in accordance with the United States Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1, and has been reviewed and approved for use during field operations at the Naval Construction Battalion Center (NCBC), located in Gulfport, Mississippi.

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Project Manager - Plan Concurrence (904) 730-4669

## **2.0 BACKGROUND INFORMATION**

### **2.1 CONTRACTOR**

Tetra Tech, Inc. (Tetra Tech) will conduct the field activities identified in the APP.

### **2.2 CONTRACT NUMBER**

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 (NAVFAC), as defined under Contract No. N62472-08-D-1001; Contract Task Order Number (CTO) JM44.

### **2.3 PROJECT NAME**

Treatability Study of Site 6 – Former firefighting training area at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi

### **2.4 PROJECT DESCRIPTION**

The primary objective of the Treatability Study for Site 6 is to evaluate whether implementing an alternative technology to long term monitoring will expedite achievement of target remediation goals (TRGs).

### **2.5 LOCATION**

Site 6, the Fire Fighting Training Area, occupies less than 2 acres in the west-central part of NCBC Gulfport in Harrison County, Mississippi (Figure 2-1) and is bounded by Fifth Street to the north, Colby Avenue to the west, administrative Buildings 461 and 386 to the east, and Marvin Shields Avenue to the south. Drainage ditches are located along the western and northern site boundaries. The site location map of Site 6 is shown in Figure 2-2.

Between 1966 and 1975, the Site 6 area was used to train firefighters using various flammable liquids as a combustion source in two unlined pits at the site. The north pit was 50 feet long, 35 feet wide and 4 feet deep. The south pit was 40 feet long, 25 feet wide and 6 feet deep. Up to 500,000 gallons of waste oils, solvents, paint thinners, and cleaning compounds are suspected to have been burned in the pits. The pits were backfilled with sand and gravel when firefighting training activities concluded in 1975.

## **2.6 PHASES OF WORK REQUIRING ACITIVITY HAZARD ANALYSIS (AHA)**

The AHA identifies the sequence of work, specific hazards anticipated, and the control measures to be implemented to minimize or eliminate each hazard. The AHA is used to augment daily health and safety meetings, and is intended to heighten safety and hazard awareness on the job. A pre-task briefing will be documented, and may be combined with the daily tailgate safety meeting. AHAs are the focal point for safe conduct of work on a project. Since each task is described and evaluated, workers should be better prepared to perform work safely. The FOL/SSO will discuss the risks and precautions associated with each task identified in the Work Plan. The tasks and AHAs for this project are:

- Mobilization and Demobilization
  - Global positioning system (GPS) Survey
- Soil boring using direct push technology (DPT)
  - Subsurface soil sampling
  - BIOX injection
- Groundwater sampling of existing monitoring wells
- Decontamination of sampling and heavy equipment
- IDW management

### 3.0 STATEMENT OF SAFETY AND HEALTH POLICY

Tetra Tech is committed to providing our employees with a safe and healthful workplace. It is the goal of Tetra Tech to continue excellent safety performance on NAVFAC contracts to support the Navy in their safety efforts. Specifically, Tetra Tech will perform work in a manner that is consistent with the Zero Incident Philosophy. It is our goal to plan and perform the work in a manner that integrates safety and health considerations so that worker injuries or illnesses, environmental releases/impacts, or property damage are eliminated. In addition to the line and staff management functions described in this APP, each individual performing work under this contract has the responsibility for his/her own personal health and safety, as well as for assisting in assuring the health and safety of co-workers. This element is also the first one listed in our corporate Health and Safety Policy Statement, which requires that employees "recognize a *personal* responsibility for their own health and safety and for actions that affect the health and safety of fellow employees." This employee responsibility includes observing specified health and safety requirements and communicating with the designated FOL/SSO on matters such as the effectiveness of specified control measures, identification of new potential hazards, and other related issues.

An employee's failure to adhere to the requirements of this APP, or to observe specified safety requirements and restrictions, or to properly use identified protective equipment may lead to injury or illness. As a result, deviation from safety and health procedures is not tolerated. Failure to comply with health and safety procedures and requirements will lead to reprimand up to and including dismissal.

Health and safety-related information is communicated to employees through meetings, postings, written communications, and reporting of hazards.

This APP establishes the requirements that the Site Safety and Health Officer (SSO) must follow to respond to changing conditions by knowing when to stop work and call for additional guidance from a Certified Industrial Hygienist (CIH)/Certified Safety Professional (CSP). The Project Health and Safety Manager (PHSM) will provide the SSO with additional information, or request additional information, in order to fully evaluate the situation. This type of communication provides the SSO with the necessary support and knowledge to equip the workers with the required protection either through adjustment to the work procedures, or through additional techniques, tools, or equipment. Personal protective equipment (PPE) may be altered to provide additional protection to the workers, based on the information provided by the SSO to the PHSM. This APP also delineates health and safety responsibilities and assigns those responsibilities to project and office personnel.

### 3.1 TETRA TECH SAFETY STATISTICS

Table 3-1 presents safety statistics for Tetra Tech for the last 3 calendar years compared to the national averages for our industry. This comparison uses data collected by the United States Department of Labor, Bureau of Labor Statistics (BLS) for different types of employers, segregated by North American Industry Classification System (NAICS) codes.

**TABLE 3-1  
COMPARISON OF TETRA TECH AND 2011 BLS DATA FOR  
NAICS CODE 541 (RCIR AND DART CASE RATES)**

|   | NAICS 541<br>Professional,<br>Scientific and<br>Technical<br>Services<br>2011 | Tetra Tech<br>2011 | Tetra Tech<br>2012 | Tetra Tech<br>2013 |
|---|---|--------------------|--------------------|--------------------|
| Total Recordable Case Incident Rate (RCIR)          | 0.8   | 0.57               | 0.67               | 0.69               |
| Days Away/Restricted Duty/Transfer Case Rate (DART) | 0.4   | 0.14               | 0.10               | 0.15               |

The data comparison illustrates that Tetra Tech's performance compares favorably with the most-recent national averages for the environmental engineering and hazardous waste services industries. Raw data for these statistics can be found in the OSHA Form 300 and 300A attached as Figure 3-1.

#### Tetra Tech Man Hours Worked

- 2011                    23,725,239
- 2012                    24,904,295
- 2013                    24,812,849

#### Tetra Tech Experience Modification Rates (Policy Year October 1 - September 30):

- 2012-2013            0.76
- 2013-2014            0.80
- 2014-2015            0.83

## **4.0 RESPONSIBILITIES AND LINES OF AUTHORITY**

### **4.1 STATEMENT OF RESPONSIBILITY**

Tetra Tech, as the employer for staff that will be engaged in performing the work presented in this APP, fully recognizes and accepts ultimate responsibility for protecting the safety and health of our employees, and for the implementation of an effective Safety and Occupational Health program. No person shall be required or instructed to work in surroundings or under conditions that are unsafe or dangerous to his or her health. Each employee is responsible for complying with applicable safety and occupational health requirements, wearing prescribed safety and health equipment, reporting unsafe conditions/activities, preventing avoidable accidents, and working in a safe manner.

### **4.2 IDENTIFICATION AND ACCOUNTABILITY**

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

#### **4.2.1 U.S Navy Personnel**

The Navy personnel primarily responsible for this project are the Navy Engineer-in-Charge (EIC) Mr. Robert Fisher and the Site Contact Mr. Gordon Crane.

#### **4.2.2 Tetra Tech Personnel**

##### **4.2.2.1 *Project Manager– Gregory Roof, P.E.***

The Tetra Tech PM is responsible for the overall direction and implementation of health and safety for this work. The PM coordinates closely with the RPM who is responsible to oversee the project implementation, including scoping, data review, and evaluation for the NAVFAC. This includes the responsibility for ensuring that:

- Work is appropriately planned and executed in accordance with contractual, regulatory, and internal requirements
- Adequate resources (including personnel, equipment, and supplies) are assembled, and made available to the FOL/SSO to safely and effectively accomplish the work.
- Ensure implementation of this APP through coordination with the HSM, and the PHSM, as applicable.

- Conduct periodic inspections.
- Participate in the incident investigations.
- Ensure APP has the required approvals before any site work is conducted.
- Ensure that the PHSM and HSM are informed of project scope changes that require modifications of the APP.
- Assume overall project responsibility for health and safety.
- Ensure that adequate resources are provided to the field staff to carry out their responsibilities as outlined below.

Mr. Roof has approximately 31 years of professional experience including 24 years of experience in the environmental and civil consulting/construction industry. He has also served in the United States Air Force for five years as an officer and two years in manufacturing. His current roles include being a technical lead as a Professional Engineer, and managerial role as a program manager and senior project manager. Project experience includes all areas of CERCLA and RCRA corrective action processes; UST and AST system design, installation and removal; UST site assessment and remediation (Texas and Florida); engineering design; preparation of plans and specifications (CSI format); horizontal/water resource construction; hazardous waste management compliance; waste characterization; RCRA unit closure; RCRA unit closure certification; facility decommissioning; remedial design; remedial action; mechanical design; industrial compliance (under various regulatory programs); Space Optimization for the USAF using S-file; property transfer assessments; environmental baseline surveys; and asbestos.

- OSHA 1910.120 40-Hour HAZWOPER Training; 1991
- OSHA 1910.120 8-Hour Annual Refresher Training; 2014
- OSHA 1910.120 8-Hour Supervisory Training; 1999

#### **4.2.2.2 Health and Safety Manager – Matthew Soltis, CIH, CSP**

The HSM is responsible for the development and administration of the company health and safety program. The HSM will act in an advisory capacity to PM and site personnel for project-specific health and safety issues. The Tetra Tech PM will establish a liaison between the RPM and the HSM on matters relating to health and safety. In the fulfillment of the duties of this position, the HSM will enlist the support of safety and occupational health professionals, as appropriate. The HSM is responsible for the following actions:

- Developing, maintaining, and overseeing implementation of this APP
- Visiting project sites as needed to audit the effectiveness of the APP
- Remaining available to respond to project emergencies

- Developing modifications to the APP, as needed
- Evaluating occupational exposure monitoring/air sampling data and adjusting APP as necessary
- Serving as a Quality Control staff member
- Approving the APP by signature

Mr. Soltis is an occupational safety, health and security professional with over 30 years of professional experience. He is dual-certified in comprehensive practice for both occupational safety and industrial hygiene (CSP and CIH) and he has achieved national recognition in his areas of expertise by the American Industrial Hygiene Association, and has been elected as a Fellow of that organization. He has provided technical and management services to a wide diversity of clients both in the United States and overseas. This experience has involved numerous industries including manufacturing, construction, chemical processing, energy generation/transmission, R&D, and environmental sectors. Mr. Soltis has also served as Adjunct Professor for the Indiana University of Pennsylvania Safety Sciences Department, teaching course work in the fields of safety engineering and industrial hygiene.

The work under this contract, including this field effort, is subject to a comprehensive health and safety program developed, designed, and implemented by Mr. Soltis. Mr. Soltis serves as Corporate Manager of Health and Safety for Tetra Tech Technical Support Services and as the HSM for the planned work addressed in this APP. His training experience includes:

- 40-Hour HAZWOPER Training, 29 CFR 1910.120 OSHA; 1988
- 8 Hour Refresher 29 CFR 1910.120 OSHA Annual Refresher; 2014
- 8-Hour Supervisory Training, 29 CFR 1910.120 OSHA; 1990
- OSHA 10-hour Construction Safety Training #31-003300669; 2011
- FEMA IS-200 ICS for Single Resources and Initial Action Incidents; September, 2009

#### **4.2.2.3 Project Health and Safety Officer – James K. Laffey, CESCO**

The PHSO is responsible for developing this APP in accordance with applicable OSHA and U.S Army Corps of Engineers EM 385 1-1 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 training and medical surveillance certificates
- Providing standard work practices to minimize potential injuries and exposures

- Modifying this APP, as necessary

Mr. Laffey has served as a PHSO for a wide variety of Environmental Investigation/Remediation Projects for USACE since 1993. He is a certified Environmental and Safety Compliance Officer (CESCO) #464375803 by the National Registry of Environmental Professionals. His experience involves CERCLA investigations, remedial action projects, and baseline characterization studies (estimated at over 100 different projects). In this capacity, he is responsible for identifying site chemical and physical hazards and developing the SSHP, providing technical guidance to field personnel to control or minimize site hazards. He is a certified instructor for all the OSHA HAZWOPER training programs including the 40-hour initial training, 8-hour supervisory training, and 8-hour annual refresher training. He is certified by the FEMA and the USEPA as an Incident Command System Instructor for IS 100 through 400. His training experience includes:

- OSHA Construction Safety and Health 30-hour Training #36-60070909; 2010
- OSHA 29 CFR 1910.120 40-hour HAZWOPER Training; 1990
- OSHA 29 CFR 1910.120 8-hour Annual Refresher Training; 2014
- OSHA 29 CFR 1910.120 Supervisory 1991 and Refresher Training; 2012
- Safety in Excavation Training Course; 2002
- American Red Cross, First Aid and CPR/AED; 2010

#### **4.2.2.4 Field Operations Leader/Site Safety Officer (FOL/SSO) – Bill Olson P.G.**

The FOL/SSO is responsible for implementation of the project work plans in accordance with the APP. The FOL manages field activities, executes the SAP, and enforces safety procedures as applicable to the SAP. Other duties include:

- Ensuring that the proper notifications are made prior to beginning work
- Verifying training and medical clearance of onsite personnel status in relation to site activities
- Selecting, applying, inspecting, and maintaining personal protective equipment
- Implementing Hazard Communication Program and other health and safety programs as needed
- Providing site-specific training for onsite personnel
- Investigating accidents and injuries

Mr. Olson has over 20 years of professional experience in the environmental field conducting site investigations and remediation projects for federal and state government agencies, as well as commercial clients. He has been involved with environmental projects for federal clients including the U.S. Navy, Air Force and Coast Guard, the U.S. Army Corps of Engineers, and the E.P.A. Mr. Olson has conducted site

investigations, remediation, Phase I site assessments and wetland delineations for Florida State agencies. He also was involved with site investigations, Phase I site assessments and remediation projects for commercial clients including Stauffer Management Company, ABB-Service and Bridgestone/Firestone.

- OSHA 1910.120 40-Hour HAZWOPER Training; 1993
- OSHA 1910.120 8-Hour Annual Refresher Training; 2014
- OSHA 1910.120 8-Hour Supervisory Training; 1994
- First Aid, CPR and AED Training Refresher; 2012

As the Site Safety Officer the FOL/SSO is also responsible for ensuring that corrective measures have been implemented, appropriate internal and NCBC authorities have been notified, and follow-up reports have been completed. Individual subcontractors are required to cooperate with the SSO within the parameters of their respective Scope of Work. These duties may include the following:

- Select, inspect, implement, and maintain personal protective equipment
- Establish work zones and control points
- Implements air-monitoring program for onsite activities
- Verify training and medical status of onsite personnel status in relation to site activities
- Coordinate emergency services
- Provide site specific training for onsite personnel
- Investigate accidents and injuries
- Developing and maintaining current chemical inventories and Material Safety Data Sheets (MSDS)/Safety Data Sheets (SDS) files for hazardous chemicals that will be used/stored at that workplace
- Ensuring that onsite personnel who may use hazardous chemicals have access to and review pertinent SDS prior to using or dispensing such chemicals
- Ensuring compliance with container labeling requirements
- Providing input to the PHSO regarding the need to modify this APP or other health and safety documents as per site-specific requirements

Compliance with the requirements stipulated in this APP is monitored by the FOL/SSO and coordinated through the PHSO and HSM. The FOL/SSO must be notified of any on-site emergencies and is responsible for ensuring that the appropriate emergency procedures described in this section are followed. The FOL/SSO is also responsible for informing the Navy RPM of major incidents and associated corrective actions.

#### **4.2.2.5 Site Personnel - Various**

In addition to the line and staff management functions, each individual performing work under this contract has the responsibility for their own personal health and safety, as well as assisting in assuring the health and safety of their co-workers. This element is also the first one listed in our corporate Health and Safety Policy Statement, which requires that "each employee recognize a *personal* responsibility for their own health and safety and for actions that affect the health and safety of fellow employees." This employee responsibility includes observing specified health and safety requirements and communicating with the designated FOL/SSO on matters such as the effectiveness of specified control measures, identification of new potential hazards, and other related issues. Site Personnel are responsible to:

- Report any unsafe or potentially hazardous conditions to the FOL/SSO.
- Report injuries, illnesses, spills, fires, and property damage to the FOL/SSO.
- Maintain knowledge of the information, instructions, and emergency actions contained in this APP.
- Comply with rules, regulations, and procedures set forth in this APP and any revisions that are instituted.
- Initiate the Incident Report when involved in an incident/accident if able to do so.
- Inspect the tools and equipment, including PPE, daily prior to use.
- Conduct daily operations check of electronic equipment and annotate in the team logbook.
- Assist the FOL/SSO with implementation and compliance with the APP

#### **4.2.2.6 Subcontractors and Suppliers**

Tetra Tech directs the subcontractor's supervisor regarding the work and the manner in which tasks are to be performed. Subcontractors are responsible for assigning specific tasks to their employees; ensuring that their employees are properly trained and are in compliance with applicable regulations; and allocating sufficient time, materials, and equipment to safely complete activities in accordance with this APP and their individual Environmental Health and Safety plans. Subcontractors will attend the Tetra Tech daily health and safety meeting prior to starting field work.

- Site-specific briefing regarding the hazards present on the work site
- Required safety activities
- Individual roles and responsibilities for safety practices
- While on site subcontractors/vendors will be under the direct supervision of the FOL/SSO.

#### **4.3 STOP WORK AUTHORIZATION**

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 PM and the Corporate Health and Safety Manager. 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.

#### **4.4 COMPETENT AND QUALIFIED PERSON(S)**

The competent and qualified person for this project is Bill Olsen. His resume and qualifications are listed in Section 4.2.2.4. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate or control these hazards and conditions. The FOL/SSO has field supervision and safety experience.

#### **4.5 REQUIREMENT OF DESIGNATED COMPETENT PERSON ON SITE**

Work tasks at NCBC will only be performed when the designated competent person is physically on the job site.

##### **4.5.1 PPE Program**

The competent person will be responsible to implement the PPE program. Specific PPE applicable for each task is noted in the Activity Hazard Analysis (see Section 10.0). The following constitute the minimum level of required PPE:

- Long pants
- Sleeved shirt
- Safety toe boots/shoes
- Nitrile gloves (as needed)
- Safety glasses (as needed)
- Goggles (as needed)
- Hard hat (as needed)

The overall level of protection will be reevaluated continually as the project progresses. PPE will be modified to ensure the most efficient type of protection be worn by site workers when they are required to perform different tasks.

#### **4.6 REQUIREMENTS OF PRE-TASK SAFETY AND HEALTH ANALYSIS**

The FOL/SSO will conduct daily pre-shift tailgate safety meetings discussing the planned site activities, the hazards associated with each task, and the training required of personnel involved in these tasks. The related personal protective equipment or related work equipment will be inspected by the competent/qualified person before any work is started.

Tetra Tech requires that an AHA be prepared for each job task to be performed at this site to identify hazards before they occur and provide mitigation measures. The AHAs focus on the relationship between the worker, the task, the tools, and the work environment. The AHAs are reviewed at the tailgate safety meeting at the beginning of each work day. These sessions inform each person of the potential hazards for each task and provide steps to take to eliminate or reduce hazards to an acceptable risk level. The AHAs are presented in the Section 10.0.

Personnel will be encouraged to report to the FOL/SSO any conditions or practices that they consider detrimental to their health or safety, or those they believe violate applicable health and safety standards. Such reports may be made orally or in writing. Personnel who believe that an imminent danger threatens human health or the environment are encouraged to bring the matter to the immediate attention of the FOL/SSO for resolution. Job site activities presenting danger to life or limb should be stopped immediately and reported to the FOL/SSO for resolution. Near miss incidents are to be reported to the FOL/SSO who will record the information in the site logbook and in the Tetra Tech TOTAL System.

At least one copy of this APP will be available to site personnel. Each vehicle used on the job site will contain a copy of the APP to ensure quick and easy access by employees. In addition to a review of the AHAs, minor changes and any other relevant topics will be discussed by the FOL/SSO at the daily tailgate safety meeting. However, significant revisions must be discussed with the HSM and PM and approved prior to implementation.

It is the goal of Tetra Tech to continue its excellent safety performance on NAVFAC contracts. Specifically, Tetra Tech will perform the work in a manner that is consistent with the Zero Incident Philosophy. In accordance with this philosophy, it is our stated goal to plan and perform the work in a manner that integrates safety and health considerations so that it is accomplished without experiencing any worker injuries or illnesses, environmental releases/impacts, or property damage events.

## **4.7 LINES OF AUTHORITY**

Personnel who will be working on this project are covered by this APP. These documents shall be rigorously enforced during this field effort. Violators of the APP will be verbally notified upon first violation, and the violation will be noted by the FOL/SSO in the field logbook. Upon second violation, the violator will be notified in writing, and the Tetra Tech PM and the violator's supervisor will be notified. A third violation will result in a written notification and the violator's eviction from the site. The written notification will be sent to the human resources department and the HSM.

Any violations that are deemed to be serious, intentional, or otherwise egregious will be subject to immediate corrective action, up to and including removal from the site, and will not require adherence to this progressive, three-step disciplinary process.

In the Tetra Tech Health and Safety Program Summary, it is stated by the company Chief Executive Officer Mr. Daniel L. Batrack, "Management is responsible for ensuring that all aspects of the workplace, including offices and project locations, are safe and that any risks, hazards, and safety violations are brought to their attention, investigated, and corrected promptly. Tetra Tech's associates are responsible for complying with the H&S policy, programs and standards, and conducting their work safely and without detriment to themselves, other employees, other individuals or property. Compliance with this policy is mandatory. Willful violation or negligent disregard of this policy will be considered cause for disciplinary action up to and including termination."

### **4.7.1 Policies and Procedures Regarding Noncompliance**

An employee's failure to adhere to the requirements of this Accident Prevention Plan, the Project Specific Work and Safety Plans, or to observe specified safety requirements and restrictions or to properly use identified protective equipment may lead to injury or illness. As a result, deviation from safety and health procedures is not tolerated. Failure to comply with health and safety procedures and requirements will lead to reprimand up to and including dismissal.

#### **4.7.2 Manager and Supervisor Accountability**

The purpose of the Tetra Tech corporate Health and Safety Program is to define the health and safety standards required on a corporate wide basis. The corporate Health and Safety Program applies to all Tetra Tech employees and sets forth minimum requirements for subcontractors working under contract to Tetra Tech. The responsibilities, organizational structure, recordkeeping requirements, and evaluation of Tetra Tech's corporate Health and Safety Program are outlined in detail in the Program Administration and Organizational Structure document:

- Senior Vice President of Administration has overall responsibility for the Tetra Tech corporate Health and Safety Program.
- Corporate Health and Safety Director
- Operational Unit Health and Safety Managers individuals assigned to health and safety administration within each Tetra Tech operating unit
- Operations Managers individuals who manage an office(s) within an operating unit of Tetra Tech
- Office Health and Safety Representative who is assigned to health and safety program-related functions within an office or long-term project location
- Project Managers who are responsible for managing a particular project or job.
- Site Safety Coordinators who provide health and safety oversight for a particular project site.
- Field personnel who are required to participate in appropriate health and safety programs and maintain their field-ready status.
- Each and every employee of Tetra Tech is responsible for upholding the standards established by the company.

An organization chart depicting the lines of authority is included as Figure 4-1.

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## 5.0 SUBCONTRACTORS AND SUPPLIERS

Tetra Tech will employ subcontractors in the performance of work covered by this APP. Subcontractor personnel are required to read and comply with the sections of this Tetra Tech APP. The subcontractor personnel entering the site must sign the Site-Specific Training Documentation form included in the APP and the individual AHAs included in the APP.

### 5.1 IDENTIFICATION

The principal subcontractors for various scopes of work during projects conducted under this CTO are detailed below:

Subcontractor: Biox Services  
Assignment Biox Injection  
Address: 700 N Sacramento Blvd Suite 101  
Chicago IL 60612  
Phone: 773-299-1949

Project Contact: \_\_\_\_\_

Subcontractor: \_\_\_\_\_  
Assignment \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Project Contact: \_\_\_\_\_

### 5.2 SAFETY RESPONSIBILITES OF SUBCONTRACTORS AND SUPPLIERS

Subcontractor personnel must comply with the applicable 29 CFR §1910.120 training and medical surveillance requirements. Subcontractors are responsible for providing PPE needed to protect personnel as specified by their safety and health planning documents and by this APP, and are directly responsible for assuring the health and safety of their employees. Subcontractors who have not met OSHA training, medical surveillance, and PPE requirements are not permitted to enter areas where exposure to hazardous materials is possible.

This APP shall be rigorously enforced during this field effort. Subcontractor personnel who violate the APP will be verbally notified upon first violation and the violation will be noted by the FOL/SSO in a field logbook. Upon second violation, the violator will be notified in writing, and the Tetra Tech PM and the

violator's supervisor will be notified. A third violation will result in a written notification and the violator's eviction from the site. The written notification will be sent to the Subcontractor, Tetra Tech Contracts Department, and the HSM.

Enforcement of violations of the APP and AHAs is conducted by the FOL/SSO during remedial actions. Tetra Tech will monitor the work practices of its subcontractor workers onsite, and unequivocally enforce all aspects of the AHAs. Subcontractors are responsible for enforcing all health and safety policies applicable to site activities on this project. Disciplinary action will be enforced against the subcontractor manager and personnel for noncompliance violations.

NOTE: Any violations that are deemed to be serious, intentional, or otherwise egregious will be subject to immediate corrective action, up to and including removal from the site.

## **6.0 TRAINING**

Site personnel must satisfy any specialized training requirements that are presented in the AHAs for tasks to be completed on this project. Health and safety-related information will be communicated to employees through meetings, postings, written communications, and reporting of hazards.

### **6.1 NEW HIRE HEALTH AND SAFETY ORIENTATION**

Tetra Tech requires all new employees to attend orientation training which includes a review and sign off on the Employee Handbook. This employee handbook is a general guide to various personnel policies including the Health and Safety Program and employee benefits of Tetra Tech. Each new hire is required to view a video that explains basic safety policies at Tetra Tech. Prior to working in the field on their own they are required to spend a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.

### **6.2 SITE-SPECIFIC SAFETY AND HEALTH TRAINING**

The FOL/SSO will provide site-specific training to Tetra Tech employees who will perform work on this project. In addition, a brief meeting will be held at the beginning of each day to discuss operations planned for that day and to review the appropriate AHAs with the planned task participants. Based on field activities, a short meeting may also be held at the end of the day to discuss the operations completed and any problems encountered. Site personnel will be required to sign the Site-Specific Training Documentation form.

### **6.3 HAZARD COMMUNICATION TRAINING**

In accordance with the OSHA Hazard Communication Standard (29 CFR 1920.1200 and 29 CFR 1926.59), copies of SDS for hazardous chemical materials that are used during site operations or that may be present on site will be available on site from the SSO. The SSO will conduct hazard communication (HAZCOM) training in accordance with 29 CFR 1920.1200 and 29 CFR 1926.59, Engineer Manual (EM) 385-1-1 (current version), and the HAZCOM program. Training will include, but is not be limited to, the hazards or potential hazards associated with work activities, and any hazardous chemical materials brought to on the site.

#### **6.4 FIRST AID AND CARDIO PULMONARY RESUSCITATION TRAINING**

The FOL/SSO will identify those individuals who have current first aid and cardiopulmonary resuscitation (CPR) training. At a minimum two people including the SSO will be current in first aid/CPR. The names of all first aid/CPR-qualified workers will be posted on the site bulletin board and will be added to this APP when the project starts.

#### **6.5 BLOODBORNE PATHOGENS TRAINING**

Individuals on site who have first aid and CPR certification and who may provide emergency medical treatment shall have completed training in accordance with the Tetra Tech Bloodborne Pathogens Program and OSHA Bloodborne Pathogen Standard, 29 CFR 1910.1030. The Hepatitis B Vaccine Declination (mandatory) (in the event of accidental needle stick or other exposure to blood during first aid, etc.) will be one of the topics covered in the site orientation training in accordance with 29 CFR 1910.1030.

#### **6.6 TRAINING DOCUMENTATION**

Attachment I (Site Specific Training Documentation) documents 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 identifies 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.

#### **6.7 PERIODIC SAFETY AND HEALTH TRAINING**

Tetra Tech supervisors and employees are required to maintain their training and certifications and participation in the medical surveillance program required for field work. This is accomplished throughout the year by attending classroom sessions, taking on-line instruction, participating in webinars, attending professional conferences and obtaining annual or bi-annual physical examinations. In addition to other corporate training Tetra Tech requires all employees to review and sign off on the Employee Handbook bi-annually which contains the Corporate Health and Safety Program.

#### **6.8 EMERGENCY RESPONSE TRAINING**

Tetra Tech personnel who are involved in emergency response activities are required to attend and maintain their certifications.

## **7.0 SAFETY AND HEALTH INSPECTIONS**

It is Tetra Tech's internal policy that the job sites involving work for NAVFAC are subject to audits by corporate safety staff.

### **7.1 SPECIFIC ASSIGNMENT OF RESPONSIBILITY FOR A MINIMUM DAILY JOB SITE SAFETY AND HEALTH INSPECTION DURING PERIODS OF WORK ACTIVITY**

The Tetra Tech FOL/SSO will conduct safety and health inspections during this field effort to ensure safe work areas and compliance with the APP.

#### **7.1.1 Proof of Inspector's Training/Qualifications**

See Section 4.2.2.4.

#### **7.1.2 Inspection Frequency**

Daily site safety inspections shall be conducted by the FOL/SSO.

#### **7.1.3 Documentation Procedures**

The FOL/SSO will record any deficiencies in the Field Log Book that is maintained onsite for the site practices.

#### **7.1.4 Deficiency Tracking System and Follow-up Procedures**

The items noted during field audits will be communicated to the Tetra Tech HSM who maintains a corrective/preventive action database. Responsibility for resolving each item noted during these audits is assigned and tracked through resolution.

Results from field audits are also regularly communicated throughout Tetra Tech through training and electronic means as a method of continuous program improvement. The FOL/SSO will follow up on deficiencies to ensure that they are resolved.

#### **7.1.5 External Inspections/Certifications**

The Tetra Tech HSM or a designated representative may conduct an unannounced inspection during this project.

## **8.0 ACCIDENT REPORTING**

When an incident occurs, the FOL/SSO will verbally notify the PM. If the incident is an injury requiring more than first aid or property damages exceeding \$2,000 the PM will immediately notify the RPM.

### **8.1 EXPOSURE DATA**

If required by the RPM, the FOL/SSO will calculate exposure data on a monthly basis. Man-hours worked are obtained from hours charged to a project for payroll purposes. Tetra Tech also collects the number of man-hours worked by subcontractors on project sites by reviewing daily production reports and recording the hours on those reports.

### **8.2 ACCIDENT INVESTIGATIONS, REPORTS, AND LOGS**

Accidents or incidents, as well as near-miss events, are to be reported within 24 hours by either completing the written event report form or using the Tetra Tech web-based incident reporting process. Within five working days, a complete investigation report must be submitted to the RPM.

Tetra Tech employees have been educated that prompt and accurate reporting of any incidents they encounter is one of their personal health and safety responsibilities. On this project, the FOL/SSO are responsible for assuring that the incidents and serious near miss events are reported via the Tetra Tech TOTAL incident reporting system. The HSM is responsible for assuring that the incidents and serious near-miss events are adequately investigated. The HSM is also responsible for collecting, tracking, and trending incident data (e.g., recordable cases, employee hours worked, etc.). Accidents involving near misses, injuries, or illnesses must be immediately reported to the PM and the HSM.

Hazardous work conditions or unsafe work practices will be corrected in a timely manner, both in the field and in the office. Upon discovery of an unsafe condition at a field site, the degree of hazard must be assessed. Action may range from complete shutdown of the operation to phased correction.

The Tetra Tech employees working on this project have "Stop Work" authority in the event that a potentially serious action or condition is observed. Tetra Tech will shut down a project during which life threatening, severe environmental impact, or significant equipment or property damage conditions may exist. Employees shall follow specific information for emergency evacuation and PPE usage as described in this APP.

### **8.3 IMMEDIATE NOTIFICATION OF MAJOR INCIDENTS**

Any occupational incidents meeting the definitions presented below that occur on this project will be immediately reported to the RPM as soon as possible, but not later than 24 hours from the time of the event. Incidents that must be reported include those that result in any of the following:

- Fatalities
- Permanent total disability
- Permanent partial disability
- Hospitalization of 3 or more people resulting from a single occurrence
- Property damage of \$200,000 or more

With consultation with the PHSO, the FOL will coordinate with the Tetra Tech PM in making any such notifications to the RPM.

### **8.4 INCIDENT REPORTING PROCEDURES**

Following the prescribed incident reporting procedure is necessary for documenting the information obtained at the time of the incident.

#### **8.4.1 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. Some examples of incidents are as follows:

- Work-related injury or illness
- Automobile or vehicle-related incidents
- Significant property or equipment damage
- An unplanned fire or explosion
- An unplanned spill or release (including air releases) to the environment

A near miss incident is described as an undesired event or workplace condition, which under slightly different circumstances had a reasonable probability of resulting in one of the outcomes described above. Some examples of near miss incidents are as follows:

- Tools falling from overhead work near workers below
- Unexpected contact without damage to aboveground or below ground utilities
- Discovery of an unknown and potentially hazardous material or anomaly

Incidents, including near-miss incidents, involving Tetra Tech personnel shall be reported and investigated. TOTAL is maintained on the secure Tetra Tech Intranet site at <https://my.tetrattech.com/>.

#### **8.4.2 How to Access TOTAL to Report an Incident**

Once on the “My Tetrattech” web site, TOTAL can be found under the “Health and Safety” tab, by clicking on “Incident Reporting.” Select “Report an Incident (TOTAL)” then, near the bottom of the screen, click on “Launch TOTAL Application.” This connects the user directly to TOTAL. Next, click on “Enter new incident”, and follow the steps as presented. The system was designed to be “fail safe” in that the user will not be able to skip any required information. TOTAL can also be accessed directly from the internet using the following web address: <http://totalhs.tetrattech.com/>.

**Note:** When accessing the system from 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 dependent upon outside factors such as connection speed, signal strength, etc. Enter the system using your network user name and password. The user name should be in the following format - TT\firstname.lastname.

If any Tetra Tech personnel are injured or develop an illness as a result of working onsite, and they are at a remote location where they cannot establish reliable internet connection with TOTAL to report an incident, then the employee will complete a hard-copy Tetra Tech “Incident Report Form.”

Tetra Tech’s Incident Reporting and Investigation Program requires that employees report all incidents as soon as possible, but within 24 hours. An initial report must be completed on TOTAL within that time frame.

Figure 8-1 is a print out of the screens found online in the TOTAL system. It can be used as a reference during the incident information gathering phase and prior to completing the form on line.

## **9.0 REQUIRED PLANS (PROGRAMS, PROCEDURES)**

The follow sections further describe the plans and/or identify the location of the information.

### **9.1 LAYOUT PLANS**

Temporary facilities will not be erected on this project.

### **9.2 EMERGENCY RESPONSE PLANS**

The emergency response agencies listed in the APP are capable of providing the most effective response, and as such, are designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. The Site Contacts will be notified if these response agencies are contacted.

#### **9.2.1 Procedures and Tests**

In the event of an emergency situation such as fire or explosion, the FOL/SSO will activate an air or vehicle horn for approximately 15 seconds, indicating the initiation of evacuation procedures. The personnel will evacuate and assemble in a predetermined safe area, as identified by the FOL/SSO.

Prior to start of work at any project site, the FOL/SSO will identify and mark the location of an evacuation assembly area for that project site. For efficient and safe site evacuation and assessment of the emergency situation, the FOL/SSO will have the authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The FOL/SSO must establish that access for emergency equipment is provided and that the equipment that may cause combustion has been shut down once the alarm has been sounded.

As soon as possible, and while the safety of the personnel is being confirmed, emergency agency notification will commence. The FOL/SSO will brief site personnel each day as to the location of the evacuation assembly area. Prior to the start of activities at the site, the FOL/SSO will establish safe egress routes from the site to the evacuation assembly area.

#### **9.2.2 Spill Plans**

It is not anticipated that bulk quantities of potentially hazardous materials (greater than 55-gallons) may be handled during the site activities.

### **9.2.2.1 Personnel Training and Spill Prevention**

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

### **9.2.2.2 Spill Control Plan**

This section describes the procedures Tetra Tech field crewmembers will employ upon the detection of a spill or leak of potentially contaminated material.

- Take immediate actions to stop the leak or to control the spill.
- Notify the FOL/SSO immediately.
- Avoid contacting container contents.
- The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for the cleanup.
- Spread the absorbent material in the area of the spill covering completely.
- If necessary, the spill area will be evacuated, isolated, and secured.

It is not anticipated that a spill will occur of such magnitude that the field crew cannot handle it. Should this occur, however, the FOL/SSO will notify appropriate emergency response agencies and the Site Contacts immediately.

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

- Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry)
- Absorbent pads
- 5-gallon buckets
- Shovels, rakes, and brooms
- Polyethylene sheeting

### **9.2.3 Firefighting Plan**

Workers will only fight incipient stage fires. There will be at least one 5- pound 10B:C fire extinguisher in each site vehicle. Fire extinguishers will also be located in each piece of mobile construction equipment and in the crew vehicles.

The fire extinguishers are intended to fight only fires that have recently occurred and can be reasonably extinguished immediately. Workers will only attempt to fight a fire that can be reasonably extinguished within 30 seconds to 1 minute. The fire extinguishers are only sufficient to fight small fires. Fire extinguishers will be inspected by the FOL/SSO on a monthly basis (at a minimum). Additionally, fire extinguishers will be inspected and serviced annually by a qualified professional. Any defective or partially used fire extinguisher will be red-tagged and taken out of service until such time that it can be serviced. Fire extinguishers will be secured or supported when transported and in storage.

At the conclusion of field activities, extinguishers will be handled/shipped/disposed safely in accordance with DOT regulations (that preclude shipping via air carrier). Smoking is allowed only in areas designated by the FOL/SSO.

#### **9.2.4 Posting of Emergency Telephone Numbers**

The list of emergency telephone numbers will be maintained at the telephone communications point in the site vehicle. See Figure 9-1.

#### **9.2.5 Man Overboard/Abandon Ship**

Not applicable.

#### **9.2.6 Medical Support (Onsite/Offsite)**

Tetra Tech will ensure that a minimum of two people have current certifications in CPR/AED, first aid, and bloodborne pathogens. Other than rendering basic CPR and first aid, these employees are not expected to perform emergency medical duties. However, they are authorized to perform emergency rescue or other duties up to the level of their training. Emergency medical assistance will be acquired. Life-threatening medical emergencies will be handled by the calling 9-1-1. Others will be referred to the closest hospital.

Tetra Tech personnel are instructed to perform a drive-by of the nearest hospital prior to commencing site activities to ensure that it is accessible and available and that the most efficient routes (primary and alternate) are well mapped. The map showing the route to the nearest hospital (Figure 9-2) will be used if minor medical services are required.

##### **9.2.6.1 Medical Data Sheet**

Each field team member, including visitors and subcontractors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet (see Figure 9-3). This shall be

provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention. Any pertinent information regarding allergies to medications or other special conditions should be documented. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

#### **9.2.6.2 WorkCare Incident Intervention Program**

The WorkCare Incident Intervention program is an injury and illness management tool that provides 24/7 immediate telephone access for Tetra Tech employees to access a WorkCare occupational medical provider. Their clinical staff of nurses and doctors will intervene on behalf of the Tetra Tech employee after a workplace injury and illness. The goal of the program is to help make sure the employee receives proper care with effective outcomes.

When this service is used within the first hour of an incident, known as the “golden hour,” the clinical team has the ability to guide the proper course of action so that medical evaluation and treatment are rendered appropriately. This early intervention service provides the right care, at the right time, in the proper setting.

At the time of a workplace injury or illness, the FOL/SSO calls the WorkCare toll free telephone number – **(888) 449-7787**. The FOL/SSO then provides information on the type of incident, possible cause, and the scope of the situation.

The WorkCare clinician will provide:

- An evaluation of the incident
- Direction on the appropriate course of action
- Consults with the employees treating physician to design a quality care treatment plan that meets the needs of the employee and employer.

### **9.3 SUBSTANCE ABUSE POLICY**

The Tetra Tech Substance Abuse policy prohibits the unlawful manufacture, distribution, dispensation, possession, or use of alcohol, illegal drugs or intoxicants on any Company-owned or leased space, client facility, or work site. Use of these substances, regardless of whether it is determined that such use occurred during the work hours or at a company work location, or whether such use actually affected an employee’s ability to perform his or her job, is a violation of this policy.

In order to enforce this policy, the Company may investigate potential violations and require personnel to undergo drug/alcohol screening, including urinalysis, blood tests or other appropriate tests. The Company may also conduct searches of all areas of the Company premises, including, but not limited to work areas, rest rooms, break areas, personal articles, employee's clothes, desks, work stations, lockers, and personal and Company-owned vehicles.

Violation of this policy or any of its provisions may result in disciplinary action up to and including termination of employment. Employees may be subject to discipline up to and including termination for refusing to cooperate with searches or investigations, refusing to submit to screening, or failing to execute consent forms when required by supervisors.

Employees who are convicted of any criminal drug statute for a violation occurring in the workplace are required to notify their Human Resources Representative no later than five days after the conviction. It shall also be the responsibility of each employee who observes or has knowledge of another employee in a condition which impairs the employee to perform his or her job duties or who presents a hazard to the safety and welfare of others to promptly report that fact to his or her immediate supervisor.

#### **9.4 SITE SANITATION PLAN**

Housekeeping is an important issue at each work site. The work sites shall be kept as clean as possible during task operation, taking into consideration the nature of the work. The FOL/SSO is responsible to ensure that housekeeping occurs on a continuous basis.

Drinking water is provided for each site worker. An adequate supply of cool potable water is provided at the sites for both drinking and personal cleansing. Public accessible toilets will be utilized while on site. The work conducted under this task order will be by mobile crews at normally unattended locations. Transportation is readily available to nearby toilet and/or washing facilities. Showers, changing rooms, clothes drying facilities and food service are available near the site. Heavy duty plastic trash bags will be used to collect waste. Waste receptacles will be provided on site as needed.

#### **9.5 ACCESS AND HAUL ROAD PLAN**

Not applicable.

#### **9.6 RESPIRATORY PROTECTION PLAN**

Not applicable.

## 9.7 HEALTH HAZARD CONTROL PLAN

Primary contaminants of concern (COCs) in groundwater for Site 6 include naphthalene, total petroleum hydrocarbons (TPH), and vinyl chloride. Additional contaminants observed at concentrations greater than their respective Tier 1 TRGs during the most recent long term monitoring event include 1,1 dichloroethane and chloroethane. The other detected contaminants were at concentrations below Federal drinking water standards. From a worst case scenario, vinyl chloride is the only contaminant of concern (COC) that could potentially reach concentrations that meet or slightly exceed the current Occupational Exposure Limits (OEL). These results for VOCs are summarized in Table 9-1.

**TABLE 9-1  
COMPARISON OF VOC WORST-CASE AIR CONCENTRATIONS  
WITH CURRENT OCCUPATIONAL EXPOSURE LIMITS**

| COC                | Highest Concentration Previously Detected in Groundwater ( $\mu\text{L}$ ) | Worst-Case Air Concentration That Could Be Encountered (ppm) | Current OEL   |
|--------------------|--|--|---|
| Chloroethane       | 31   | 5.33   | ACGIH: 100 ppm, TWA <sub>8</sub><br>Skin                  |
| 1,1 Dichloroethane | 48.6   | 2.76   | ACGIH: 100 ppm TWA <sub>8</sub>                           |
| Vinyl Chloride     | 17.7   | 7.87   | ACGIH: 1 ppm TWA <sub>8</sub><br>OSHA: 5 ppm STEL<br>Skin |

**Table Notes:**

TWA<sub>8</sub>: Average air concentration over an 8-hour work period that is not to be exceeded

ACGIH STEL: Concentration in air that is not be exceeded for more than 15 minutes more than 4 times per day

Skin: Danger of cutaneous absorption

As indicated in this table, from a worst-case scenario, concentrations immediately above a captured air phase above contaminated groundwater (such as in the head space of a monitoring well) could reach concentrations that exceed permissible limits. In regarding the results of this data evaluation, it is important to recognize the following:

- the planned work area is outdoors, with ample natural ventilation that will reduce any airborne VOCs through dilution and dispersion,
- the groundwater value used in this evaluation was the *highest* concentration detected during the most recent groundwater monitoring events,

As a result of these factors, it is very unlikely that workers participating in this activity will encounter any airborne concentrations of any of the COCs that would represent an occupational exposure concern. To monitor this route, real-time direct reading monitoring instruments will be used (as described in

Section 9.3.3.9). This will be performed during the intrusive tasks of groundwater sampling and IDW management activities, as these tasks are the most likely to involve encountering/releasing any VOCs into the air phase.

### **9.7.1 Signs and Symptoms of Exposure**

The signs and symptoms of exposure for these substances are summarized below:

#### **9.7.1.1 SVOCs/Volatile Organic Compounds (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/SVOCs 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 heartbeat. Permanent nervous system damage and/or liver injury have resulted from severe overexposure.

#### **9.7.1.2 Vinyl Chloride**

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. People are more likely to develop these changes if they breathe high levels of vinyl chloride. Some people who work with vinyl chloride have nerve damage and develop immune reactions. The lowest levels that produce liver changes, nerve damage, and immune reaction in people are not known. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow in their hands. Their fingers turn white and hurt when they go into the cold.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

Animal studies have shown that long-term exposure to vinyl chloride can damage the sperm and testes.

The U.S. Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, lung cancer, and some cancers of the blood have also been observed in workers.

### **9.7.1.3 Total Petroleum Hydrocarbons**

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 of the 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. Animal studies have shown effects on the lungs, central nervous system, liver, and kidney from exposure to TPH compounds. Some TPH compounds have also been shown to affect reproduction and the developing fetus in animals.

## **9.7.2 Potential Exposure Routes**

### **9.7.2.1 Inhalation**

It is considered unlikely that workers would encounter airborne concentrations that would represent an inhalation exposure concern due to the facts that the planned activity is minimally intrusive and the potential to disrupt or potential contaminated soils is unlikely.

### **9.7.2.2 Ingestion and Skin Contact:**

Potential exposure concerns to these constituents may also occur through ingesting or coming into direct skin contact with contaminated soils. However the likelihood of worker exposure through these two routes is also considered very unlikely, provided that workers follow good personal hygiene practices. Exposure through skin contact and ingestion can be minimized, if not eliminated, through the use of PPE and good hygiene practices. 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 surgeon's-style gloves whenever handling potentially-contaminated media, including soils, hand tools, and sample containers.

## **9.8 HAZARD COMMUNICATION PROGRAM**

Site operations will be compliant with the provisions of the OSHA Hazard Communication 29 CFR 1910.1200(f) Standard. OSHA recently revised its Hazard Communication Standard to align with the United Nations' Global Harmonized System of Classification and Labeling of Chemicals. Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDS) formerly known as Material Safety Data Sheets (MSDSs). To help companies comply with the revised standard OSHA is phasing in the specific requirements over several years ending September 1, 2016. Site personnel are aware of these changes and will process this information accordingly.

### **9.8.1 Safety Data Sheets**

Tetra Tech personnel will provide SDSs for chemicals brought onsite. The contents of these documents will be reviewed by the FOL/SSO with the user(s) of the chemical substances prior to any actual use or application of the substances onsite. The SDS will then be included in Attachment II and will be available for anyone to review upon request.

### **9.8.2 Chemical Inventory**

The FOL/SSO is responsible to develop and maintain an accurate chemical inventory list for the chemicals that will be used and stored at that workplace.

### **9.8.3 Container Labeling**

When a chemical is brought onsite, the FOL/SSO is responsible for its receipt will verify that the container is properly labeled with the following information:

- Name of the chemical substance
- Appropriate hazard warning
- Name and address of the chemical manufacturer

New OSHA labeling regulations, which are gradually coming into effect now and will be mandatory by 2015, will require the following information on labels:

- Name, Address and Telephone Number
- Product Identifier
- Signal Word
- Hazard Statement
- Precautionary Statement(s)
- Pictograms

While these regulations are not currently mandatory some companies have already started to implement these changes.

### **9.8.4 Training**

Any new chemicals brought onsite that may present new hazards may require additional training. The FOL/SSO will ensure that the appropriate training is conducted for the site personnel required to use the chemical.

## **9.9 PROCESS SAFETY MANAGEMENT PLAN**

Not applicable

## **9.10 LEAD ABATEMENT PLAN**

Not applicable

**9.11 ASBESTOS ABATEMENT PLAN**

Not applicable

**9.12 RADIATION SAFETY PROGRAM**

Not applicable

**9.13 ABRASIVE BLASTING**

Not applicable

**9.14 HEAT/COLD STRESS MONITORING PLAN**

It is necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent heat and cold stress. While it is unlikely, if such conditions are encountered use the following information on heat and cold stress recognition, prevention and control.

Ambient temperature extremes (hot or cold working environments) may occur during performance of this work depending on the project schedule. Work performed when ambient air temperatures are below 50 degrees Fahrenheit (°F) may result in varying levels of cold stress (frost nip, frost bite, and/or hypothermia) depending on environmental factors such as temperature, wind speed, and humidity; physiological factors such as metabolic rate and moisture content of the skin; and other factors such as work load and the protective clothing being worn. Work performed when ambient temperatures exceed 70°F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on factors similar to those presented above for cold stress.

In either case, these conditions can be debilitating and, when extreme, they can be fatal. An understanding of the importance in preventing heat/cold stress, coupled with the worker's awareness of the signs and symptoms of overexposure, can significantly reduce the potential for adverse health effects. If this hazard is present during site operations, each worker will be provided with information necessary to protect themselves, and site management will be instructed to permit frequent breaks in mild temperature rest areas having hot/cold fluids available for consumption. When site personnel are required to wear semi-permeable (Saranex, Tyvek) or impermeable protective clothing to perform their assigned tasks and ambient temperatures are 70°F or higher, biological monitoring may be performed and data compared to the most recent recommendations of the American Conference of Governmental Industrial Hygienists (ACGIH).

## **9.14.1 Heat Related Disorders**

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

### **9.14.1.1 Heat Rash**

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

#### **9.14.1.1.1 Signs and Symptoms**

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

### **9.14.1.2 Heat Cramps**

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

#### **9.14.1.2.1 Signs and Symptoms**

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

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

### **9.14.1.3 Heat Exhaustion**

Heat exhaustion is a more severe response to salt and water loss, as well as an initial disturbance in the body's heat-regulations system. Like heat cramps, heat exhaustion tends to occur in people working in

hot environments. Heat exhaustion may progress to heat stroke. Treatment for heat exhaustion is similar in principle to that for heat cramps.

#### 9.14.1.3.1 Signs and Symptoms

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

#### **9.14.1.4 Heat Stroke**

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

#### 9.14.1.4.1 Signs and Symptoms

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

#### **9.14.1.5 Controlling Heat Stress**

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

- Inform affected workers of the signs and symptoms of heat stress and encourage co-worker observations.
- Schedule tasks that are physically-demanding in early morning and late afternoon timeframes when heavy loads would be less of an issue.
- Notify the FOL/SSO who may perform biological monitoring to determine the extent of the heat related condition.
- The FOL/SSO may alter the work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- The FOL/SSO may also recommend cooling devices such as vortex tubes or cooling vests be worn beneath protective garments.
- When conditions where heat related disorders may be experienced, the FOL/SSO through site-specific training and safety briefing will inform site personnel of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.
- Provide adequate liquids to replace lost body fluids.
- Personnel must replace water and salt lost from sweating.
- Personnel must be encouraged to drink more than the amount required to satisfy thirst.
- Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Approximately 1 cup of cool water every 20 minutes is recommended.
- Replacement fluids can be commercial mixes such as Gatorade®.
- Move affected persons into a shaded cool rest area (below 77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- One of the following biological monitoring procedures may be utilized by the FOL/SSO to monitor heat stress concerns.
- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute.
- If the HR is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of rest period stays the same.
- If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.
- The length of the initial work period will be determined by using the table below.

**TABLE 9-2**  
**PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES**

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

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

**NOTE:** External temperatures in excess of those stated above shall be regarded as inclement weather.

#### 9.14.1.5.1 Temperature Extremes – Heat Stress Indication

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

- Watch for signs of heat stress/exhaustion, see Table 9-3.
- Provide fluid replacement.
- Provide adequate number of breaks within a cooler environment.

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

- Wear a hat that shades the face, neck, and ears.
- Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot.

- Plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 AM and 4 PM and can damage your skin even on hazy days. Portable canopies over the sample station are an example of this.
- Wear wrap-around sunglasses to protect the eyes and delicate skin around them.

**TABLE 9-3**

**HEAT STRAIN SYMPTOMS**  
**Stop work if any worker demonstrates any of the following:**

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

Individuals may be at greater risk of heat stress when:

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

9.14.1.5.2 First Aid for Heat Stroke

Take the following steps to treat a worker with heat stroke:

- Call 9-1-1 and then notify FOL/SSO.
- Move the affected individual to a cool shaded area.
- Cool the worker using methods such as:
  - Soaking their clothes with water.
  - Spraying, sponging, or showering them with water.
  - Fanning their body.

9.14.1.5.3 First Aid for Heat Exhaustion

Treat victim suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.

- Have them take a cool shower, bath, or sponge bath.

#### 9.14.1.5.4 First Aid for Heat Cramps

Individuals with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear water, juice or a sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
  - The person has heart problems.
  - The person is on a low-sodium diet.
  - The cramps do not subside within one hour.

#### 9.14.1.5.5 First Aid for Heat Rash

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

### 9.14.2 Cold Stress Related Disorders

Just as heat can present a problem for on-site personnel during certain activities, so can cold temperatures. Just as the heat related disorders are magnified by environmental conditions and the tasks to be completed, so are the cold related disorders. As above, the focus is on recognizing conditions contributing to cold related disorders and selecting the most appropriate control measure.

The ACGIH cold stress Threshold Limit Values (TLVs) are recommended to protect workers from the severest effects of cold stress (hypothermia) and cold injury and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects. The TLV objective is to prevent the deep body temperature from falling below 36 °C or (96.8°F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body determined by conventional methods for rectal temperature measurements). For a single, occasional exposure to a cold environment, a drop in core temperature to no lower than 3 °C (9 °F)

should be permitted. In addition to provisions for total body protection, the TLV objective is to protect all parts of the body with emphasis on hands, feet, and head from cold injury.

Fatal exposures to cold among workers have almost always resulted from accidental exposures involving failure to escape from low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body. The clinical presentations of victims of hypothermia are shown in Table 9-4. Workers should be protected from exposure to cold so that the deep core temperature does not fall below 36°C (96.8°F); lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences.

**TABLE 9-4**  
**PROGRESSIVE CLINICAL PRESENTATIONS OF HYPOTHERMIA\***

| Core Temperature |      | Clinical Signs   |
|------------------|------|--|
| °C               | °F   |  |
| 37.6             | 99.6 | "Normal" rectal temperature  |
| 37               | 98.6 | "Normal" oral temperature  |
| 36               | 96.8 | Metabolic rate increases in an attempt to compensate for heat loss   |
| 35               | 95.0 | Maximum shivering  |
| 34               | 93.2 | Victim conscious and responsive, with normal blood pressure  |
| 33               | 91.4 | Severe hypothermia below this temperature  |
| 32               | 89.6 | Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated but react to light; shivering ceases                   |
| 31               | 87.8 |  |
| 30               | 86.0 | Progressive loss of consciousness; muscular rigidity increases; pulse and blood pressure difficult to obtain; respiratory rate decreases |
| 29               | 84.2 |  |
| 28               | 82.4 | Ventricular fibrillation possible with myocardial irritability   |
| 27               | 80.6 | Voluntary motion ceases; pupils nonreactive to light; deep tendon and superficial reflexes absent  |
| 26               | 78.8 | Victim seldom conscious  |
| 25               | 77.0 | Ventricular fibrillation may occur spontaneously   |
| 24               | 75.2 | Pulmonary edema  |
| 22               | 71.6 | Maximum risk of ventricular fibrillation   |
| 21               | 69.8 |  |
| 20               | 68.0 | Cardiac standstill   |
| 18               | 64.4 | Lowest accidental hypothermia victim to recover  |
| 17               | 62.6 | Isoelectric electroencephalogram   |
| 9                | 48.2 | Lowest artificially cooled hypothermia patient to recover  |

\* Presentations approximately related to core temperature. Reprinted from the American Family Physician, published by the American Academy of Family Physicians.

#### 9.14.2.1 Signs and Symptoms

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering occurs when the body temperature has fallen to 35°C (95°F). This must be taken as a sign of danger and exposure to cold should be immediately terminated when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

### **9.14.2.2 Control Measures**

Since prolonged exposure to cold air or to immersion in cold water, at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided.

- Adequate insulating dry clothing to maintain core temperatures above 36°C (96.8°F) must be provided to workers if work is performed in air temperatures below 4°C (40°F).
- Wind chill cooling rate and the cooling power of air are critical factors. [Wind chill cooling rate is defined as heat loss from a body expressed in watts per meter squared which is a function of the air temperature and wind velocity upon the exposed body.]
- The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- An equivalent chill temperature chart relating the actual dry bulb air temperature and the wind velocity is presented in Table 9-5.
- The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep body core temperature.
- Unless there are unusual or extenuating circumstances, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia.
- Older workers or workers with circulatory problems require special precautionary protection against cold injury.
  - The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions which should be considered.
  - The precautionary actions to be taken will depend upon the physical condition of the worker and should be determined with the advice of a physician with knowledge of the cold stress factors and the medical condition of the worker.
- Acclimatization – With exposure the body does undergo changes that will permit it to adjust to the cold weather better.

**TABLE 9-5**

**COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE  
(under calm conditions)\***

| Estimated Wind Speed<br>(in mph)                                | Actual Temperature Reading (°F)  |    |    |     |   |     |     |     |   |      |      |      |
|---|--|----|----|-----|---|-----|-----|-----|---|------|------|------|
|   | 50   | 40 | 30 | 20  | 10  | 0   | -10 | -20 | -30   | -40  | -50  | -60  |
|   | Equivalent Temperature (°F)  |    |    |     |   |     |     |     |   |      |      |      |
| Calm  | 50   | 40 | 30 | 20  | 10  | 0   | -10 | -20 | -30   | -40  | -50  | -60  |
| 5   | 48   | 37 | 27 | 16  | 6   | -5  | -15 | -26 | -36   | -47  | -57  | -68  |
| 10  | 40   | 28 | 16 | 4   | -9  | -24 | -33 | -46 | -58   | -70  | -83  | -95  |
| 15  | 36   | 22 | 9  | -5  | -18   | -32 | -45 | -58 | -72   | -85  | -99  | -112 |
| 20  | 32   | 18 | 4  | -10 | -25   | -39 | -53 | -67 | -82   | -96  | -110 | -121 |
| 25  | 30   | 16 | 0  | -15 | -29   | -44 | -59 | -74 | -88   | -104 | -118 | -133 |
| 30  | 28   | 13 | -2 | -18 | -33   | -48 | -63 | -79 | -94   | -109 | -125 | -140 |
| 35  | 27   | 11 | -4 | -20 | -35   | -51 | -67 | -82 | -98   | -113 | -129 | -145 |
| 40  | 26   | 10 | -6 | -21 | -37   | -53 | -69 | -85 | -100  | -116 | -132 | -148 |
| (Wind speeds greater than 40 mph have little additional effect) | LITTLE DANGER<br>In < hr with dry skin.<br>Maximum danger of false sense of security |    |    |     | INCREASING DANGER<br>Danger from freezing of exposed flesh within one minute. |     |     |     | GREAT DANGER<br>Flesh may freeze within 30 seconds. |      |      |      |

Trench foot and immersion foot may occur at any point on this chart.

- Dehydration – Water and salt loss magnifies conditions associated with hypothermia. Warm, sweet nonalcoholic fluids should be employed for fluid replacement. Soup, non-caffeinated drinks including decaffeinated teas, coffees, etc. are suitable for this purpose.
- Diet – A balanced diet can provide the body with the necessary nutrients to aid in combating cold stress. Restrictive diets avoiding salts, carbohydrates, etc. may rob you of certain elements that you need. Caffeine and alcoholic drinks may increase the effects of a cold environment through the loss of water and salts.
- Engineering Controls such as wind shields/barriers may be used to control the potential effects of cold stress.
- Administrative controls such as worker rotation; work/warm regimens; required fluid intake; scheduling the work for warmer weather; assigning more workers to the task to complete it quicker.
- Overall physical condition should always be considered when combating cold stress.
  - Older persons and those on certain medications (blood pressure control) are vulnerable to cold environment and cold stress disorders.
- Environmental monitoring results will tell you if the conditions are such that cold related disorders can occur.
  - Biological monitoring will provide real time information as to the progression of the cold related disorders within your field crew.

#### **9.14.2.3 Monitoring**

- Core temperature
  - Ensure that it does not drop below 96.8°F
- Weight Loss
  - Monitoring weight loss may be indicative of water and salt loss through dehydration.
  - >2% changes in body weight are indicative of water loss.
- Visual observation of signs and symptoms of overexposure.

#### **9.14.2.4 Special Conditions - Evaluation and Control**

For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent chill temperature of -32°C (-25.6°F). Superficial or deep local tissue freezing will occur only at temperatures below -1°C (30.2°F) regardless of wind speed.

At air temperatures of 2°C (35.6°F) or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

TLVs recommended for properly clothed workers for periods of work at temperatures below freezing are shown in Table 9-6.

Special protection of the hands is required to maintain manual dexterity for the prevention of accidents:

- If fine work is to be performed with bare hands for more than 10-20 minutes in an environment below 16°C (60.8°F), special provisions should be established for keeping the workers' hands warm.
- For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized.

Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below -1°C (30.2°F).

- If the air temperature falls below 16°C (60.8°F) for sedentary, 4°C (39.2°F) for light, -7°C (19.4°F) for moderate work and fine manual dexterity is not required, then gloves should be used by the workers.
- To prevent contact frostbite, the workers should wear anti-contact gloves.
- When cold surfaces below -7°C (19.4°F) are within reach, a warning should be given to each worker by the supervisor to prevent inadvertent contact by bare skin.
- Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.
- Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). The workers should wear cold protective clothing appropriate for the level of cold and physical activity:
- If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water.
- With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted.
- The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layers of sweat.

**TABLE 9-6**

**THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT\***

| Air Temperature - Sunny Sky |              | No Noticeable Wind              |               | 5 mph Wind                      |               | 10 mph Wind                     |               | 15 mph Wind                     |               | 20 mph Wind                     |               |
|-----------------------------|--------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|---------------|
| °C (approx)                 | °F (approx)  | Max. Work Period                | No. of Breaks |
| -26° to -28°                | -15° to -19° | (Norm Breaks)                   | 1             | (Norm Breaks)                   | 1             | 75 min                          | 2             | 55 min                          | 3             | 40 min                          | 4             |
| -29° to -31°                | -20° to -24° | (Norm Breaks)                   | 1             | 75 min                          | 2             | 55 min                          | 3             | 40 min                          | 4             | 30 min                          | 5             |
| -32° to -34°                | -25° to -29° | 75 min                          | 2             | 55 min                          | 3             | 40 min                          | 4             | 30 min                          | 5             | Non-emergency work should cease |               |
| -35° to -37°                | -30° to -34° | 55 min                          | 3             | 40 min                          | 2             | 30 min                          | 5             | Non-emergency work should cease |               |                                 |               |
| -38° to -39°                | -35° to -39° | 40 min                          | 4             | 30 min                          | 1             | Non-emergency work should cease |               | Non-emergency work should cease |               |                                 |               |
| -40° to -42°                | -40° to -44° | 30 min                          | 5             | Non-emergency work should cease |               | Non-emergency work should cease |               | Non-emergency work should cease |               |                                 |               |
| -43° & below                | -45° & below | Non-emergency work should cease |               |

**NOTES:**

- Schedule applies to moderate to heavy work activity with warm-up breaks of 10 minutes in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at 35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
- The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
- If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: (1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 W/M<sup>2</sup>; (2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m<sup>2</sup>. In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.
- TLVs apply only for workers in dry clothing.

\* Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

- If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating.
- If clothing is wet, the employee should change into dry clothes before entering the cold area.
- The workers should change socks and any removable felt insoles at regular daily intervals or use vapor barrier boots.
- The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
- If exposed areas of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should be supplied in auxiliary heated versions.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

#### **9.14.2.5 Work - Warming Regimen**

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below -7°C (19.4°F), heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The workers should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation or a change of dry work clothing provided. A change of dry work clothing should be provided as necessary to prevent workers from returning to work with wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effects.

For work practices at or below -12°C (10.4°F) ECT, the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods should be taken in heated shelters and opportunity for changing into dry clothing should be provided.

- New employees should not be required to work full time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized.
- Unprotected metal chair seats should not be used.
- The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures.
- The training program should include as a minimum instruction in:
  - Proper rewarming procedures and appropriate first aid treatment.
  - Proper clothing practices.
  - Proper eating and drinking habits.
  - Recognition of impending frostbite.
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
  - Safe work practices.

**Note:** This information has been adopted from the 2010-1011 "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Indices" by the American Conference of Governmental Industrial Hygienists (ACGIH).

As conditions may vary, it will be at the discretion of the Field Operations Leader and the Site Safety Officer to temporarily suspend or terminate activities as conditions dictate. All site activities will be terminated in the advent of electrical storms, tornadoes, and other hazardous weather conditions.

#### **9.15 CRYSTALLINE SILICA MONITORING PLAN**

Not applicable.

#### **9.16 NIGHT OPERATIONS LIGHTING PLAN**

Not applicable.

**9.17 FIRE PREVENTION PLAN**

Combustible materials will be protected from heat, flames, and sparks by moving or covering them. Flammables will be kept in closed containers. Safety cans will be used, when required. The site workers have training on the use of portable fire extinguishers. Each site vehicle has at least a 5-lb dry chemical, ABC fire extinguisher.

**9.18 WILD LAND FIRE MANAGEMENT PLAN**

Not applicable.

**9.19 HAZARDOUS ENERGY CONTROL PLAN**

Not applicable.

**9.20 CRITICAL LIFT PLAN**

Not applicable.

**9.21 CONTINGENCY PLAN FOR SEVERE WEATHER**

The FOL/SSO will monitor the weather forecast daily. In preparation for an approaching storm, all equipment will be secured, and all doors and windows of the equipment will be closed. All tools and supplies will be stored in a designated secure location.

The National Weather Service Mobile broadcasts continuous weather information on station KEC-61 162.550 megahertz.

**9.22 FLOAT PLAN**

Not applicable.

**9.23 SITE-SPECIFIC FALL PROTECTION & PREVENTION PLAN**

Not applicable.

**9.24 DEMOLITION PLAN**

Not applicable.

**9.25 EXCAVATION/TRENCHING PLAN**

Not applicable.

**9.26 EMERGENCY RESCUE (TUNNELING)**

Not applicable.

**9.27 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN**

Not applicable.

**9.28 COMPRESSED AIR PLAN**

Not applicable.

**9.29 FORMWORK AND SHORING ERECTION AND REMOVAL PLANS**

Not applicable.

**9.30 PRECAST CONCRETE PLAN**

Not applicable.

**9.31 LIFT SLAB PLANS**

Not applicable.

**9.32 STEEL ERECTION PLAN**

Not applicable.

**9.33 SITE SAFETY AND HEALTH PLAN FOR HTRW WORK**

This Site Safety and Health Plan (SSHP) establish policies and procedures to protect workers and the public from the potential hazards posed during field operations at the NCBC. It was developed using historical site background information regarding known or suspected chemical contaminants, information obtained on previous site visits, and knowledge of potential physical hazards that may be associated with the proposed work at the site.

This SSHP will be modified, as necessary, if new information becomes available, and changes will be made with the approval of the Tetra Tech FOL/SSO and the HSM. Requests for modifications to the SSHP should be directed to the FOL/SSO. The FOL/SSO will notify the HSM, who will then notify affected personnel of the changes.

### **9.33.1 Site Description and Contamination Characterization**

See Section 2.5 Location for the site description and Section 9.7 Health Hazard Control Plan for the Contamination Characterization.

### **9.33.2 Hazard/Risk Analysis**

The potential hazards associated with the site activities also include physical, chemical, natural hazards. The potential for encountering various hazards will depend on the work being conducted, the location of that work, and the time of year. Specific hazards are discussed below. There are also environmental hazards associated with the physical location of the site (such as vehicular traffic) and weather conditions such as heat, noise, and flora and fauna contact.

### **9.33.3 Classic Safety**

In the site hazard assessment, preliminary site-specific hazards will be identified through the AHAs generated during development of the SSHP to determine the appropriate safety and health procedures needed to protect workers from the identified physical, natural, chemical, and natural hazards. This section is intended to provide information on some of the most commonly encountered hazards associated with the tasks anticipated at the NCBC. This section will also reference some of the common safe work practices, PPE, and administrative controls generally used to mitigate potential hazards. Some of these hazards can be regarded as most severe or as more commonly-encountered in remedial activities such as these, and are further addressed in the following subsections.

#### **9.33.3.1 Slips, Trips, and Falls**

Planned activities associated with hazardous waste operations/construction operations will bring field personnel into areas where potential slip, trip, and fall hazards. These hazards may include the following:

- Uneven terrain due to excavation
- Plastic protective covers (e.g., associated with temporary decontamination pads)
- Work place clutter (e.g., tangled hoses)

Hazards of this nature and the potential consequences of injury from a slip, trip or fall are magnified when personnel are maneuvering and carrying equipment on these work sites. Control measures may include the following:

- Selecting the best approach routes to work areas and locations, keeping in mind that these may not be the shortest routes
- Where necessary, using rope ladders and associated mechanisms to aid in ascent and descent
- Applying traction grit such as sand over slippery surfaces
- Maintaining good housekeeping practices.

The FOL/SSO will evaluate all walking/working surfaces to ensure these comply with the objectives stipulated in 29 CFR 1926 Subparts C – General Safety and Health; G – Signs, Signals and Barricades; Subpart L – Scaffolds; Subpart M – Fall Protection; and Subpart X – Stairways and Ladders. Requisite strength, heights and widths, and fall protection will be evaluated.

#### **9.33.3.2 *Head and Back Injuries***

At a minimum, workers will don safety shoes/boots and safety glasses prior to performing any investigation activities. Hard hats will be worn when overhead hazards are present or heavy machinery (e.g., direct-push rigs, drill rigs) is in use. This will prevent minor injuries caused by bumping one's head while working around and under equipment and vegetation. Personnel are instructed in proper lifting techniques and will not lift heavy items without assistance. Each worker will not lift more than 50 pounds. Objects heavier than 50 pounds, and those with uneven weight distribution, may require assistance from another person. Supervisors will use mechanical lifting equipment whenever possible to minimize worker exposure to lifting hazards.

#### **9.33.3.3 *Falling Objects***

The items raised will be slowly lowered to the ground using a grapple and/or skip bucket. No personnel will work under equipment at any time. Also, the supervisor will verify that an adequate area is clear of personnel while the equipment is in operation.

#### **9.33.3.4 Heavy or Awkward Lifting**

Hazards associated with heavy or awkward lifting become more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions will be used to minimize hazards of this nature:

- Use machinery, lifting assist devices (two wheeled carts or dollies), or multiple personnel for heavy lifts, where possible.
- Use proper lifting techniques.
- Plan your lifts
- Place heavy items on shelves between the waist and chest and lighter items on higher shelves.
- If the load must be carried to another location, plan and inspect the route to ensure that slipping/tripping hazards are absent.
- Stretch and limber muscles prior to and after extended periods/frequent lifts.
- “Test” the lift, i.e., before attempting to fully lift or move an object, give the object a “nudge” to assess its approximate weight and your ability to safely lift and move it without injury.
- If you are unsure that you can complete the lift without hurting yourself, either get a lifting aid (such as a dolly or mechanical hoist), get help from others, or both.
- Move as close to the load as possible, and ensure that good hand holds are obtainable. Wear gloves where necessary to improve hand holds.
- Lift with your legs not your back, bend your knees and avoid turning and twisting when lifting, carrying, or depositing loads.
- Break lifts into steps if the vertical distance from the starting point to the placement of the lift is excessive.
- Periods of high-frequency lifts or extended-duration lifts should include sufficient breaks to guard against fatigue and injury.
- Assess the area available to maneuver the lift.
- Rearrange the area, remove clutter, and minimize the necessity of twisting and turning.
- Evaluate area of the lift.
- Conditions of the walking/working surfaces where the lift will occur, over the planned path of travel, and at the location the load will be deposited.
- Conditions such as poor housekeeping/clutter, slippery surfaces, and rough or uneven terrain may magnify the potential for injury during a lift.
- Your overall physical condition
- Report previous injuries on your Medical Data Sheet.

- DO NOT attempt to lift items that will put you at risk.
- Break loads that you must carry into smaller manageable loads, and get assistance whenever significant lifting tasks are involved.

By evaluating applicable contributing factors, planning your lifts, and incorporating feasible control measures, the potential for injury associated with lifting can be minimized.

#### **9.33.3.5 Noise**

Site activities will not expose site personnel to equipment or conditions exceeding occupational noise exposure limit action levels. However, if abnormal conditions exist and site personnel are exposed to noise equal to or exceeding the OSHA 8-hour Time-Weighted Average sound level [85 decibels adjusted (dBA)] the FOL/SSO will ensure the following measures are employed:

- Effective use of hearing protection will be implemented by personnel working near the excessive noise sources.
- Site workers will evacuate to a safe area until the noise subsides
- Engineering and/or administrative controls may be used to reduce employee exposures to noise.

Workers on site will be informed to observe the “noise rule of thumb” on this project, described as follows:

- If a worker must raise his/her voice to be heard by someone standing next to him/her (within 2 feet), noise levels may be exceeding 85 dBA and hearing protection will be required.

#### **9.33.4 Natural Hazards**

Natural hazards may be encountered on site. Workers should anticipate the increased likelihood of encountering these hazards. Insect stings can cause localized swelling, itching, and minor pain that can be handled by first aid treatment. In sensitized individuals, however, effects can be more serious such as anaphylactic shock, which can lead to severe reactions in the circulatory, respiratory, and central nervous system and, in some cases, even death. The FOL/SSO will identify personnel with a known reaction to bites and stings at the pre job safety orientation meeting. Personnel will not attempt to capture or feed any wild or semi wild animals such as cats, rats, or ground squirrels due to the possibility of a bite or parasitic infestation. Animal and bird droppings often contain mold, fungus, or bacteria that represent a significant respiratory hazard, including lung diseases and allergies. Personnel will not touch visual droppings.

#### **9.33.4.1 Insects**

Insects, including bees, wasps, hornets, spiders and ticks, may be present at this site making the chance of a bite or sting very possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition; any individuals who have been bitten or stung by an insect will notify the SSO. Field personnel who may have insect allergies will provide this information to the SSO prior to commencing work, and will have allergy medication on site. The following is a list of preventive measures: Apply insect repellent prior to fieldwork and as often as needed throughout the work shift. Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips), and apply the permethrin repellent spray to field clothing. Note: Allow the permethrin to dry before using the treated clothing. Wear proper protective clothing (work boots, socks and pants). When walking in vegetated areas, avoid contact with bushes, tall grass, or brush as much as possible.

Mild insect stings or bites should be treated by applying a baking soda paste or ice wrapped in a wet cloth. Bee stingers should be gently scraped off the skin, working from the side of the stinger. The suction device in commercially available snake bite kits can also be used to remove the stinger. If insect bites become red or inflamed or symptoms such as nausea, dizziness, shortness of breath, etc., appear, medical care will be sought immediately. Immediate medical care is essential for persons who are allergic to insect bites/stings. If an allergic person receives spider bite or insect bite/sting, seek immediate medical attention, keep the victim calm, and check vital signs frequently. Rescue breathing should be given, if necessary, to supply oxygen to the victim.

#### **9.33.4.2 Spiders**

Various spiders may be encountered at the NCBC; however, two spiders are potentially in the area that are poisonous – the Black Widow and Brown Recluse. The Black Widow spider varies from dark brown to black in color. Its body is 1/4 inch wide and overall size is 1-1/2 inches with legs extended. Only the female is poisonous and can be determined by the red or yellow hourglass marking the underside of the abdomen. The Brown Recluse has a characteristic fiddle-shaped pattern on their head region. The spider is golden brown with the fiddle being dark brown or black. This spider is not hairy and the fiddle pattern is often shiny. They are about 1/4 to 3/4 inch long. The victim will experience the following if a Black Widow or Brown Recluse spider has bitten them:

- The spider's bite will feel like a sharp pinprick or may not even be noticed.
- In 15 minutes or less, the person will feel a dull numbing pain in the bitten area.
- A faint red bite mark appears.
- Black Widow bites in the lower part of the body or legs will cause the victim will have muscle stiffness or cramps in their abdomen.

- If the bite is on the upper body or arms, the victim will have muscle stiffness or cramps affecting the shoulders, back, or chest.
- Additionally, the victim may experience headache, chills, fever, heavy sweating, dizziness, nausea, vomiting, and severe abdominal pain.
- Brown Recluse bite severity may vary.
- The symptoms may vary from no harm to a very severe reaction.
- Often there is a systemic reaction within 24-36 hours characterized by restlessness, fever, chills, nausea, weakness, and joint pain.
- Where the bite occurs there is often tissue death and skin is sloughed off. In some severe cases, a wound may develop that lasts several months.
- First aid procedures for a Black Widow, Wolf Spider and Brown Recluse bites are as follows:
- Clean the bitten area with soap and water or rubbing alcohol.
- Do not apply a constricting band because the black widow venom's action is swift; there is little to be gained by trying to slow absorption with a constriction band.
- To relieve pain, place an ice pack over the bite.
- Keep the victim quiet and monitor breathing.
- Seek immediate medical attention.
- If possible, catch the spider to confirm its identity, even if the body is crushed.

#### **9.33.5 Staff Organization, Qualifications and Responsibilities**

See Section 4.0 of the APP.

#### **9.33.6 Training**

See Section 6.0 of this APP.

#### **9.33.7 Personal Protective Equipment**

The levels of personal protection to be used for work tasks at the NCBC site have been selected based on the nature of the planned work activities and on the known or anticipated hazards; types and concentrations of contaminants that may be encountered onsite; and contaminant properties, toxicity, exposure routes, and matrixes.

PPE is selected by the PHSO when writing the SSHP, and is confirmed through a rigorous review process by the Tetra Tech HSM. To assure proper PPE has been selected, both the physical and chemical hazards present at the job site are taken into account in both developing and reviewing safety-related documents.

The anticipated levels of protection selected for use by field personnel during site activities is the U.S Environmental Protection Agency (EPA) Level D. If site conditions performed during site activities warrant a higher level of protection, the field personnel will withdraw from the site, immediately notify the Tetra Tech PHSO, and obtain further instructions.

PPE levels can be upgraded or downgraded based on a change in site conditions or investigation findings. When a significant change in site conditions occurs, hazards will be reassessed.

PPE has been selected based on the results of task-specific hazard assessments. Through the completion of employee training (e.g., introductory 40-hour hazardous waste training, annual refresher training, etc.), Tetra Tech employees have been informed of the proper selection, use, and care of PPE items provided to them. After PPE is provided to an employee, the responsibility for using and caring for it appropriately is the responsibility of that employee. The FOL/SSO is responsible for assuring that these responsibilities are fulfilled through daily observations and work area inspections at the sites. The FOL/SSO is also responsible for assuring that appropriate and adequate supplies of PPE are maintained such that they are readily available for issuance/replacement and in a clean and sanitary manner and location. The site personnel will use the procedures presented in the AHAs to obtain optimum performance from PPE.

The levels of personal protection to be used for work tasks have been selected based on the nature of the planned work activities and on the known or anticipated hazards. Specific PPE selected for this project is listed, by task, in the AHAs located in Section 10.0 of the APP. The PPE minimum is as follows:

- Safety glasses with side shields when there is a possibility of splashing liquids
- Hard hat if near overhead hazards
- Shirts and long pants
- Cotton or leather work gloves
- Safety toe shoe/boots
- Tyvek<sup>®</sup> coverall type suits if a chance of soiling clothing

#### **9.33.8 Medical Surveillance**

Personnel performing onsite work that will result in exposure to contaminant-related health and safety hazards shall be enrolled in a medical surveillance program that complies with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65(f). Site personnel will have had a physical examination, conducted by a board certified occupational medicine physician, which meets the requirements of Tetra Tech's medical

surveillance program. Certification of medical surveillance program participation is appended to the SSHP. The certification shall include:

- Employee name
- Date of last examination
- Name of examining physician(s).

The required written occupational physician's opinion shall be made available upon request to the Navy Contracting Officers Representative. The medical records shall be maintained in accordance with 29 CFR 1910.1020. Attachment I contains the certification of participation in a medical surveillance program.

### **9.33.9 Exposure Monitoring/Air Sampling Program**

None of the contaminants are expected to be present in significant concentrations to present an inhalation hazard during planned site activities. As a precautionary measure to assure that such exposures are avoided and documented, a direct reading instrument will be used to monitor worker exposures to chemical hazards present at the site.

#### **9.33.9.1 Instruments and Use**

For this project, based on the properties of the primary contaminant of concern, a Photoionization Detector (PID) or a Flame Ionization Detector (FID) may be used to monitor the air.

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

### **9.33.9.2 Action Levels**

PID: 4 readings of 5 minutes each at 7 ppm above BG in BZ areas in any one work day

FID: 4 readings of 5 minutes each at 1.25 ppm above BG in BZ in any one work day

### **9.33.9.3 Instrument Maintenance and Calibration**

Hazard monitoring instruments will be maintained and pre-field calibrated by the equipment vendor. Operational checks and field calibration will be performed on the instruments by site personnel 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. Calibration efforts must be documented. Figure 9-4 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 9-4 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

### **9.33.9.4 Documenting Instrument Readings**

The SSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this SSHP 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 (e.g., PID, etc.)
- Personnel present at the area where the reading was noted

- Other conditions that are considered relevant to the SSO (weather conditions, instrument interference, etc.)

If a change in site conditions should occur (i.e., are wetting techniques are insufficient to control dust generated during heavy activities) field personnel will withdraw from the site, immediately notify the SSO, and wait for further instructions. The SSO will then make the determination if any upgrade in protective equipment is necessary.

#### **9.33.10 Heat and Cold Stress**

See Section 9.14 of this APP.

#### **9.33.11 Standard Operating Procedures, Engineering Controls and Work Practices**

In addition to the task-specific work practices and restrictions identified in the AHAs found in Section 10.0 of the APP, the following general safe work practices are to be followed when conducting work on-site.

- Personnel engaged in onsite activities will practice the "buddy system" to ensure the safety of personnel involved in this operation.
- 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.
- 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.
- Plan and mark entrance, exit, and emergency evacuation routes.
- Rehearse unfamiliar operations prior to implementation.
- Establish appropriate safety zones including support, contamination reduction, and exclusion zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone).
- Non-essential vehicles and equipment should remain within the support zone.
- Establish appropriate decontamination procedures for leaving the site.

- Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the FOL/SSO.
- Observe co-workers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

#### **9.33.11.1 Material Handling Procedures**

Handling and storing materials involve many operations including handling drums and moving equipment. Improper handling and storing of materials often result in injuries. Whether moving materials manually or mechanically, know and understand the potential hazards associated with the task at hand and how to control the workplace to minimize danger.

Hazards include lifting heavy objects, falling objects, improperly stacked materials, and various types of equipment. Potential injuries that can occur when manually moving materials include the following:

- Strains and sprains from lifting loads improperly or from carrying loads that are either too large or too heavy.
- Fractures and bruises caused by being struck by materials or by being caught in pinch points.
- Cuts and bruises caused by falling materials that have been improperly stored or by incorrectly cutting ties or other securing devices.
- Manual lifting is likely to occur during many phases of the project.

Tetra Tech personnel should notify supervisors or designated safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities, such that the Tetra Tech may evaluate safe operational procedures with regard to the required task.

- Proper lifting techniques (use of knees and not back) must be used when lifting any object:
- Plan storage and staging to minimize lifting or carrying distances.
- Use drum dollies/carts with a latching mechanism when handling full/loaded drums.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift especially for heavy (>40 lbs.) or awkward loads.
- If site personnel are not capable of lifting 40 lbs., seek assistance from a team member to split the load.
- Make sure the path of travel is clear prior to the lift.

### **9.33.11.2 Drum/Container/Tank Handling**

During the execution of the contract, various types and quantities of generated waste materials will be generated and may include, but not be limited to, PPE excess soil, and limited quantities of decontamination fluids. Personnel are permitted to handle and/or sample drums containing known waste sources/materials, but handling or sampling of other drums (unknowns) requires an APP revision or amendment approved by the Tetra Tech HSM. The following control measures must be taken when managing drums containing waste sources/materials:

- Minimize transportation of drums or other containers with generated waste materials.
- However, where this is deemed necessary, appropriate drum dollies, hand trucks or other suitable material handling equipment shall be used to transfer drums of generated waste materials.
- Sample or open only labeled drums or drums known to contain generated waste materials.
- Unknown drums or drums that show evidence of excessive buckling/ bulging, corrosion, vapors, crystallization, unusual discoloration or other abnormalities may only be sampled with:
  - Evaluation of engineering controls,
  - Proper PPE and
  - Use of properly trained personnel familiar with the sampling of unknown drum contents.
  - Use caution when sampling bulging or swollen drums.
  - Relieve pressure slowly and step away from the drum as pressure is being released.
  - If drums contain, or potentially contain, flammable materials, use non-sparking (i.e., brass) tools to open the drum.
  - Picks, chisels, and firearms may not be used to open drums.
  - Reseal bung holes or plugs whenever possible.
  - Avoid mixing incompatible drum contents.
  - Sample drums without leaning over the drum opening.
  - Transfer the content of drums using a method that minimizes contact with material.
  - PPE worn to minimize potential dermal to identified contaminants of concern.
  - Good personal hygiene practices and procedures must be maintained.

### **9.33.11.3 Comprehensive AHA of Treatment Technologies**

See Section 10.0 of the APP.

### **9.33.12 Site Control Measures**

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.

#### **9.33.12.1 Control Zones**

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. Site personnel entering the exclusion zone and contamination reduction corridor will log-in and log-out with the FOL/SSO on a daily basis. This information will be kept in the FOL/SSO project log book.

#### **9.33.12.2 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
- Hand augering and surveying – 10-feet
- Test pit excavation – 10-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.

#### **9.33.12.3 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.

#### **9.33.12.4 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 away from potential exposure to site contaminants during normal working conditions or foreseeable emergencies.

#### **9.33.12.5 Site Visitors**

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

- Personnel invited to observe or participate in operations by Tetra Tech
- Regulatory personnel (i.e., DoD, USEPA, 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.

#### **9.33.12.6 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.

### **9.33.12.7 Communication**

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary. External communication will be accomplished by using cellular telephones at approved locations.

External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities at the site, it is strongly recommended that cell signal strength be checked in the work areas and the relevant project phone numbers are programmed on site worker cell phones. The FOL will determine and arrange for telephone communication procedures.

Workers should enter the emergency and important phone numbers from Figure 9-1 in Section 9.2.4 into their cell phones prior to beginning work.

### **9.33.13 Personal Hygiene and Decontamination**

This section provides decontamination procedures and guidelines for developing site and activity specific decontamination procedures.

#### **9.33.13.1 Responsibilities**

The PHSO shall ensure that decontamination measures are adequately addressed in the Site Specific Health and Safety Plan. The FOL/SSO is responsible for establishing a decontamination area. The FOL/SSO also ensures that adequate decontamination procedures are followed to prevent contamination of individuals or the environment beyond the exclusion zone. The PM will ensure that sufficient information has been provided to the PHSO to prepare adequate decontamination procedures for inclusion in the SSHP.

#### **9.33.13.2 Decontamination**

Decontamination involves physically removing contaminants and/or converting them chemically into harmless substances. Decontamination, proper PPE donning procedures, and safety zones minimize the chance of cross-contamination from protective clothing to wearer, equipment to personnel, and one area to another.

The decontamination will consist of a soap/water wash and rinse for outer protective equipment (e.g., boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the drilling operations bordering the support zone.

This decontamination procedure will consist of:

- Equipment drop
- Soap/water wash and rinse of outer gloves and outer boots, as applicable
- Soap/water wash and rinse of the outer splash suit, as applicable
- Wash hands and face, leave contamination reduction zone

The FOL/SSO will determine the organization and materials used. Factors that are considered include: the extent and type of hazard expected, meteorological conditions, topography, levels of protection selected, and availability of equipment and supplies.

#### **9.33.13.3 Contamination Avoidance**

Avoiding contamination is the first and best method for preventing the transfer of contamination to personnel or to non-contaminated areas. Each person involved in site operations must regularly practice the methods, listed below, for contamination reduction.

- Know the limitations of the protective equipment being used.
- Do not sit or lean against anything in a contaminated area.
- Waste containers should be checked for incompatible materials.
- Do not set sampling equipment directly on contaminated areas.
- Use the proper tools to safely conduct the job.

#### **9.33.13.4 Decontamination Guidance**

Personnel decontamination will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, splash suits, etc.). This function will take place at an area adjacent to the site activities.

Decontamination procedures will be reviewed with site personnel prior to entering the EZ. Each person will be given precise instructions and be acquainted with the procedure for moving through the decontamination line. Progress through the decontamination line will be deliberate, organized to minimize hazard contamination for personal.

#### **9.33.13.5 Closure of the Decontamination Line**

When the decontamination line is no longer needed, it will be closed down by site personnel. The disposable items used during the operation will be double-bagged and contained onsite, or removed to an

approved off-site disposal facility. Decontamination and rinse solutions may be discarded onsite if approved by regulatory agencies. If not, they will be removed to an approved disposal facility. Reusable clothing should be dried and prepared for future use. If gross contamination had occurred, additional decontamination or disposal of these items may be required. Cloth items must be bagged and removed from the site for final cleaning or disposal. Wash tubs, pails, containers, etc., must be thoroughly washed, rinsed, and dried before removal from the site.

#### **9.33.14 Sampling Equipment Decontamination**

Sampling equipment will be decontaminated as stated per the requirements in the Work Plan. MSDS/SDS for any decontamination solutions (such as Alconox<sup>®</sup>, methanol, isopropanol, hexane, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.). The sampling equipment used will require a complete decontamination between locations and prior to removal from the site.

The equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment, such as drill rigs, will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. The site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.

The equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.

The FOL/SSO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. Equipment will only be authorized access or exit with this authorization.

Evaluation will consist of a visual inspection to ensure that visible contamination has been effectively removed.

#### **9.33.15 Emergency Equipment and First Aid**

The following emergency equipment will be strategically placed and maintained onsite:

- A first aid kit meeting the requirements of OSHA and EM 385-1-1, Section 03.B.01, will be readily available at each work site by having the kit available and ready for use.

- The location of each first aid kit shall be clearly marked, and kits shall be protected from the weather and maintained clean.
- The kit must contain all the items listed in Figure 9-5 Requirements for Basic Unit Packages (from Section 3 of the EM 385-1-1 Manual) and include one pocket mouthpiece or CPR barrier and latex gloves.
- The kit will be inspected weekly and items shall be replaced as they are used.
- Eye wash units (or bottles of disposable eyewash solution) are maintained during sampling activities due to the small quantities of corrosive preservatives and well construction activities due to the caustic nature of the cement/grout products.
  - These units are acceptable due to extremely small quantity of the corrosives.
  - These will be used as adjunct support until access to a fixed unit or the medical provider.
  - These units will be maintained in a clean location and inspected each week.
- Fire extinguishers will be maintained in each site vehicle and shall be immediately available for use in the event of an emergency.
  - If fuel will be transferred from portable fuel cans, they will be Underwriters Laboratory (UL) approved safety cans properly labeled.
  - If greater than 25 gallons is stored onsite a 5A:60BC fire extinguisher will be mounted within 50 feet of the fueling location.
  - Fire extinguishers will be inspected monthly to ensure:
    - Sufficient charge
    - No physical damage
    - Tamper indicators are in place
    - Inspection tag documents inspection
  - Site personnel will be trained in the use of the fire extinguisher as part of site specific training.

#### **9.33.15.1 First Aid**

Tetra Tech personnel will perform rescue operations from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid and Cardio Pulmonary Resuscitation (CPR)" 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. Medical attention above First-Aid level support will require assistance from the designated emergency response agencies. At least two Tetra Tech site personnel will be trained to this level while working onsite.

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. Site personnel will record 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 which will be filed onsite.

### **9.33.16 Emergency Response and Contingency Procedures**

In the event of an emergency during onsite work, the primary response action by onsite personnel will be to safely evacuate, assemble at an area unaffected by the emergency, and notify the Site Contacts.

The local 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 Site Contacts will be notified if these response agencies are contacted.

Tetra Tech personnel will provide insipient emergency prevention activities such as:

- Initial (e.g., non-structural) fire-fighting support (fire extinguisher) and prevention
- Initial spill control and containment measures and prevention
- Evacuate personnel from emergency situations
- Initial medical support for injury/illness requiring only first-aid level support

#### **9.33.16.1 Pre-Emergency Planning**

Based on the nature of the planned activities, emergencies resulting primarily from physical hazards could be encountered. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following:

- Coordinating with the local Emergency Response personnel prior to the commencement of work to ensure that Tetra Tech emergency action activities are compatible with existing emergency response procedures.
- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency.
- Creating and maintaining documents onsite that can be important in the event of an emergency situation, including:
  - A Chemical Inventory of hazardous chemicals onsite
  - Corresponding MSDS/SDS.
  - Completed Medical Data Sheets (Figure 9-3) for onsite personnel.

- A log book identifying personnel onsite each day.
- Hospital route maps with directions.
- Emergency Notification - phone numbers.

In the event of an onsite emergency, the FOL/SSO will be responsible for the following tasks:

- Determining that an emergency situation exists, initiating a site evacuation, accounting for onsite personnel at the assembly area, and determining if/when return to work conditions resume.
- With assistance from the FOL/SSO, educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention.
- With assistance from the FOL/SSO, periodically performing practice drills to ensure site workers are familiar with incidental response measures.

#### **9.33.16.2 Personnel and Lines of Authority for Emergency Situations**

In the event of an emergency situation the FOL/SSO will serve as the Incident Commander until the local emergency services arrive on site. Other site personnel will provide support and follow direction from the Incident Commander.

#### **9.33.16.3 Criteria and Procedures for Emergency Recognition and Site Evacuation**

Emergency situations may be encountered during site activities.

##### 9.33.16.3.1 Emergency 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 chemical hazards. To adequately recognize chemical exposures, site personnel must have an awareness of signs and symptoms of exposure associated with the principle site contaminant of concern. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in this SSHP and APP. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The FOL/SSO will be responsible for performing and documenting surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Site personnel are responsible for reporting perceived hazardous situations.

The above actions will provide early recognition for potential emergency situations, and allow Tetra Tech to instigate necessary control measures. However, if the FOL/SSO determines that control measures are

not sufficient to eliminate the hazard, Tetra Tech will withdraw from the site and notify the appropriate response agencies.

#### 9.33.16.3.2 Site Evacuation

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; and evidence of personnel overexposure to potential site contaminants.

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

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

#### 9.33.16.3.3 Emergency Alarm Systems

Tetra Tech personnel will be working in close proximity to each other. As a result, hand signals, two-way radio communications, 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 warranting evacuation occurs, the following procedures are to be initiated:

Initiate the evacuation via radio communications, hand signals, voice commands, line of site communication, or vehicle horns (for approximately 15 seconds). The following signals shall be utilized when communication via vehicle horn is necessary:

|                   |                    |         |
|-------------------|--------------------|---------|
| <b>HELP</b>       | three short blasts | (. . .) |
| <b>EVACUATION</b> | three long blasts  | (- - -) |

- Report to the designated refuge point.
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the FOL/SSO (who will serve as the initial Incident Coordinator) pertinent incident details.

#### **9.33.16.4 Decontamination and Medical Treatment of Injured Personnel**

Based on the nature of the planned activities and on the nature and extent of contamination that may be encountered during these activities, the need for any specific personal decontamination activities in an emergency medical situation is highly unlikely. In the unlikely instance that such efforts become necessary, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of the involved personnel. Decontamination will be postponed if the incident warrants immediate evacuation. As soon as possible and prior to transportation to a medical center the contaminated site worker will be:

- Washed and rinsed
- Contaminated clothing removed and disposed of as hazardous waste
- First aid treatment rendered

#### **9.33.16.5 Route Maps and Phone Numbers for Emergency Responders**

The closest hospital is Memorial Hospital at Gulfport. The Emergency Department is open 24 hours a day, 365 days a year, and is equipped to treat all illnesses and injuries, whether minor, serious or life threatening.

For directions and a map to the Memorial Hospital see Figure 9-2. Tetra Tech personnel are instructed to perform a drive-by of the nearest hospital prior to commencing site activities to ensure that it is accessible and available and that the most efficient routes (primary and alternate) are well mapped. Prior to initiating field activities, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident.

#### **9.33.16.6 Criteria for Alerting Local Community Responders**

In the event of an emergency situation, the FOL/SSO will enact emergency notification procedures to secure additional assistance in the following manner:

- Dial emergency numbers listed in Figure 9-1 and report the incident.
- Give the emergency operator the:
  - Location of the emergency
  - Type of emergency
  - Number of injured
  - A brief description of the incident.
- Stay on the phone and follow the instructions given by the operator.
- The operator will then notify and dispatch the proper emergency response agencies.

#### **9.34 BLASTING SAFETY PLAN**

Not applicable.

#### **9.35 DIVING PLAN**

Not applicable.

#### **9.36 CONFINED SPACE PROGRAM**

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 APP are not allowed, under any circumstances, to enter confined spaces. 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.

## 10.0 RISK MANAGEMENT PROCESSES

The task-specific AHA(s) will be reviewed prior to initiating any field activities during the daily safety meetings. This effort will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Use of the APP will provide the line of communication for reviewing task-specific hazards and protective measures associated with each operation. The APP will be used as the primary reference for selecting levels of protection and control measures.

The FOL/SSO is responsible for making the parties aware of the contents and requirements of the APP. Any problems encountered with the protective measures required will be documented and brought to the attention of the FOL/SSO. As an ongoing quality assurance effort, the FOL/SSO will review operations to ensure the AHAs adequately address potential hazards for the tasks being conducted. Where deficient, they will be corrected and that information shared with the field personnel. Amended AHAs will be forwarded to the PHSO for inclusion in future APPs for similar activities. See Table 10-1.

The planned activities involved in this effort are presented in detail in the Work Plan. If new tasks are to be performed at the site this section and the accompanying AHA will be modified accordingly.

- Mobilization and Demobilization
  - Global positioning system (GPS) Survey
- Soil boring using direct push technology (DPT)
  - Subsurface soil sampling
  - BIOX injection
- Groundwater sampling of existing monitoring wells
- Decontamination of sampling and heavy equipment
- IDW management

**Table 10-1  
Activity Hazard Analysis**

| <b>Activity/Work Task:</b> Site Mobilization and Demobilization and GPS Survey  |  | <b>Overall Risk Assessment Code (RAC) (Use highest code)</b>  |             |                    |            | <b>L</b>                 |          |
|---|--|---|-------------|--------------------|------------|--------------------------|----------|
| <b>Project Location:</b> NCBC Gulfport  |  | <b>Risk Assessment Code (RAC) Matrix</b>  |             |                    |            |                          |          |
| <b>Contract Number:</b> N62472-08-D-1001  |  | Severity  | Probability |                    |            |                          |          |
| <b>Date Prepared:</b> October 20, 2014  |  |   | Frequent    | Likely             | Occasional | Seldom                   | Unlikely |
| <b>Prepared by:</b> J. Laffey, CESCO  |  | Catastrophic  | E           | E                  | H          | H                        | M        |
|   |  | Critical  | E           | H                  | H          | M                        | L        |
| <b>Reviewed by:</b> J. Carothers, PhD   |  | Marginal  | H           | M                  | M          | L                        | L        |
|   |  | Negligible  | M           | L                  | L          | L                        | L        |
| Notes: (Field Notes, Review Comments, etc.)   |  | Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)  |             |                    |            |                          |          |
|   |  | "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.  |             |                    |            | <b>RAC Chart</b>         |          |
|   |  | "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible  |             |                    |            | <b>E= Extremely High</b> |          |
|   |  | Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.  |             |                    |            | <b>H= High</b>           |          |
|   |  |   |             | <b>M= Moderate</b> |            |                          |          |
|   |  |   |             | <b>L= Low</b>      |            |                          |          |
| ACTIVITY / PHASE  | HAZARDS  | CONTROLS  |             |                    |            |                          | RAC      |
| <ul style="list-style-type: none"> <li>Assembling equipment and supplies</li> <li>Performing initial/exit inspections of the intended work areas</li> <li>Arranging for utilities, site access, notifying appropriate client contacts</li> <li>Performing equipment inspections of vehicles and equipment arriving/preparing to leave the site</li> </ul> | 1. Equipment   | 1. Conduct initial site acceptance inspection prior to performing any work at this site.  |             |                    |            |                          | L        |
|   | 2. Poorly maintained or improperly handled vehicles                  | 1. Make sure back-up alarms on all vehicles are functioning.  |             |                    |            |                          | L        |
|   | 3. Heavy lifting (muscle strains and pulls)                          | 1. Practice safe lifting techniques. Use mechanical lifting devices such as a dolly whenever possible<br>2. Ensure clear path of travel.<br>3. Have a good grasp on object.<br>4. Perform "test lift" to gauge ability to safely make the lift.<br>5. Lift with legs not back.<br>6. Obtain help when needed to lift large, bulky, or heavy items). |             |                    |            |                          | L        |
|   | 4. Vehicular traffic when moving large equipment to the support area | 1. Designate and mark vehicle and equipment staging areas. Inform the site personnel of heavy equipment areas and of their responsibility to stay clear of moving vehicles.<br>2. In high traffic areas, wear a high-visibility vest, shirt or jacket.  |             |                    |            |                          | L        |
|   | 5. Slips, Trips, Falls   | 1. Watch for tree branches, roots, weeds, limbs and other ground hazards.<br>2. Wear appropriate foot protection to prevent slips and trips.<br>3. Use caution when working on uneven and wet ground surfaces.  |             |                    |            |                          | L        |

**Table 10-1  
Activity Hazard Analysis**

| ACTIVITY / PHASE  | HAZARDS   | CONTROLS   | RAC |
|---|---|--|-----|
|   | 6. Intermittent high noise levels   | <ol style="list-style-type: none"> <li>1. Site 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 (approximately 2 feet) of them.</li> <li>2. FOL/SSO is responsible for determining and designating when hearing protection is required.</li> <li>3. Hearing protection is to consist of either ear muffs or plugs that have a noise reduction rating (NRR) of at least 25 decibels (dB).</li> </ol>   | L   |
|   | 7. Inclement weather  | <ol style="list-style-type: none"> <li>1. The FOL/SSO will temporarily suspend outside activities in the event of electrical storms or high winds.</li> <li>2. It is preferred that supported systems such as lightning detection devices or emergency weather broadcasts are employed.</li> <li>3. However, when this is not possible field personnel should use the 30/30 Rule: <ul style="list-style-type: none"> <li>• "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."</li> </ul> </li> </ol> | L   |
|   | 8. Implement Site Specific Hazard Communication Program   | <ol style="list-style-type: none"> <li>1. Complete the chemical inventory for the project.</li> <li>2. Procure SDS for chemicals used exclusively on this project.</li> <li>3. Label containers used onsite for hazardous materials.</li> <li>4. Identification of any additional hazard communication training requirements.</li> </ol>   | L   |
| EQUIPMENT TO BE USED  | INSPECTION REQUIREMENTS   | TRAINING REQUIREMENTS  |     |
| Hand tools (dollies, hand carts, hand knives, etc.)   | Visual inspection prior to use by user.   | Review of AHA during pre-task tailgate safety briefing with the intended task participants.  |     |
| <b>Personal Protective Equipment</b><br><b>Minimum:</b> Safety toe boots, safety glasses, long pants and sleeved shirts.<br><b>Optional items:</b> Hardhat, hearing protection. | Initial PPE inspection performed by FOL/SSO. Ongoing (prior to each use) inspections responsibilities of PPE users. | PPE training in proper use, care, storage, and limitations.  |     |

**Table 10-1**  
**Activity Hazard Analysis**

I have read and understand this AHA:

| Name (Printed) | Signature | Date |
|----------------|-----------|------|
|                |           |      |
|                |           |      |
|                |           |      |
|                |           |      |

**Table 10-1  
Activity Hazard Analysis**

|   |  |   |        |             |                   |          |            |
|---|--|---|--------|-------------|-------------------|----------|------------|
| <b>Activity/Work Task:</b> Soil Boring using DPT, including subsurface soil sampling and Biox injection   | <b>Overall Risk Assessment Code (RAC) (Use highest code)</b>   |   |        |             |                   | H        |            |
| <b>Project Location:</b> NCBC Gulfport  | <b>Risk Assessment Code (RAC) Matrix</b>   |   |        |             |                   |          |            |
| <b>Contract Number:</b> N62472-08-D-1001  | Severity   | Probability   |        |             |                   |          |            |
| <b>Date Prepared:</b> October 20, 2014  |  | Frequent  | Likely | Occasional  | Seldom            | Unlikely |            |
| <b>Prepared by:</b> J. Laffey   | Catastrophic   | E   | E      | H           | H                 | M        |            |
|   | Critical   | E   | H      | H           | M                 | L        |            |
| <b>Reviewed by:</b> J. Carothers, PhD   | Marginal   | H   | M      | M           | L                 | L        |            |
|   | Negligible   | M   | L      | L           | L                 | L        |            |
| Notes: (Field Notes, Review Comments, etc.)   | Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)   |   |        |             |                   |          |            |
|   | "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.   |   |        |             | <b>RAC Chart</b>  |          |            |
|   | "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible |   |        |             | E= Extremely High |          |            |
|   | Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.       |   |        |             | H= High           |          |            |
|   |  |   |        | M= Moderate |                   | L= Low   |            |
| <b>JOB STEPS</b>  | <b>HAZARDS</b>   | <b>CONTROLS</b>   |        |             |                   |          | <b>RAC</b> |
| DPT rig set up<br><br><ul style="list-style-type: none"> <li>Positioning Unit (engaging outriggers. etc.)</li> <li>Assembling equipment and supplies</li> </ul> | 1. Struck By   | 1. Hard hats and high visibility vests for all personnel in work area.<br>2. Control work area (use flaggers, signage, barricades, and/or other means) and restrict all non-essential personnel from the area.<br>3. Inspect rig and ensure that all equipment, augers, rods and tools will be properly secured during transport.                             |        |             |                   |          | L          |
|   | 2. Tip Over  | 1. Never permit rig to attempt to traverse severely sloping terrain.<br>2. Use a ground guide along with a functioning back-up alarm during equipment backing.<br>3. Once rig is sited, deploy outriggers to properly block and level the rig and secure parking brake.   |        |             |                   |          | L          |
|   | 3. Slips, Trips, Falls   | 1. Clear trees, roots, weeds, limbs and other ground hazards from the DPT location.<br>2. Practice good housekeeping to keep the ground around the DPT site clear of obstructions, equipment and other tripping hazards.<br>3. Wear appropriate foot protection to prevent slips and trips.<br>4. Use caution when working on uneven and wet ground surfaces. |        |             |                   |          | L          |
|   | 4. Minor cuts, or abrasions  | 1. When handling equipment and tools wear cut-resistant gloves when handling items with sharp or rough edges.   |        |             |                   |          | L          |

**Table 10-1**  
**Activity Hazard Analysis**

| JOB STEPS      | HAZARDS                                     | CONTROLS  | RAC |
|----------------|---|---|-----|
|                | 5. Heavy lifting (muscle strains and pulls) | <ol style="list-style-type: none"> <li>1. Practice safe lifting techniques</li> <li>2. Use mechanical lifting devices such as a dolly whenever possible</li> <li>3. Ensure clear path of travel</li> <li>4. Have a good grasp on object</li> <li>5. Perform "test lift" to gauge ability to safely make the lift</li> <li>6. Lift with legs not back</li> <li>7. Obtain help when needed to lift large, bulky, or heavy items.</li> </ol>   | L   |
|                | 6. Insect bites                             | <ol style="list-style-type: none"> <li>1. Shake out boots before donning.</li> <li>2. Use insect repellants</li> <li>3. Products containing DEET should be applied to exposed skin,</li> <li>4. Products containing Permethrin should be applied to clothing only.</li> <li>5. Follow manufacturer's recommendations for application.</li> <li>6. Tape up pants leg to work boot joints with duct tape.</li> <li>7. Wear light-colored clothing to better see and remove any insects.</li> <li>8. Perform close body inspections at least daily upon leaving the site.</li> </ol> | L   |
|                | 7. Inclement weather                        | <ol style="list-style-type: none"> <li>1. The FOL and/or the SSO will temporarily suspend outside activities in the event of electrical storms or high winds.</li> <li>2. It is preferred that supported systems such as lightning detection devices or emergency weather broadcasts are employed.</li> <li>3. However, when this is not possible field personnel should use the 30/30 Rule: <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></li> </ol>                         | L   |
| DPT Operations | 1. Intermittent high noise levels           | <ol style="list-style-type: none"> <li>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.</li> <li>2. SSO responsible for determining and designating when hearing protection is required.</li> <li>3. Hearing protection is to consist of either ear muffs or ear plugs that have an NRR of at least 25 dB.</li> </ol>  | L   |
|                | 2. Contact with equipment moving parts.     | <ol style="list-style-type: none"> <li>1. Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation.</li> <li>2. Ensure that back-up alarms are functional on equipment.</li> <li>3. The equipment operators and on-site Supervisors responsible for the equipment are to ensure that the equipment is properly inspection prior to</li> </ol>   | L   |

**Table 10-1  
Activity Hazard Analysis**

| JOB STEPS                       | HAZARDS   | CONTROLS   | RAC |
|---------------------------------|---|--|-----|
|                                 |   | being permitted onsite.<br>4. Ensure that all moving parts are guarded if such parts are exposed.<br>5. Check/test all emergency stop controls.  |     |
|                                 | 3. Contact/striking underground or overhead utilities | 1. Movement of rig with mast raised will be strictly prohibited.<br>2. Inspect for buried and overhead utilities in the vicinity of the DPT location.<br>3. Verify the location of utility lines in accordance with the Tetra Tech SOP Utility Location and Excavation Clearance located in Attachment III of this APP.<br>4. Pre-plan the move with the local utility companies if utility lines must be moved.<br>5. Pre-survey the height of equipment and height of utility lines to determine which lines must be removed or raised.<br>6. Equipment should not come within 20 feet of existing overhead utility lines. | L   |
| DPT Rod / Auger / Tool Handling | 1. Struck by/entanglement                             | 1. Be prepared for sudden shifting when removing rod sections.<br>2. Restrict non-essential personnel from approaching working area.   | L   |
|                                 | 2. Overhead hazards                                   | 1. Personnel within the radius of the DPT rig must wear ANSI approved hard hats.   | L   |
|                                 | 3. Slips, Trips, Falls                                | 1. Clear trees, roots, weeds, limbs and other ground hazards from the location.<br>2. Practice good housekeeping to keep the ground around the site clear of obstructions, equipment and other tripping hazards.<br>3. Wear appropriate foot protection to prevent slips and trips.<br>4. Use caution when working on uneven and wet ground surfaces.<br>5. Keep a wide base and assure secure footing while attempting to handler auger flights and tooling.  | L   |
|                                 | 4. Contusions, cuts, or abrasions                     | 1. When handling auger flights and tools, wear cut-resistant heavy cotton or leather work gloves when handling items with sharp or rough edges.  | L   |
|                                 | 5. Heavy lifting (muscle strains and pulls).          | 1. Practice safe lifting techniques<br>2. Use mechanical lifting devices such as a dolly whenever possible<br>3. Ensure clear path of travel<br>4. Have a good grasp on object<br>5. Perform "test lift" to gauge ability to safely make the lift<br>6. Lift with legs not back<br>7. Obtain help when needed to lift large, bulky, or heavy items   | L   |

**Table 10-1  
Activity Hazard Analysis**

| JOB STEPS    | HAZARDS                                    | CONTROLS   | RAC |
|--------------|--|--|-----|
| DPT sampling | 1. Chemical exposure to site contaminants. | 1. Wear surgeons gloves when handling potentially-contaminated media and samples,<br>2. Avoid contact with potentially-contaminated media to the extent possible.<br>3. Follow good decontamination and practice good personal hygiene (hands and face washing) when exiting work area<br>4. Hand-to-mouth activities in the work area will be prohibited (eating, drinking, smoking, etc.).<br>5. Inhalation exposure concerns are an anticipated hazard. Exposure via dermal contact and ingestion represent some limited concern during this task<br>6. Exposure to potential site contaminants during this activity is unlikely given the nature of the work and the limited contact with potentially contaminated media.<br>7. The following precautionary procedures will be implemented: <ul style="list-style-type: none"> <li>• A PID will be used to monitor the air and collect screening samples.</li> <li>• PID: 4 readings of 5 minutes each at 7ppm ANY ONE reading 21ppm above BG in BZ areas in any one work day</li> </ul> 8. FID: 4 readings of 5 minutes each at 1.25ppm above BG in BZ in any one work day. If elevated readings are observed, the following process will be followed: <ul style="list-style-type: none"> <li>• The SSO shall order site personnel to stop work and retreat upwind to a safe, unaffected area, where they will remain until further directed by the SSO.</li> <li>• Only when levels are below the PEL standard in BZ areas will work be permitted to resume.</li> <li>• If background levels are not regained, the SSO will contact the HSM for additional direction.</li> </ul> | L   |
|              | 2. Slips/Trips/Fall Hazards                | 1. Maintain clear walking working areas and good housekeeping to the extent possible.<br>2. Debris and rutted areas create tripping hazards. <ul style="list-style-type: none"> <li>• As part of the initial site preparation, these hazards will be eliminated if possible.</li> </ul> 3. Personnel will return the site to a neat and orderly condition prior to leaving the site.<br>4. All exit and access pathways will be maintained free of obstructions.   | L   |

**Table 10-1  
Activity Hazard Analysis**

| JOB STEPS  | HAZARDS   | CONTROLS   | RAC |
|--|---|--|-----|
|  | 3. Cuts and lacerations – when cutting acetate liners without the proper material handling devices. | 5. If excavation holes are to be left open overnight, they will be barricaded.<br><br>1. Always cut away from yourself and others.<br>2. Do not place items to be cut in your hand or on your knee.<br>3. Change blades as necessary to maintain a sharp cutting edge as many accidents result dull cutting attachments.<br>4. Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife/saw hand, where possible.<br>5. When cutting acetate liners use the tubing retention tub to secure the tube.<br>6. Use the knife intended for that purpose.<br>7. Geoprobe® makes a kit for this purpose. | L   |
|  | 4. Strains/sprains from heavy or improper lifting   | 1. Practice safe lifting techniques.<br>2. Use mechanical lifting devices such as a dolly whenever possible<br>3. Ensure clear path of travel.<br>4. Get a good grasp on object<br>5. Lift with legs not back<br>6. Obtain help when needed to lift large, bulky, or heavy items   | L   |
| Biox Injection   | 1. Slips, Trips, Falls  | 1. Clear intended work areas and walking paths of roots, weeds, limbs and other ground hazards.<br>2. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards.<br>3. Ensure that work boots have adequately-aggressive sole design.<br>4. Use caution when working on uneven and wet ground.  | L   |
|  | 2. Chemical exposure  | 1. Ensure all containers are in good condition.<br>2. Check for leaks.<br>3. When connecting hoses, properly secure each coupling.<br>4. Wear proper PPE<br>5. If contact with Biox is made, wash and rinse affected area.   | L   |
| Direct Injection Delivery (DID) high velocity fluid jetting system | 1. Cuts, lacerations and struck-by  | 1. Before operating a high-pressure hose, check all hoses to ensure they are connected properly and inspect the electrical cords for frays or other defects.<br>2. Do not use the machine if any of its parts do not meet the manufacturer's safety requirements.<br>3. Wear safety glasses, goggles or face shield, steel-toed boots and  | L   |

**Table 10-1**  
**Activity Hazard Analysis**

| JOB STEPS   | HAZARDS  | CONTROLS  | RAC |
|---|--|---|-----|
|   |  | impervious gloves.<br>4. Check a hose for leaks while pressurized, run a piece of cardboard or paper along the hose.<br>5. Never place your hand over a jetting nozzle.<br>6. Do not point the stream of water toward any wiring or electrical outlets because this could cause a fire or a power failure.<br>7. Never point toward other people.<br>8. When operating the high-pressure hose, be cautious of people or objects around you and turn the off if anyone approaches you.<br>9. Don't "crack" high pressure connectors or lines to "check" for pressure and/or flow<br>10. Shut down all equipment when looking for leaks<br>11. Relieve pressures in lines (also known as "bleeding the line")<br>12. Check to ensure pressure relieved Lockout/tagout deactivation to zero energy<br>13. Always replace damaged high-pressure hose. |     |
| EQUIPMENT TO BE USED  | INSPECTION REQUIREMENTS  | TRAINING REQUIREMENTS   |     |
| DPT Rig, acetate cutting device and sharp knives, hand tools (dollies, hand carts, etc.)  | Visual inspection prior to use by user. Equipment must be calibrated as per the manufacturer's recommendations and documented on each use. | Review of AHA during pre-task tailgate safety briefing with all intended task participants.   |     |
| <b>Personal Protective Equipment:</b><br><b>Minimum:</b> Hardhat, safety toe boots. Safety glasses, nitrile surgeon's style gloves. High visibility clothing. <b>Optional items:</b> Boot covers, hearing protection and Tyvek if there is a chance to soil clothing. | Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.                            | PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees' 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in any onsite activities, and will be confirmed by visual observations of worker activities.  |     |

**Table 10-1**  
**Activity Hazard Analysis**

I have read and understand this AHA:

| Name (Printed) | Signature | Date |
|----------------|-----------|------|
|                |           |      |
|                |           |      |
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|                |           |      |

**Table 10-1  
Activity Hazard Analysis**

|   |   |   |                         |          |            |                               |          |
|---|---|---|-------------------------|----------|------------|-------------------------------|----------|
| <b>Activity/Work Task:</b> Groundwater sampling   |   | <b>Overall Risk Assessment Code (RAC) (Use highest code)</b>  |                         |          |            | <b>L</b>                      |          |
| <b>Project Location:</b> NCBC Gulfport  |   |   |                         |          |            |                               |          |
| <b>Contract Number:</b> N62472-08-D-1001  |   | <b>Severity</b>   | <b>Probability</b>      |          |            |                               |          |
| <b>Date Prepared:</b> November 20, 2014   |   |   | Frequent                | Likely   | Occasional | Seldom                        | Unlikely |
| <b>Prepared by:</b> J. Laffey, CESCO  |   | Catastrophic  | <b>E</b>                | <b>E</b> | <b>H</b>   | <b>H</b>                      | <b>M</b> |
|   |   | Critical  | <b>E</b>                | <b>H</b> | <b>H</b>   | <b>M</b>                      | <b>L</b> |
| <b>Reviewed by:</b> J. Carothers, PhD   |   | Marginal  | <b>H</b>                | <b>M</b> | <b>M</b>   | <b>L</b>                      | <b>L</b> |
|   |   | Negligible  | <b>M</b>                | <b>L</b> | <b>L</b>   | <b>L</b>                      | <b>L</b> |
| <b>Notes: (Field Notes, Review Comments, etc.)</b>  |   | Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)  |                         |          |            |                               |          |
|   |   | "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.  |                         |          |            | <b>RAC Chart</b>              |          |
|   |   | "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible  |                         |          |            | <b>E= Extremely High Risk</b> |          |
|   |   | Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.  |                         |          |            | <b>H= High Risk</b>           |          |
|   |   |   | <b>M= Moderate Risk</b> |          |            |                               |          |
|   |   |   | <b>L= Low Risk</b>      |          |            |                               |          |
| <b>JOB STEPS</b>  | <b>HAZARDS</b>  | <b>CONTROLS</b>   |                         |          |            | <b>RAC</b>                    |          |
| <p>Prepare sample bottles with preservatives and labels.</p> <ul style="list-style-type: none"> <li>Collect water sample from discharge tubing into sample bottles.</li> <li>Securely cap containers and store in sample cooler until shipping.</li> <li>Pack cooler for shipment.</li> </ul> | <p>1. Contact with and burns from acids used for sample preservation and potentially contaminated groundwater</p> | <p>1. Wear surgeons' gloves when handling potentially-contaminated media and samples. Avoid contact with potentially-contaminated media to the extent possible.</p> <p>2. Practice good personal hygiene (hands and face washing) when exiting work area.</p> <p>3. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.).</p> <p>4. Exposure via dermal contact and ingestion represent some limited concern during this task.</p> <p>5. Periodically screen sample with monitoring equipment.</p> <ul style="list-style-type: none"> <li>If readings above daily-established background levels (BGLs) are noted in borehole, monitor worker breathing zone (BZ) areas.</li> <li>If readings in worker BZ areas exceed the action level: <ul style="list-style-type: none"> <li>After at least 5 minutes, SSO will approach from upwind direction screening BZ areas.</li> </ul> </li> </ul> <p>6. The following precautionary procedures will be implemented:</p> <ul style="list-style-type: none"> <li>A PID with lamp strength of 10.6 or higher or FID will be used to monitor the air and collect screening samples.</li> <li>PID Action Level: 4 exposures of 5 minutes each in any one work day of no more than 7 ppm</li> <li>FID Action Level: 4 exposures of 5 minutes each in any one work day</li> </ul> |                         |          |            | <b>L</b>                      |          |

**Table 10-1  
Activity Hazard Analysis**

| JOB STEPS  | HAZARDS  | CONTROLS  | RAC |
|--|--|---|-----|
|  |  | of no more than 1.25 ppm<br>7. Work may resume when readings in the BZ return to BGLs.  |     |
|  | 2. Tripping potential on air/sample discharge line.  | 1. Organize line to keep out of way as much as possible, mark potential tripping hazards with caution tape or safety cones.   | L   |
|  | 3. Back strain when transporting coolers full of collected samples.  | 1. Use proper lifting techniques.<br>2. Get assistance when possible, especially for containers heavier than 50 lbs.  | L   |
| EQUIPMENT  | INSPECTION   | TRAINING  |     |
| Hand auger, sample collection tools and containers (jars, spatulas, spoons, etc.)<br><b>Safety Equipment:</b><br>Portable eye wash bottle<br><b>Monitoring Instruments:</b><br>PID with 10.6 eV lamp or FID  | Visual inspection prior to use by user.  | <ul style="list-style-type: none"> <li>Review of AHA during pre-task tailgate safety briefing with all intended task participants. Revise as necessary to incorporate site specific conditions.</li> <li>Training/experience in proper sample collection, handling and chain of custody requirements Personnel must be trained in use of drilling equipment.</li> <li>The DPT operator must have current certifications to operate the equipment.</li> <li>If the vehicle or combination vehicles exceed 26,001 lbs then a CDL endorsement will be required for the movement of equipment. Equipment over this size will require an air brake endorsement.</li> <li>Personnel will be proficient in the operation of the PID and if using a FID the proper hydrogen filling procedure.</li> </ul> |     |
| <b>Personal Protective Equipment:</b><br><b>Minimum:</b> Sleeved shirt, nitrile surgeon's gloves, safety glasses safety toe boots,<br><b>Optional items:</b> Hardhat, hearing protection. If contact with contaminants is likely, wear chemical-resistant coveralls (e.g., Tyvek) or aprons and surgeon's nitrile gloves under leather/cotton work gloves. | Initial PPE inspection performed by SSO.<br>Ongoing (prior to each use) inspections responsibilities of PPE users. | <p>OSHA 40 Hazardous Waste Operations and Emergency Response (HAZWOPER) training, plus appropriate 8-hour annual refresher training for the task participants. Supervisors must have completed additional 8 hours of HAZWOPER training. ALSO: Review of AHA during pre-task 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>   |     |

**Table 10-1**  
**Activity Hazard Analysis**

| EQUIPMENT | INSPECTION | TRAINING   |
|-----------|------------|--|
|           |            | SSO trained in proper calibration, use, and care of air monitoring devices used. 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. |

I have read and understand this AHA:

| Name (Printed) | Signature | Date |
|----------------|-----------|------|
|                |           |      |
|                |           |      |
|                |           |      |
|                |           |      |

| <b>Activity/Work Task:</b> Decontamination   |                                   | Overall Risk Assessment Code (RAC) (Use highest code)   |             |        |            | L                      |          |
|--|-----------------------------------|---|-------------|--------|------------|------------------------|----------|
| <b>Project Location:</b> NCBC Gulfport   |                                   | Risk Assessment Code (RAC) Matrix   |             |        |            |                        |          |
| <b>Contract Number:</b> N62472-08-D-1001   |                                   | Severity  | Probability |        |            |                        |          |
| <b>Date Prepared:</b> October 20, 2014   |                                   |   | Frequent    | Likely | Occasional | Seldom                 | Unlikely |
| <b>Prepared by:</b> J. Laffey, CESCO   |                                   | Catastrophic  | E           | E      | H          | H                      | M        |
|  |                                   | Critical  | E           | H      | H          | M                      | L        |
| <b>Reviewed by:</b> J. Carothers, PhD  |                                   | Marginal  | H           | M      | M          | L                      | L        |
|  |                                   | Negligible  | M           | L      | L          | L                      | L        |
| <b>Notes:</b> (Field Notes, Review Comments, etc.)   |                                   | Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)  |             |        |            |                        |          |
|  |                                   | "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.  |             |        |            | RAC Chart              |          |
|  |                                   | "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible  |             |        |            | E= Extremely High Risk |          |
|  |                                   | Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.  |             |        |            | H= High Risk           |          |
|  |                                   |   |             |        |            | M= Moderate Risk       |          |
|  |                                   |   |             |        |            | L= Low Risk            |          |
| JOB STEPS  | HAZARDS                           | CONTROLS  |             |        |            | RAC                    |          |
| Personal Decontamination   | 1. Slips, Trips, Falls            | 1. Clear intended decon area location of ground hazards.<br>2. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards.<br>3. Wear appropriate foot protection to prevent slips and trips.<br>4. Use caution when working on uneven and wet surfaces.  |             |        |            | L                      |          |
| Equipment drop<br>Segregated removal of PPE (wash and rinse reusable items, dispose of non-reusable items) | 2. Exposure to contaminated media | 1. Follow good decontamination practices (work from top down and outside in).<br>2. Nitrile gloves are to be the last item of PPE removed.<br>3. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.   |             |        |            | L                      |          |
| Decontamination of DPT rig and other vehicles and large tools (e.g., vehicles, etc.) using pressure washer | 3. Noise                          | 1. Pressure washer operator must wear hearing protection (muffs or plugs with NRR of at least 25 dB).<br>2. Restrict other personnel from decon pad during pressure washing operations.   |             |        |            | L                      |          |
|  | 4. Flying projectiles             | 1. Pressure washer operator must exercise care when directing the wand so that it is not pointing at himself/herself or at any other worker.<br>2. Pressure washer operator must wear full face shield over safety glasses with side shields and brow protection.<br>3. At SSO discretion, additional PPE consisting of hardhat, rainsuit, apron, and or boot covers may be required during decon operations - depending on |             |        |            | L                      |          |

**Table 10-1**  
**Activity Hazard Analysis**

| JOB STEPS   | HAZARDS                               | CONTROLS  | RAC  |
|---|---------------------------------------|---|--|
|   |                                       | observations indicating that significant contact with decon overspray and/or windy conditions during washing activities.  |  |
|   | 5. Falling objects                    | 1. Place items to be decontaminated on ground or on washing/drying racks in a manner that they are secure and will not fall.<br>2. Wear safety toe safety footwear.   | L  |
|   | 6. Strains/sprains from heavy lifting | 1. Practice safe lifting techniques<br>2. Use mechanical lifting devices such as a dolly whenever possible<br>3. Ensure clear path of travel<br>4. Have a good grasp on object<br>5. Perform "test lift" to gauge ability to safely make the lift<br>6. Lift with legs not back<br>7. Obtain help when needed to lift large, bulky, or heavy items. | L  |
|   | 7. Slips/trips/falls                  | 1. Keep decon areas orderly, maintain good housekeeping, spread light coating of sand on decon pad liner to increase traction.  | L  |
|   | 8. Exposure to contaminated media     | 1. Follow good decontamination practices (work from top down and outside in). Surgeon's gloves are to be the last item of PPE removed.<br>2. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.   | L  |
| EQUIPMENT   |                                       | INSPECTION  | TRAINING   |
| Hand tools (hand brushes, garden sprayers, etc.)<br><br>Pressure washer   |                                       | Visual inspection prior to use by user. Check wooden handles for cracks or splinters.<br><br>Inspect pressure washer prior to putting into service to ensure that it is in good working order, and ensure that fittings are secure.   | None required.<br><br>Review manufacturer's instructions and safety guidelines prior to use.   |
| <b>Personal Protective Equipment:</b><br><b>Minimum:</b> Safety toe boots, safety glasses <b>Optional items:</b> Hardhat, hearing protection.<br>Decontamination pad pressure |                                       | Initial PPE inspection performed by SSO.<br>Ongoing (prior to each use) inspections responsibilities of PPE users.  | Initial site specific H&S training to cover review of the APP and SSHP. Daily tail-gate and pre-task briefings to review appropriate AHAs and other relevant topics. OSHA 40 HAZWOPER training, plus appropriate 8-hour annual refresher training for the task participants. |

**Table 10-1**  
**Activity Hazard Analysis**

| EQUIPMENT  | INSPECTION | TRAINING   |
|--|------------|--|
| <p>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>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 |
|----------------|-----------|------|
|                |           |      |
|                |           |      |
|                |           |      |
|                |           |      |

|  |  |             |        |                  |                        |          |
|--|--|-------------|--------|------------------|------------------------|----------|
| <b>Activity/Work Task:</b> IDW Management          | Overall Risk Assessment Code (RAC) (Use highest code)  |             |        |                  |                        | L        |
| <b>Project Location:</b> NCBC Gulfport             | Risk Assessment Code (RAC) Matrix  |             |        |                  |                        |          |
| <b>Contract Number:</b> N62472-08-D-1001           | Severity   | Probability |        |                  |                        |          |
| <b>Date Prepared:</b> October 20, 2014             |  | Frequent    | Likely | Occasional       | Seldom                 | Unlikely |
| <b>Prepared by:</b> J. Laffey , CESCO              | Catastrophic   | E           | E      | H                | H                      | M        |
|  | Critical   | E           | H      | H                | M                      | L        |
| <b>Reviewed by:</b> J. Carothers, PhD              | Marginal   | H           | M      | M                | L                      | L        |
|  | Negligible   | M           | L      | L                | L                      | L        |
| <b>Notes:</b> (Field Notes, Review Comments, etc.) | Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)   |             |        |                  |                        |          |
|  | "Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.   |             |        |                  | RAC Chart              |          |
|  | "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible |             |        |                  | E= Extremely High Risk |          |
|  | Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.       |             |        |                  | H= High Risk           |          |
|  |  |             |        | M= Moderate Risk |                        |          |
|  |  |             |        | L= Low           |                        |          |

| JOB STEPS                              | HAZARDS                                 | CONTROLS   | RAC |
|--|---|--|-----|
| Filling, moving 55-gallon drums of IDW | 1. Struck by/pinches compressions       | 1. Exercise caution when handling drums.<br>2. Position drums so that there is adequate room between them for placement and repositioning.   | L   |
|  | 3. Falling objects (drums)              | 1. Do not stack drums on top of each other.<br>2. Do not place more than 4 drums to a pallet.<br>3. Leave at least 4 ft. of clearance between pallets for clear access.  | L   |
|  | 4. Slips, Trips, Falls                  | 1. Maintain good housekeeping in IDW storage areas, keeping it clear of loose debris and other potential tripping hazards.<br>2. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces.                      | L   |
|  | 5. Foot hazards                         | 1. Safety toe foot protection will be required for IDW container handling activities   | L   |
|  | 6. Strains/sprains due to heavy lifting | 1. Practice safe lifting techniques<br>2. Use mechanical lifting devices such as a dolly whenever possible<br>3. Ensure clear path of travel<br>4. Get a good grasp on object<br>5. Lift with legs not back<br>6. Obtain help when needed to lift large, bulky, or heavy items | L   |
|  | 7. Minor contusions, abrasions, cuts    | 1. Wear cut-resistant gloves when handling items with sharp or rough edges.  | L   |

**Table 10-1  
Activity Hazard Analysis**

| Equipment To Be Used  | Training Requirements/Competent or Qualified Personnel name(s)   | Inspection Requirements   |
|---|--|---|
| Hand tools (drum dollies, wrenches, etc.)   | Site personnel participating in this activity must be current with HAZWOPER training requirements.   | Visual inspection prior to use by user. Check wooden handles for cracks or splinters. .                         |
| <p><b>Personal Protective Equipment:</b><br/> <b>Minimum:</b> Safety toe boots, safety glasses<br/> <b>Optional items:</b> Hardhat, cotton or leather work gloves.</p> <p><b>HTRW:</b> If contact with IDW is likely, wear chemical-resistant coveralls (e.g., surgeon's nitrile gloves under leather/cotton work gloves.</p> | <p>Initial site specific H&amp;S training to cover review of the APP and SSHP. Daily tail-gate and pre-task briefings to review appropriate AHAs and other relevant topics.</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> | Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users. |

I have read and understand this AHA:

| Name (Printed) | Signature | Date |
|----------------|-----------|------|
|                |           |      |
|                |           |      |
|                |           |      |
|                |           |      |

## 11.0 REFERENCES, MATERIALS AND DOCUMENTATION

United States Army Corps of Engineers (USACE). 15 September 2008. Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual.

Available online at: <http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/entire.pdf>

The Tetra Tech FOL/SSO shall ensure the following materials/documents are taken to the project site and used when required. The following documentation is to be maintained at the site for quick reference purposes in the Tetra Tech work vehicle.

**Chemical Inventory Listing (posted)** - This list represents the chemicals brought onsite, including decontamination solutions, sample preservations, fuel, etc. This list will be maintained in the Tetra Tech Work Trailer.

**Material Safety Data Sheets/Safety Data Sheets (SDS) (maintained)** - The SDS will be maintained in the Tetra Tech Work trailer. These documents should match the listings on the chemical inventory list for substances used onsite. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

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

**Emergency Phone Numbers and Directions to the Hospital(s) (posted)** - This list of numbers and directions will be maintained at phone communications points and in each site vehicle.

**Medical Data Sheets/Cards (maintained)** - Medical Data Sheets will be completed by onsite personnel and filed in the Tetra Tech Work Trailer. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to personnel to carry at times.

## FIGURES

**FIGURE 2-1**  
**FACILITY LOCATION MAP**

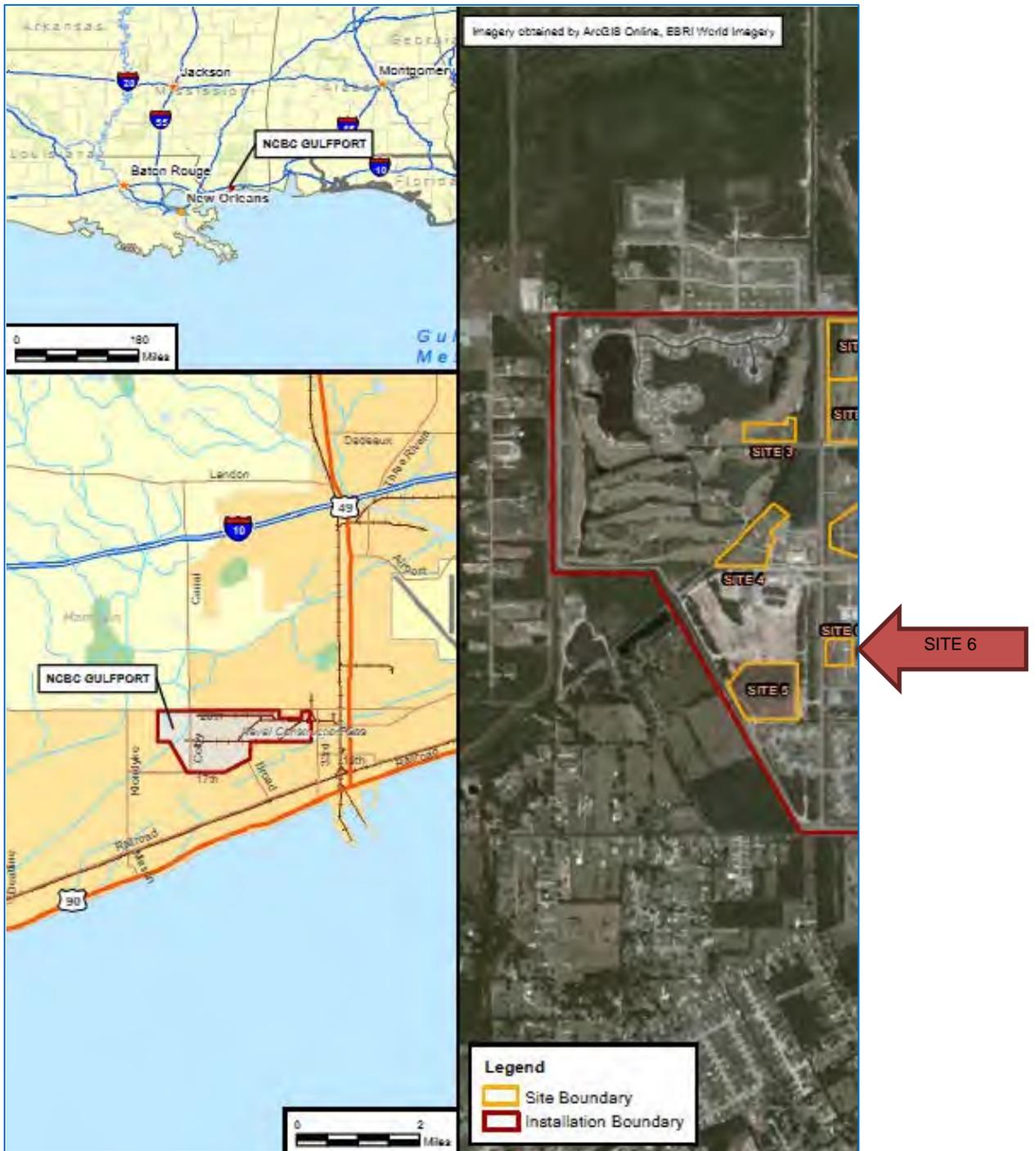
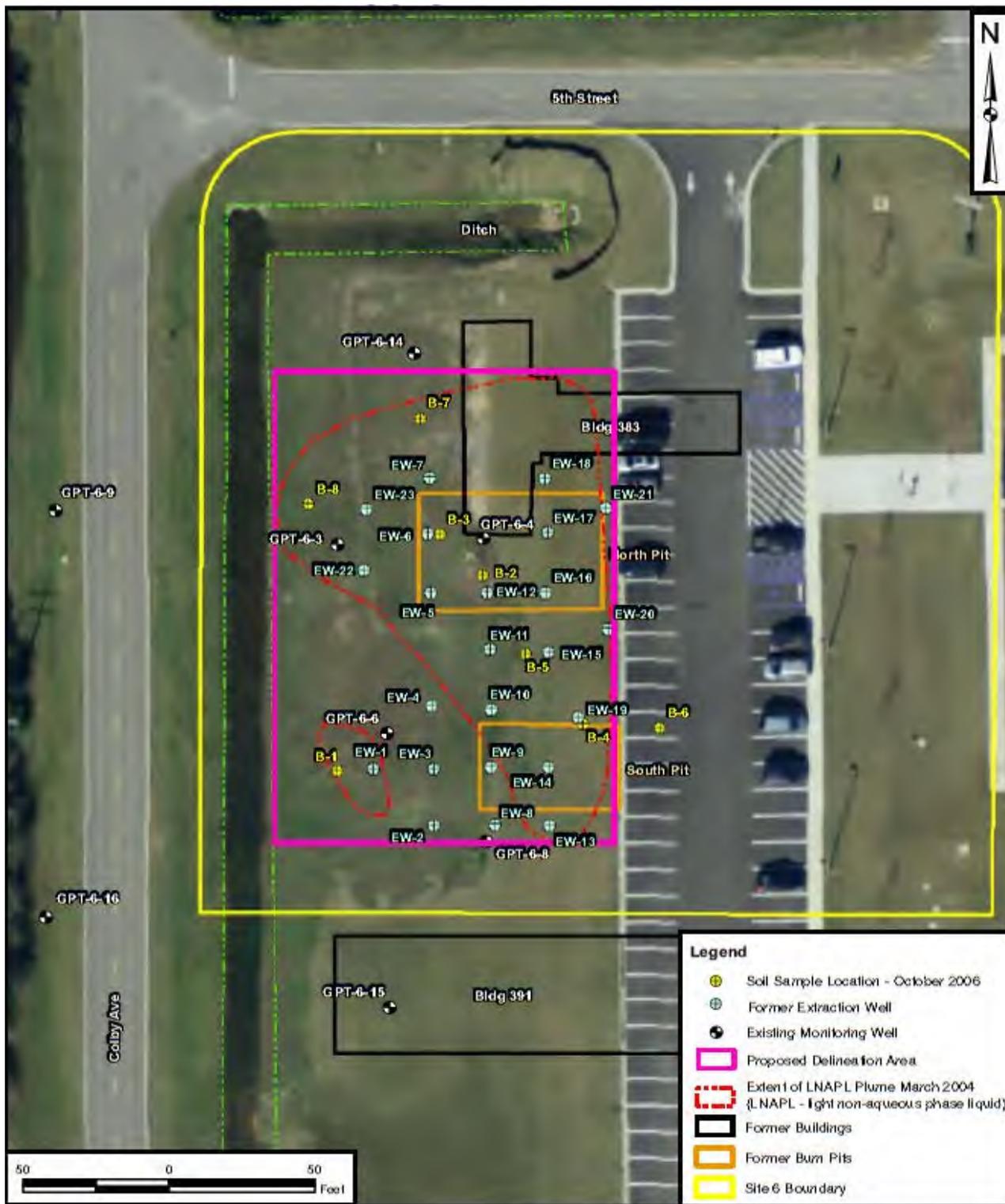


FIGURE 2-2  
SITE 6 MAP

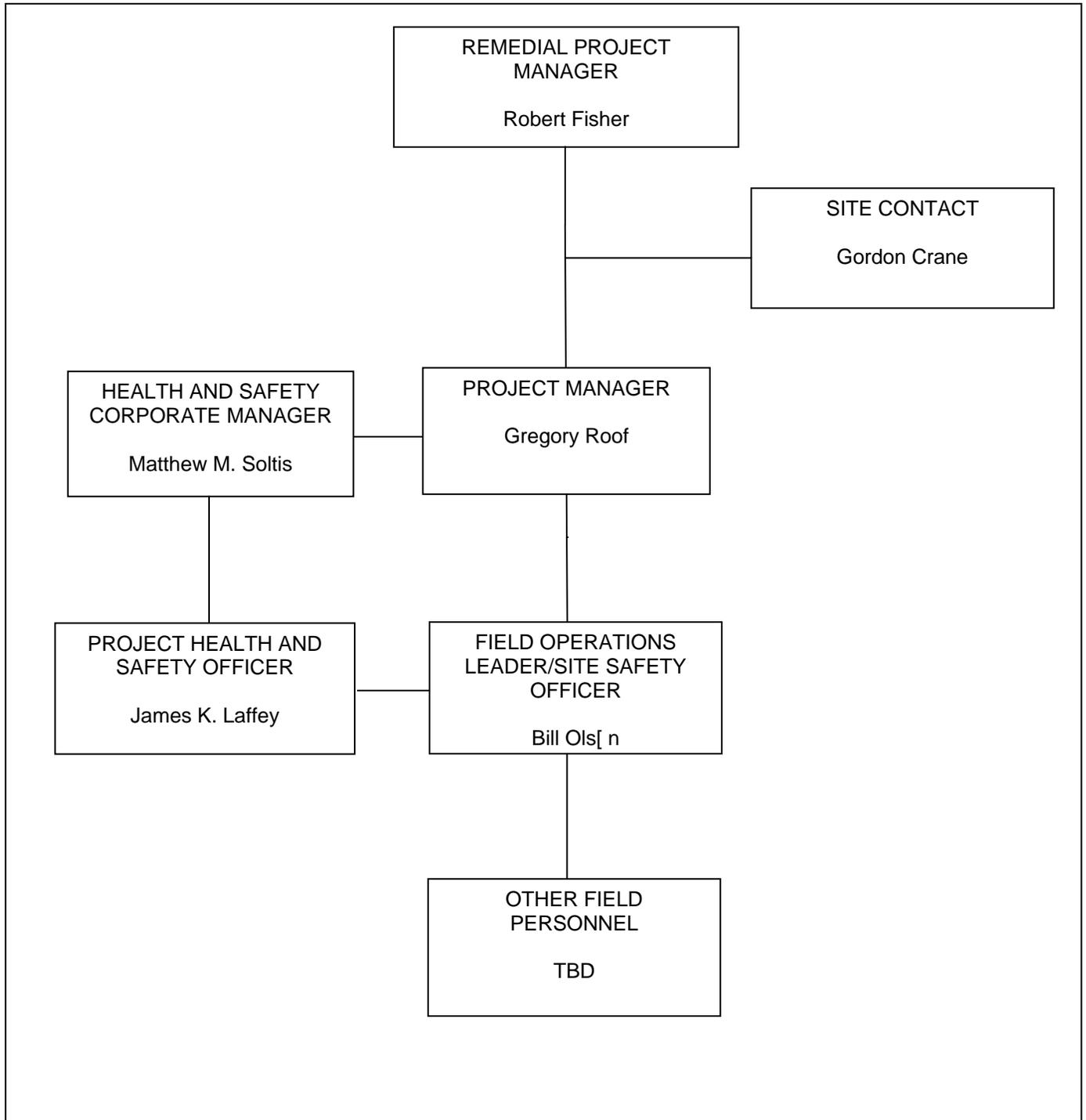








**FIGURE 4-1**  
**ORGANIZATION CHART**  
**FIELD ACTIVITIES AT NCBC GULFPORT**



**FIGURE 8-1**

**TETRA TECH, INC.  
INCIDENT REPORT**



|             |                    |                        |
|-------------|--------------------|------------------------|
| Report Date | Report Prepared By | Incident Report Number |
|             |                    |                        |

**INSTRUCTIONS:**

All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.

Complete any additional parts to this form as indicated below for the type of incident selected.

| TYPE OF INCIDENT (Check all that apply)                                      | Additional Form(s) Required for this type of incident                       |
|--|---|
| Near Miss (No losses, but could have resulted in injury, illness, or damage) | <input type="checkbox"/> Complete IR Form Only                              |
| Injury or Illness  | <input type="checkbox"/> Complete Form IR-A; Injury or Illness              |
| Property or Equipment Damage, Fire, Spill or Release                         | <input type="checkbox"/> Complete Form IR-B; Damage, Fire, Spill or Release |
| Motor Vehicle  | <input type="checkbox"/> Complete Form IR-C; Motor Vehicle                  |

**INFORMATION ABOUT THE INCIDENT**

**Description of Incident**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

|                         |  |
|-------------------------|--|
| <b>Date of Incident</b> | <b>Time of Incident</b>  |
|                         | _____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/> |

|   |  |
|---|--|
| <b>Weather conditions at the time of the incident</b> | <b>Was there adequate lighting?</b>                            |
|   | _____ Yes <input type="checkbox"/> No <input type="checkbox"/> |

**Location of Incident**

\_\_\_\_\_ Was location of incident within the employer's work environment? Yes  No

|                       |  |
|-----------------------|--|
| <b>Street Address</b> | <b>City, State, Zip Code and Country</b> |
|                       |  |

|                            |                |
|----------------------------|----------------|
| <b>Project Name/Number</b> | <b>Client:</b> |
|                            |                |

|   |  |
|---|--|
| <b>Tt Supervisor or Project Manager</b> | <b>Was supervisor on the scene?</b>                      |
|   | Yes <input type="checkbox"/> No <input type="checkbox"/> |

**WITNESS INFORMATION (attach additional sheets if necessary)**

|             |                |
|-------------|----------------|
| <b>Name</b> | <b>Company</b> |
|             |                |

|                       |                                 |
|-----------------------|---------------------------------|
| <b>Street Address</b> | <b>City, State and Zip Code</b> |
|                       |                                 |

**Telephone Number(s)**

\_\_\_\_\_



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 [ ] Level - 2 [ ] None [ ]

Root Cause Analysis Level Definitions

Table with 2 columns: Level - 1, Level - 2. Each row contains a definition and a list of events that trigger the respective RCA level.

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

Table with 5 columns: Title, Printed Name, Signature, Telephone Number, Date. Rows include Project Manager or Supervisor, Site Safety Coordinator or Office H&S Representative, Operating Unit H&S Representative, and 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)   |  |  |  |
| <b>EMPLOYEE INFORMATION</b>  |  |  |  |
| Company Affiliation  |  |  |  |
| Tetra Tech Employee? <input type="checkbox"/>  |  | Tetra Tech subcontractor employee (directly supervised by Tt personnel)? <input type="checkbox"/>              |  |
| Full Name  |  | Company (if not Tt employee)   |  |
|  |  |  |  |
| Street Address, City, State and Zip Code   |  | Address Type   |  |
| _____  |  | Home address (for Tt employees) <input type="checkbox"/>   |  |
| _____  |  | Business address (for subcontractors) <input type="checkbox"/>   |  |
| Telephone Numbers  |  |  |  |
| Work: _____  | Home: _____  | Cell: _____  |  |
| Occupation (regular job title)   |  | Department   |  |
|  |  |  |  |
| Was the individual performing regular job duties?  |  | Time individual began work   |  |
| Yes <input type="checkbox"/> No <input type="checkbox"/>   |  | _____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/> |  |
| Safety equipment   |  |  |  |
| Provided? Yes <input type="checkbox"/> No <input type="checkbox"/>   | Type(s) provided: <input type="checkbox"/> Hard hat <input type="checkbox"/> Protective clothing |  |  |
| Used? Yes <input type="checkbox"/> No <input type="checkbox"/> If no, explain why  | <input type="checkbox"/> Gloves <input type="checkbox"/> High visibility vest                    |  |  |
| _____  | <input type="checkbox"/> Eye protection <input type="checkbox"/> Fall protection                 |  |  |
| _____  | <input type="checkbox"/> Safety shoes <input type="checkbox"/> Machine guarding                  |  |  |
| _____  | <input type="checkbox"/> Respirator <input type="checkbox"/> Other (list)                        |  |  |
| <b>NOTIFICATIONS</b>   |  |  |  |
| Name of Tt employee to whom the injury or illness was first reported   |  | Was H&S notified within one hour of injury or illness?   |  |
|  |  | Yes <input type="checkbox"/> No <input type="checkbox"/>   |  |
| Date of report   |  | H&S Personnel Notified   |  |
|  |  |  |  |
| Time of report   |  | Time of Report   |  |
|  |  |  |  |
| If subcontractor injury, did subcontractor's firm perform their own incident investigation?  |  |  |  |
| Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, request a copy of their completed investigation form/report and attach it to this report. |  |  |  |

**INJURY / ILLNESS DETAILS**

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

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**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"

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

---



---

**MEDICAL CARE PROVIDED**

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

---

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

**Name of physician or health care professional**

**Facility Name**

**Street Address, City State and Zip Code**

**Type of Care?**

---



---

Was individual treated in emergency room? Yes  No

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

**Telephone Number**

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

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

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

**SIGNATURES**

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

**Affected individual (print)**

**Affected individual (signature)**

**Telephone Number**

**Date**

---



---



---



---

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



INSTRUCTIONS:

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

Incident Report Number: (From the IR Form)

TYPE OF INCIDENT (Check all that apply)

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

INCIDENT DETAILS

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

Three horizontal lines for describing incident results.

Response Actions Taken:

Three horizontal lines for describing response actions.

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. Includes three empty rows for data entry.

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

Table with 3 columns: Substance, Estimated quantity and duration, Specify Reportable Quantity (RQ). Includes a row for 'Exceeded?' with Yes, No, and NA checkboxes.

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

Fire fighting equipment used? Yes [ ] No [ ] If yes, type of equipment: \_\_\_\_\_

NOTIFICATIONS

Table with 4 columns: Required notifications, Name of person notified, By whom, Date / Time. Includes rows for Client, Agency, and Other notifications.

Who is responsible for reporting incident to outside agency(s)? Tt [ ] 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 - Tetra Tech, Vehicle 2 - Other Vehicle). Includes fields for owner/contact info, color, make, model, year, license plate, identification, damage description, insurance, and agent details.

| 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.<br/>           Driver information is captured in the preceding section.<br/>           Information related to persons injured in the accident (non-Tt employees) is captured in the section below on this form.<br/>           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 what happened during an incident.

**FIGURE 9-1**

**EMERGENCY CONTACTS  
NCBC GULFPORT, MISSISSIPPI**

| <b>AGENCY</b>  | <b>TELEPHONE</b>                                 |
|--|--|
| EMERGENCY  | <b>9-1-1</b>                                     |
| Police   | (228) 871-2222                                   |
| Fire/Hazardous Materials Release   | (228) 871-2333                                   |
| Ambulance Services   | (228) 871-2444                                   |
| Memorial Hospital at Gulfport  | (228) 867-4000                                   |
| WorkCare <sup>®</sup> Intervention Hotline   | (888) 449-7787                                   |
| Chemtrec   | (800) 424-9300                                   |
| National Response Center   | (800) 424-8802                                   |
| Mississippi Regional Poison Control Center   | (800) 222-1222                                   |
| Base Contact, Mr. Gordon Crane   | (228) 871-2485<br>(800) 343-3472 – pager         |
| Navy RPM, Robert Fisher  | (904) 542-6827                                   |
| Utilities (On Base Utility Clearances and Emergencies) Public Works Maintenance Division | (228) 871-2244                                   |
| Public Utility Locating Service Mississippi One Call System Inc.                         | 811  |
| Tetra Tech, Tallahassee Office   | (850) 359-9899                                   |
| Tetra Tech, Pittsburgh Office  | (412) 921-7090                                   |
| Task Order Manager, Gregory Roof, P.E.   | (904) 730-4669                                   |
| Tetra Tech, FOL, Bill Olson  | (850) 385-9866 ext.1359<br>(850) 443-6855 - cell |
| Tetra Tech, Gulfport, Mississippi Office   | (228) 575-6287                                   |
| Tetra Tech, CLEAN HSM Matthew Soltis, CIH, CSP   | (412) 921-8912 – office<br>(412) 260-6681 - cell |
| Tetra Tech, PHSO, James K. Laffey  | (412) 921-8678 – office<br>(412) 370-6668 - cell |



**FIGURE 9-3**

**MEDICAL DATA SHEET**

This Medical Data Sheet must be completed by on-site personnel and kept in a secured location or on your person during 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 \_\_\_\_\_

(Relationship): \_\_\_\_\_ Phone: \_\_\_\_\_

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

Doctor Prescribed Antidotes: \_\_\_\_\_ Prescription Expiration date: \_\_\_\_\_

Particular Sensitivities (Previous Medical Conditions): \_\_\_\_\_

Do You Wear Contact Lenses? \_\_\_\_\_

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

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

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

HIPAA took effect in 1996 then was amended in September 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 may 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 access this form so it may 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



FIGURE 9-5

REQUIREMENTS FOR BASIC UNIT FIRST AID PACKAGES

| Unit first aid item                           | Minimum Size or Volume (metric)   | Minimum Size or Volume (US)            | Item quantity per unit package | Unit package size |
|---|-----------------------------------|--|--------------------------------|-------------------|
| *Absorbent Compress                           | 206 cm <sup>2</sup>               | 32 in <sup>2</sup>                     | 1                              | 1                 |
| * Adhesive Bandage                            | 2.5 x 7.5 cm                      | 1 x 3 in.                              | 16                             | 1                 |
| Antibiotic Treatment                          | 0.9 g                             | 1/32 oz.                               | 6                              | 1                 |
| * Adhesive Tape                               | 457.2 cm                          | 5 yd. (total)                          | 1 or 2                         | 1 or 2            |
| * Antiseptic Swab.                            | 0.5 g                             | 0.14 fl. Oz.                           | 10                             | 1                 |
| Antiseptic Wipe                               | 2.5 x 2.5 cm                      | 1 x 1 in.                              | 10                             | 1                 |
| Antiseptic Towelette                          | 157 cm <sup>2</sup>               | 24 in.                                 | 10                             | 1                 |
| Aspirin, Individually Wrapped                 | 325 mg                            |  | 2                              | 2                 |
| Bandage Compress (2 in.).                     | 5 x 91 cm                         | 2 x 36 in.                             | 4                              | 1                 |
| Bandage Compress (3 in.).                     | 7.5 x 152 cm                      | 3 x 60 in.                             | 2                              | 1                 |
| Bandage Compress (4 in.).                     | 10 x 183 cm                       | 4 x 72 in.                             | 1                              | 1                 |
| Burn Dressing                                 | 10 x 10 cm                        | 4 x 4 in.                              | 1                              | 1-2               |
| * Burn Treatment                              | 0.9                               | 1/32 fl. oz.                           | 6                              | 1                 |
| CPR Barrier                                   |                                   |  | 1                              | 1                 |
| Cold Pack                                     | 10 x 12.5 cm                      | 4 x 5 in                               | 1                              | 1-2               |
| Eye Covering, with means of attachment        | 19 cm <sup>2</sup>                | 2.9 in <sup>2</sup>                    | 2                              | 1                 |
| Eye Wash                                      | 30 ml                             | 1 fl. Oz. total                        | 1                              | 2                 |
| Eye Wash & Covering, with means of attachment | 30 ml total<br>19 cm <sup>2</sup> | 1 fl. oz. total<br>2.9 in <sup>2</sup> | 1<br>2                         | 2                 |
| Gloves, latex free                            | XL                                | XL                                     | 1 pair                         | 1                 |
| Gloves, latex free                            | L                                 | L                                      | 1 pair                         | 1                 |
| Roller Bandage (4 in.).                       | 10 x 550 cm                       | 4 in. x 6 yd.                          | 1                              | 1                 |
| Roller Bandage (2 in.) 2 1                    | 5 x 550 cm                        | 2 in. x 6 yd.                          | 2                              | 1                 |
| * Sterile pad                                 | 7.5 x 7.5 cm                      | 3 x 3 in.                              | 4                              | 1                 |
| * Triangular Bandage                          | 101 x 101 x 142 cm                | 40 x 40 x 56 in.                       | 1                              | 1                 |

- \* Minimum mandatory contents for basic fill kit
- Section 3.03B of the EM 385-1-1 Manual

## **ATTACHMENTS**

**ATTACHMENT I**

**SITE-SPECIFIC TRAINING DOCUMENTATION FORM  
AND EMPLOYEE TRAINING/QUALIFICATIONS**



**INSERT EMPLOYEE FIRST AID DOCUMENTS HERE.**

**ATTACHMENT II**  
**SAFETY DATA SHEETS**



---

## 4. First-Aid Measures

|                      |   |
|----------------------|---|
| <b>Inhalation:</b>   | Remove the subject from dusty environment. Consult with a physician in case of respiratory symptoms.  |
| <b>Eye contact:</b>  | Flush eyes with running water for 15 minutes, while keeping the eyelids wide open. Consult with ophthalmologist in all cases.                                       |
| <b>Skin contact:</b> | Wash the affected skin with soap and mild detergent and large amounts of water. Consult with a physician in case of persistent pain or redness.                     |
| <b>Ingestion:</b>    | If the victim is conscious and not convulsing, give 2-4 cupfuls of water to dilute the chemical. <b>DO NOT</b> induce vomiting. Seek medical attention immediately. |

---

## 5. Fire-Fighting Measures

|                                      |   |
|--------------------------------------|---|
| <b>Flash point</b>                   | Not applicable  |
| <b>Flammability:</b>                 | Not applicable  |
| <b>Auto-flammability:</b>            | Not applicable  |
| <b>Danger of explosion</b>           | Non-explosive   |
| <b>Common extinguishing Methods:</b> | Large quantities of water, water spray. In case of fire in close proximity, all means of extinguishing are acceptable.  |
| <b>Specific hazards</b>              | Oxidizer. Storage vessels involved in a fire may vent gas or rupture due to internal pressure. Damp material may decompose exothermically and ignite combustibles. Oxygen release due to exothermic decomposition may support combustion. May ignite other combustible materials. Avoid contact with incompatible materials such as heavy metals, reducing agents, acids, bases, combustibles (wood, papers, cloths etc.). Thermal decomposition releases oxygen and heat. Pressure bursts may occur due to gas evolution. Pressurization if confined when heated or decomposing. Containers may burst violently. |
| <b>Fire fighting instructions:</b>   | Personnel should wear full bunker gear and positive-pressure, self-contained breathing apparatus. Apply cooling water to sides of transport or storage vessels that are exposed to flames until fire is out. Do not approach hot vessels containing product. Remain upwind of fire to avoid hazardous vapors and decomposition products.  |

---

## 6. Accidental Release Measures

- Cleanup methods:** Eliminate all sources of ignition. Evacuate unprotected personnel from equipment recommendations found in Section 8. Never exceed any occupational exposure limit.
- Shovel or sweep material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to inventory.
- Flush remaining area with water to remove trace residue and dispose of properly. Avoid direct discharge to sewers and surface waters. Notify authorities if entry occurs.
- Do not touch or walk through spilled material. Keep away from combustibles (wood, paper, oils, etc.) Do not return any product to container because of the risk of contamination.

---

## 7. Handling and Storage

- Handling:** Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Do not swallow. Avoid breathing vapors, mists, or dust. Do not eat, drink, or smoke in work area. Prevent contact with combustible or organic materials. Label containers and keep them tightly closed when not in use. Wash thoroughly after handling.
- Storage:** Store in cool, well-ventilated area away from all source of ignition and out of direct sunlight. Store in a dry location away from heat. Keep away from incompatible materials. Keep containers tightly closed. Do not store in unlabeled or mislabeled containers. Protect from moisture. Do not store near combustible materials. Keep containers well sealed, seal only with original vent cap. Ensure pressure relief and adequate ventilation. Store separately from organics and reducing materials. Avoid contamination, which may lead to decomposition.

---

## 8. Exposure Controls/Personal Protection

|                                |  |
|--------------------------------|--|
| <b>Engineering controls:</b>   | General room ventilation is required. Local exhaust ventilation, process enclosures or other engineers controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mist. Maintain adequate ventilation. Do not use in closed or confined spaces. Keep levels below exposure limits. To determine exposure levels, monitoring should be performed regularly. |
| <b>Eye/face protection:</b>    | Wear chemical safety goggles and a full-face shield while handling this product.   |
| <b>Skin protection:</b>        | Prevent contact with this product. Wear gloves and protective clothing depending on condition of use. Protective gloves: Chemical-resistant (Recommended material: PVC, neoprene or rubber)  |
| <b>Respiratory protection:</b> | For many conditions, no respiratory protection may be needed; however, in dusty or unknown atmospheres or when exposures exceed limit values, wear a NIOSH approved dust respirator.   |
| <b>Other precautions:</b>      | Safety shower and eyewash stations. Impervious clothing and rubber boots.  |

---

## 9. Physical and Chemical Properties

|                                   |   |
|-----------------------------------|---|
| <b>Appearance:</b>                | White or yellowish powder   |
| <b>Odor:</b>                      | Odorless  |
| <b>pH:</b>                        | 11 -13 (saturated solution)   |
| <b>Decomposition Temperature:</b> | Self-accelerating decomposition with oxygen release starting from 275°C |
| <b>Bulk Density:</b>              | 500 – 650 g/L   |
| <b>Solubility in Water:</b>       | Insoluble   |

---

## 10. Stability and Reactivity

|                            |  |
|----------------------------|--|
| <b>Chemical Stability:</b> | Stable under certain conditions (see below).   |
| <b>Materials to Avoid:</b> | Water<br>Acids<br>Bases<br>Salts of heavy metals<br>Reducing agents<br>Organic materials<br>Flammable substances |

**Hazardous Decomposition  
Products:**

Oxygen which supports combustion

---

## 11. Toxicological Information

**Oral:** LD<sub>50</sub>, Min. 2000 mg/kg, rat

**Dermal:** LD<sub>50</sub>, Min. 2000 mg/kg, rabbit

**Inhalation:** LD<sub>50</sub>, Min. 4580mg/kg, rat

---

## 12. Ecological Information

**Ecotoxicological Information:** Hazards for the environment is limited due to the product properties of no bioaccumulation, weak solubility and precipitation in aquatic environment.

**Chemical Fate Information:** As indicated by chemical properties oxygen is released into the environment.

---

## 13. Disposal Considerations

**Waste Treatment:** Dispose of in an approved waste facility operated by an authorized contractor in compliance with local regulations.

**Package Treatment:** The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

---

## 14. Transport Information

**D.O.T. Proper Shipping Name:** Oxidizing Solid, n.o.s.

**UN Number:** UN 1457

**Hazard Class:** 5.1

**Label(s):** 5.1 (Oxidizer)

**Packing Group:** II

---

## 15. Regulatory Information

|                                       |         |
|---------------------------------------|---------|
| <b>SARA Section:</b>                  | Yes     |
| <b>SARA (313) Chemicals:</b>          | No      |
| <b>EPA TSCA Inventory:</b>            | Appears |
| <b>Canadian WHMIS Classification:</b> | C, D2B  |
| <b>Canadian DSL:</b>                  | Appears |
| <b>EINECS Inventory:</b>              | Appears |

---

## 16. Other Information

### Notice:

OSHA STANDARD 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a Hazard Communication Program including training, labeling, Material Safety Data Sheets, and access to written records. We request that you, and it is your legal duty, make all information in this Material Safety Data Sheet available to your employees.

### Key Legend Information:

|                 |   |
|-----------------|---|
| N/A:            | Not Available   |
| N/R:            | Not Rated   |
| ND:             | Not Determined  |
| ACGIH:          | American Conference of Governmental Industrial Hygienists |
| OSHA:           | Occupational Safety and Health Administration             |
| TLV:            | Threshold Limit Value                                     |
| PEL:            | permissible Exposure Limit                                |
| TWA:            | Time Weighted Average                                     |
| STEL:           | Short Term Exposure Limit                                 |
| NTP:            | National Toxicology Program                               |
| IARC:           | International Agency for Research on Cancer               |
| SARA Title III: | Superfund Amendments and Reauthorization Act              |
| CERCLA:         | Comprehensive Response, Compensation and Liability Act    |
| TSCA:           | Toxic Substance Control Act                               |

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This Material Safety Data Sheet was prepared to comply with OSHA Hazard Communication standard, (20 CFR 1910.1200). This supersedes any previous information.



**Ingestion:** Give several glasses of water. **DO NOT** induce vomiting. If vomiting occurs keep head below hips to reduce risk of aspiration. Give fluids again. Never give anything by mouth to a person who is unconscious or convulsing. Get medical attention if health effects occur.

**Inhalation:** Remove victim to fresh air. If breathing becomes difficult, oxygen may be given, preferably under physician's advice. If breathing has stopped, give artificial respiration. Get medical attention.

---

#### 4. First-Aid Measures

**Inhalation:** Remove to fresh air. If breathing becomes difficult, oxygen may be given, preferably with a physician's advice. If not breathing, give artificial respiration. Get medical attention.

**Eye:** Flush eyes with large quantities of running water for a minimum of 15 minutes. If victim is wearing contact lenses, remove them. Hold eyelids apart during the flushing to ensure rinsing of entire surface of the eye and lids with water. Get medical attention if eye irritation occurs.

**Skin:** Remove contaminated clothing, shoes, and equipment. Immediately wash with soap and water for a minimum of 15 minutes. Wash contaminated clothing before reuse and discard footwear, which cannot be cleaned. Get immediate medical attention if irritation occurs.

**Ingestion:** If patient is conscious, give plenty of water to drink. Do NOT INDUCE VOMITING. If vomiting occurs keep head below hips to reduce risk of aspiration. **Never give anything to eat or drink to someone who is unconscious, having convulsions, or unable to swallow.** Get immediate medical attention.

---

#### 5. Fire-Fighting Measures

**Conditions of Flammability:** Not flammable or combustible.

**Flash point:** Not applicable

**Flammability:** Not applicable

**Auto-flammability:** Not applicable

**Extinguisher Media:** Use water fog or spray, dry chemical, foam or carbon dioxide extinguishing agents.

**Fire Fighting Procedures:** As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate non-essential personnel from the fire area. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

**Fire and Explosion Hazards:** Although this product is not defined as flammable or combustible, potential for dust explosion may exist. Depending upon conditions, dust may be sensitive to static discharge. Avoid possibility of dry powder and friction causing static electricity in presence of flammable materials.

**Hazardous Combustion Products:** Thermal decomposition products may release toxic and / or hazardous fumes and gases, including nitrogen oxides and carbon oxides.

---

## 6. Accidental Release Measures

**Clean Up:** Safely stop source of spill. Restrict non-essential personnel from area. All personnel involved in spill cleanup should follow good industrial hygiene practices and avoid skin and eye contact by wearing appropriate personal protective equipment. Sweep up spilled solid material, being careful not to create dust. Return sweepings to stock or, if contaminated, place into a chemical waste container for disposal.

---

## 7. Handling and Storage

**Handling:** Avoid inhalation and prolonged and/or repeated skin and eye contact. Minimize generation of dust.

**Storage:** Keep containers closed and dry. This material is suitable for any general chemical storage area. Isolate from strong oxidizing agents. Store in PVC, PE, stainless steel or bituminized tanks. Avoid contact with aluminum, copper alloys and nickel.

**Maximum Storage Temperature:** Store in a cool and dry place below 25°C / 77°F.

**General Comments:** Containers should not be opened until ready for use. It is recommended to re-test the product after three years in storage.

## 8. Exposure Controls/Personal Protection

**Skin Protection:** Skin contact with product should be minimized or prevented through the use of suitable protective clothing, gloves and footwear selected according to use condition exposure potential.

**Respiratory Protection:** Use of respiratory protection is generally not required. However, if use conditions generate dust and adequate ventilation is not available, use a NIOSH-approved organic vapor respirator with dust, mist and fume filters to reduce potential for inhalation exposure. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

**Eye Protection:** Dust-tight goggles should be worn when handling this product.

**Ventilation:** Special ventilation is usually not required under normal use conditions. However, ensure that existing ventilation is sufficient to prevent the circulation and/or accumulation of dust in the air.

**Other Protection:** All food and smoking material should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking and smoking, hands and face should be thoroughly washed.

**Exposure Limits:** In addition to any exposure limits displayed below, exposures to this product should be controlled below limits established for "Particulates Not Otherwise Classified (PNOC)":

ACGIH: 10mg/m<sup>3</sup> (inhalable Particles); 3 mg/m<sup>3</sup> (respirable Particles)  
OSHA: 15mg/m<sup>3</sup> (total dust); 5 mg/m<sup>3</sup> (respirable fraction)

## 9. Physical and Chemical Properties

|                                |   |
|--------------------------------|---|
| <b>Appearance and Odor:</b>    | White odorless free-flowing powder              |
| <b>Melting Point:</b>          | 230°F (110°C) / loss of crystallization         |
| <b>Boiling Point:</b>          | N/A   |
| <b>Vapor Pressure (mm/Hg):</b> | N/A   |
| <b>Vapor Density (air=1):</b>  | Not Determined                                  |
| <b>Reactivity In Water:</b>    | N/A   |
| <b>Specific Gravity:</b>       | Not Determined                                  |
| <b>Solubility in Water:</b>    | ~ 100g/L 68°F / 20°C); ~ 230 g/L (176°F / 80°C) |
| <b>pH:</b>                     | 4.0 – 5.0                                       |

---

## 10. Stability and Reactivity

|  |  |
|--|--|
| <b>Chemical Stability:</b>                 | Stable   |
| <b>Conditions to Avoid:</b>                | Prolonged Storage at elevated temperatures.  |
| <b>Materials to Avoid:</b>                 | Avoid contact with oxidizing materials, aluminum, copper, copper alloys, and nickel. |
| <b>Hazardous Decomposition Products:</b>   | Burning may produce Oxides of Carbon, Nitrogen or Sulfur.                            |
| <b>Polymerization Conditions to Avoid:</b> | Hazardous polymerization will not occur.   |

---

## 11. Toxicological Information

|                            |                           |
|----------------------------|---------------------------|
| <b>Eye Effects:</b>        | (Rabbits) Irritant        |
| <b>Skin Effects:</b>       | (Rabbits) Not an irritant |
| <b>Inhalation Effects:</b> | Not evaluated             |
| <b>Sensitization:</b>      | Not evaluated             |
| <b>Ingestion Effects:</b>  | (Rats) LD50>2000 mg/kg    |

**Carcinogenicity/Mutagenicity:** Nitriolotriacetic acid (NTA) and its salts were determined to be “possibly carcinogenic to humans” (Group 2B), by the International Agency for Research on Cancer (IARC) and a compound which “may reasonably be anticipated to be a carcinogen” by the NTP. EDTA and its sodium salts have been reported to cause birth defects in laboratory animals only at exaggerated doses that were toxic to the mother.

**Reproductive Effects:** Limited data in laboratory animals suggests that the material does not affect reproduction.

**Target Organs:** Kidney, bladder and developmental (in the presence of maternal toxicity).

---

## 12. Ecological Information

**Ecotoxicity:** Not data available for this product.

**Biodegradability:** Not evaluated

---

## 13. Disposal Considerations

**Waste Disposal Method:** In its unused condition, this product is not considered to be a RCRA-defined hazardous waste by characteristics of listings. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristic or listing. Dispose in accordance with all local, state and federal regulations.

**Container Disposal Information:** Containers should be cleaned of residual product before disposal or return. Empty containers should be disposed of or shipped in accordance with all applicable laws and regulations.

---

## 14. Transport Information

**Label Requirement:** None

**Shipping:** Not regulated by any means of transport.

---

## 15. Regulatory Information

**State Right To Know Laws:** The following ingredients are disclosed for compliance with State Right to Know Laws:

State RTK: PA, NJ, MA

**Sara, Title III, Hazard Classes Sections 311-312:** Immediate (acute) health hazard

**OSHA Status:** This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910, 1200.

**Sara, Title III Hazard Classes Section 302 – EXTREMELY HAZARDOUS SUBSTANCES:** This product does not contain ingredients listed in Appendix A and B as Extremely Hazardous substances.

**TSCA Status:** Listed/Reportable

**SARA Section 313:** No

**CERCLA, 40 CFR 117, 302:** This product does not contain ingredients specified in the List of Extremely Hazardous Substances.

**CERCLA Listed Substances Are:** None

**SARA Superfund Section 110:** Non regulated

**California Proposition 65:** This product contains a chemical (or chemicals) known to The State of California to cause birth defects or other reproductive harm.

**Michigan Critical Materials:** This product does not contain ingredients listed on the Michigan Critical Materials Register.

**CAA:** Non regulated

**CWA:** None known

**RCRA:** Not considered a hazardous waste

**Canada CEPA:** All components are not listed on the Canadian DSL

**Canada WHMIS:** Controlled product, Class D2

## 16. Other Information

### Notice:

OSHA STANDARD 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a Hazard Communication Program including training, labeling, Material Safety Data Sheets, and access to written records. We request that you, and it is your legal duty, make all information in this Material Safety Data Sheets available to your employees.

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This Material Safety Data Sheet was prepared to comply with OSHA Hazard Communication standard. (29 CFR 1910.1200). This supersedes any previous information.

### Key Legend Information:

|                 |  |
|-----------------|--|
| N/Av:           | Not Available  |
| N/Ap:           | Not Applicable   |
| N/R:            | Not Rated  |
| ND:             | Not Determined   |
| ACGIH:          | American Conference of Gov'ntal Industrial Hygienists  |
| OSHA:           | Occupational Safety and Health Administration          |
| TLV:            | Threshold Limit Value                                  |
| PEL:            | Permissible Exposure Limit                             |
| TWA:            | Time Weighted Average                                  |
| STEL:           | Short Term Exposure Limit                              |
| NTP:            | National Toxicology Program                            |
| IARC:           | International Agency for Research on Cancer            |
| SARA Title III: | Superfund Amendments and Reauthorization Act           |
| CERCLA:         | Comprehensive Response, Compensation and Liability Act |
| TSCA:           | Toxic Substance Control Act                            |

# **BIOX<sup>®</sup> GA**

## Material Safety Data Sheet

---

### **1. Chemical Product and Supplier Identification**

**Product Name:** BIOX<sup>®</sup> GA

**Chemical Name:** Proprietary Compound

**Trade Names:** BIOX<sup>®</sup> GA

**Formulator:** Biox Services, LLC  
700 N Sacramento Blvd, Suite 101  
Chicago, IL 60612

**Office:** (773) 299-1949  
(8:00 a - 5:00 p CST M-F)

**MSDS Number:**GA

**Effective Date:** April 1, 2014

**NOT VALID TWO YEARS AFTER EFFECTIVE DATE OR AFTER ISSUANCE OF SUPERSEDING MSDS, WHICHEVER IS EARLIER.**

---

### **2. Composition/Information on Ingredients**

**Components:** Chemical identity withheld as a trade secret

---

### **3. Hazards Identification**

**Emergency Overview:** Oxidizer - Contact with combustibles may cause fire. In a fire, this material decomposes, releasing oxygen which may intensify the fire.

**Potential Health Effects:** Irritating to the mucous membrane and eyes. In case of product splashing into the eyes and face, treat eyes first. Do not dry soiled clothing near an open flame or heat source. Submerge contaminated clothing in water prior to drying.

**Inhalation:** Excessive inhalation of dust or solution mist is irritating to the respiratory tract.

|                      |   |
|----------------------|---|
| <b>Eye contact:</b>  | Eye contact is irritating and can be damaging.  |
| <b>Skin contact:</b> | In case of prolonged contact; irritation.   |
| <b>Ingestion:</b>    | Low in toxicity with a low taste threshold. If large quantity is ingested, GI tract disturbances will occur, severe shock, vomiting, liver damage and even death (sometimes as much as three days delayed). |

---

#### 4. First-Aid Measures

|                      |   |
|----------------------|---|
| <b>Inhalation:</b>   | Seek fresh air. Consult with a physician in case of respiratory symptoms.   |
| <b>Eye contact:</b>  | Flush eyes with saline solution. Consult with ophthalmologist in all cases.   |
| <b>Skin contact:</b> | Wash the affected skin with running water. Remove and clean clothing. Consult with a physician in case of persistent pain or redness. |
| <b>Ingestion:</b>    | If the victim is conscious, rinse mouth and administer fresh water. Consult a physician in all cases.                                 |

---

#### 5. Fire-Fighting Measures

|   |  |
|---|--|
| <b>Flash point</b>                          | None   |
| <b>Flammability:</b>                        | None   |
| <b>Auto-flammability:</b>                   | Not applicable   |
| <b>Danger of explosion</b>                  | Non-explosive  |
| <b>Common extinguishing methods:</b>        | Water or whatever is appropriate for particular type of fire.  |
| <b>Inappropriate extinguishing methods:</b> | No restriction.  |
| <b>Special precautions:☹</b>                | Employ full protective clothing and self-contained breathing apparatus when this material is involved in a fire situation in an enclosed area. |
| <b>Specific hazards</b>                     | Oxidizing substance.<br>Oxygen released on exothermic decomposition may support combustion in case of surrounding fire.                        |

Pressure burst may occur due to decomposition in confined spaces/containers.  
Contact with flammables may cause fire or explosion.

**Fire fighting instructions:** Personnel should wear full bunker gear and positive-pressure, self contained breathing apparatus.  
Apply cooling water to sides of transport or storage vessels that are exposed to flames until fire is out. Do not approach hot vessels containing product.

---

## 6. Accidental Release Measures

**Precautions:** Observe the protection measures given in Sections 5 and 8. Avoid materials and products which are incompatible with the product (see Section 10). Avoid direct contact of the product with water. Immediately notify the appropriate authorities in case of reportable discharge.

**Cleanup methods:** Collect the product with a suitable means avoiding dust formation.  
All the receiving equipment should be clean, vented, dry, labeled and made of material that is compatible with the product.  
Because of the contamination risk, the collected material should be isolated in a safe place.  
Clean the area with large quantities of water.  
For disposal methods, refer to Section 13.

---

## 7. Handling and Storage

**Handling:** Welding of contaminated metals should be performed in well ventilated areas.  
Will decompose at high temperatures to sulfur dioxide which is dangerous to breathe.  
Keep away from incompatible products.  
Containers and equipment used to handle this product should be used exclusively for this material.

**Storage:** Store in a cool, dry place away from alkalines and oxidizers.

**Other precautions:** Safety glasses, dust respirators. Warn personnel about the dangers of the product.

---

## 8. Exposure Controls/Personal Protection

### Engineering controls:

Provide ventilation in work areas to keep dust below the following applicable limits:

ACGIH<sup>7</sup> TLV (1996)

5 mg/m<sup>3</sup> TWA

OSHA PEL

Total dust - 15 mg/m<sup>3</sup> TWA

Respirable fraction - 5 mg/m<sup>3</sup> TWA

NIOSH REL (1994)

5 mg/m<sup>3</sup> TWA

ACGIH<sup>7</sup> and TLV<sup>7</sup> are registered trademarks of the American Conference of Governmental Industrial Hygienists.

|                                |  |
|--------------------------------|--|
| <b>Eye/face protection:</b>    | Dust proof chemical goggles.   |
| <b>Hand protection:</b>        | Impervious protective gloves made of nitrile or natural rubber, neoprene.  |
| <b>Skin protection:</b>        | Long sleeves, apron and rubber gloves. When prolonged or frequently repeated contact could occur, use protective, full body clothing impervious to this material.                  |
| <b>Respiratory protection:</b> | Dust mask (3M 8710), in dusty or unknown atmospheres use a NIOSH approved dust respirator.   |
| <b>Other precautions:</b>      | Safety shower and eyewash stations.<br>Consult your industrial hygienist or safety manager for the selection of personal protective equipment suitable for the working conditions. |

---

## 9. Physical and Chemical Properties

|                          |                            |
|--------------------------|----------------------------|
| <b>Appearance:</b>       | Light green powder/crystal |
| <b>Odor:</b>             | Odorless                   |
| <b>pH:</b>               | 3.7                        |
| <b>Molecular Weight:</b> | 72.08                      |
| <b>Melting Point:</b>    | 527°F (275°C) - Decomposes |

|                             |  |
|-----------------------------|--|
| <b>Vapor Pressure:</b>      | Not applicable                                 |
| <b>Vapor Density:</b>       | Not applicable                                 |
| <b>Boiling point:</b>       | Not applicable                                 |
| <b>Bulk Density:</b>        | 0.5 - 0.65 g/mL (Loose Method)                 |
| <b>Solubility in Water:</b> | Cold: 32.8 g/100g water, Hot: 149 g/100g water |

---

## 10. Stability and Reactivity

|  |  |
|--|--|
| <b>Chemical Stability:</b>               | Stable   |
| <b>Conditions to avoid:</b>              | Material will oxidize to ferric sulfate if exposed to warm, moist air. |
| <b>Materials to avoid:</b>               | Alkalines<br>Soluble carbonates<br>Oxidizing agents                    |
| <b>Hazardous decomposition products:</b> | Will not occur.  |
| <b>Hazardous polymerization:</b>         | Not Applicable   |

---

## 11. Toxicological Information

|                              |  |
|------------------------------|--|
| <b>Acute toxicity:</b>       | Oral route, LD <sub>50</sub> , rat, 7340 mg/kg |
| <b>Chronic toxicity:</b>     | No data  |
| <b>Irritation:</b>           | Rabbit (eyes), severe irritant                 |
| <b>Sensitization:</b>        | No data  |
| <b>Target Organ Effects:</b> | Eyes and respiratory passages.                 |

---

## 12. Ecological Information

|  |  |
|--|--|
| <b>Toxicity:</b>                           | No data  |
| <b>Persistence and degradability:</b>      | No data  |
| <b>Bioaccumulative potential:</b>          | No data  |
| <b>Mobility:</b>                           | No data<br>Not applicable  |
| <b>Results of PBT and vPvB assessment:</b> | PBT/vPvB assessment not available as chemical safety assessment not required/not conducted |

---

### 13. Disposal Considerations

**Waste Disposal Method:** Consult current federal, state and local regulations regarding the proper disposal of this material and its emptied containers.

---

### 14. Transport Information

**D.O.T. Proper Shipping Name:** solid, n.o.s.  
**UN Number:** not regulated  
**Hazard Class:** not regulated  
**Label(s):** not regulated  
**Packing Group:** not regulated  
**STCC Number:** N/A

---

### 15. Regulatory Information

**TSCA Inventory List:** Not Listed  
**CERCLA Hazardous Substance (40 CFR Part 302)**  
**Listed substance:** No  
**Unlisted substance:** Yes  
    Reportable Quantity (RQ): N/A  
    Characteristic(s): N/A  
    RCRA Waste Number: N/A

**Sara, Title III, Sections 302/303 (40 CFR Part 355- Emergency Planning and Notification)**

**Hazard category:** None  
**Threshold planning quantity:** N/A

**Sara, Title III, Sections 311/312 (40 CFR Part 370- Hazardous Chemical Reporting: Community Right-To-Know)**

**Extremely hazardous substance:** No

---

## 16. Other Information

### HMIS Rating:

Health - 2  
Flammability - 0  
Reactivity - 1  
PPE - Required

HMIS is a registered trademark of the National Paint and Coating Association.

### NFPA Rating:

Health - 2  
Flammability - 0  
Reactivity - 1  
OX -

NFPA is a registered trademark of the National Fire Protection Association.

# **BIOX<sup>®</sup> H**

## Material Safety Data Sheet

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### 1. Chemical Product and Supplier Identification

**Product Name:** BIOX<sup>®</sup> H

**Chemical Name:** Proprietary Compound

**Trade Names:** BIOX<sup>®</sup> H

**Formulator:** Biox Services, LLC  
700 N Sacramento Blvd, Suite 101  
Chicago, IL 60612

**Office:** (773) 299-1949  
(8:00 a - 5:00 p CST M-F)

**MSDS Number:**

H

**Effective Date:** April 1, 2014

**NOT VALID TWO YEARS AFTER EFFECTIVE DATE OR AFTER ISSUANCE OF  
SUPERSEDING MSDS, WHICHEVER IS EARLIER**

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### 2. Composition/Information on Ingredients

**Components:** Chemical identity withheld as a trade secret

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### 3. Hazards Identification

**Emergency Overview:** Toxicity effects are principally related to its corrosive properties. Non-combustible, but may contribute to the combustion of other substances and causes violent and sometimes explosive reactions. May be fatal if swallowed.

**Route of Entry:** Inhalation, skin and ingestion

**Potential Health Effects:** Corrosive to mucous membranes, eyes and skin. The seriousness of the lesions and the prognosis of intoxication depend on the concentration and duration of exposure.

**Inhalation:** Nose and throat irritation. Cough. In cases of repeated or prolonged exposure; risk of sore throat, nosebleeds, chronic bronchitis.

**Eye contact:** Severe eye irritation with watering, redness, and swelling of the eyelids. Risk of serious or permanent eye lesions.

**Skin contact:** Irritation and temporary whitening at contact area. Risk of burns.

**Ingestion:** Paleness and cyanosis of the face. Severe irritation, risk of burns and perforation of the gastrointestinal tract accompanied by shock. Excessive fluid in the mouth and nose, with risk of suffocation. Risk of edema and suffocation, nausea, vomiting (bloody), and cough. Risk of chemical pneumonitis from product inhalation.

---

#### 4. First-Aid Measures

**General Recommendations:** In case of product splashing into the eyes and face, treat eyes first. Do not dry soiled clothing near an open flame or incandescent heat source. Submerge soiled clothing in water prior to drying.

**Inhalation:** Remove the subject from contaminated area. Consult with a physician in case of respiratory symptoms.

**Eye contact:** Flush eyes with running water for 15 minutes, while keeping the eyelids wide open. In case of difficulty opening the lids, administer analgesic eyewash. Consult with ophthalmologist in all cases.

**Skin contact:** Remove contaminated shoes, socks and clothing, under a shower if necessary; wash the affected skin with running water. Keep warm and provide clean clothing. Consult a physician in all cases.

**Ingestion:** Consult a physician immediately in all cases. Take to the hospital. If the victim is conscious and not convulsing, rinse mouth with fresh water. **Do Not** give anything to drink. **DO NOT** induce vomiting. Seek medical attention immediately.

---

#### 5. Fire-Fighting Measures

**Flash point** Non-flammable

**Flammability:** Non-flammable

**Auto-flammability:** Non-flammable

**Danger of explosion** Oxidizer. Flammable liquids and certain materials. Heating accelerates decomposition, releasing oxygen.

**Common extinguishing Methods:** Large quantities of water, water spray. In case of fire in close proximity, all means of extinguishing are acceptable.

**Specific hazards** Oxygen released on exothermic decomposition may support combustion in case of surrounding fire. Oxidizing

agent, may cause spontaneous ignition with combustible materials. Contact with flammables may cause spontaneous ignition with combustible materials. Contact with flammables may cause fire or explosions. Pressure burst may occur due to decomposition in confined spaces/containers.

**Fire fighting instructions:**

Evacuate all non-essential personnel. Personnel should wear full protective acid-resistant suit, and positive-pressure, self-contained breathing apparatus. After intervention, take a shower, remove clothing carefully, clean and check equipment. Apply cooling water to sides of transport or storage vessels that are exposed to flames until fire is out. Do not approach hot vessels containing product. Remain upwind of fire to avoid hazardous vapors and decomposition products.

---

## **6. Accidental Release Measures**

**Cleanup methods:**

Eliminate all sources of ignition. Evacuate unprotected personnel from equipment recommendations found in Section 8. Never exceed any occupational exposure limit.

If possible dam large quantities of liquid with sand or earth. Dilute with large quantities of water. Do not add chemical products.

In order to avoid the risk of contamination, the recovered product must not be returned to the original tank/container.

Immediately notify the appropriate authorities in case of reportable spill.

---

## **7. Handling and Storage**

**Handling:**

Operate in a well-ventilated area. Keep away from heat sources. Keep away from incompatible products. Prevent all contact with organics. Use equipment and containers, which are compatible with the substance. Before all operations, passivate the piping circuits and vessels. Never return unused product to storage container. Ensure an adequate supply of water is available in the event of an accident. Containers and equipment should be used to handle product exclusively.

**Storage:** Store in cool, well-ventilated area away from all source of heat.  
Keep away from incompatible and combustible materials.  
Keep containers tightly closed.  
Do not store in unlabeled or mislabeled containers.  
Protect from moisture.  
Keep containers well sealed, seal only with original vent cap.  
Regularly check the condition and temperature of the containers.

---

## 8. Exposure Controls/Personal Protection

**Ventilation:** Provide local exhaust ventilation. Provide ventilation in work areas to keep exposure below applicable limits.

**Eye/face protection:** Wear chemical safety goggles. If rash of splashing exists, wear goggles and a face shield.

**Hand/Skin protection:** Wear chemical –resistant protective gloves made of PVC or rubber. Consult you industrial hygienist or safety manager for the selection of personal protective equipment suitable for the working conditions.

**Respiratory protection:** Wear a NIOSH approved full-face supplied air-respirator for excessive concentrations.

**Other precautions:** Safety shower and eyewash stations should be nearby and ready for use. Impervious clothing and rubber boots. Do not smoke, eat, or drink around material.

Completely submerge contaminated clothing or other material in water prior to drying. Residual material, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in fire.

---

## 9. Physical and Chemical Properties

**Appearance:** Colorless Liquid

**Odor:** Slightly pungent

**pH:** 1-4

**Decomposition Temperature:** Self-accelerating decomposition with oxygen release > 60°C (140°F)

**Vapor Density:** 1.0 for 50% product

**Melting Point:** -33°C (-27°F) for 35% product  
-52°C (-62°F) for 50% product

**Boiling Point:** 108°C (226°F) @ 1.1013 bar (760 mmHg) for 35% product  
115°C (239°F) @ 1.1013 bar (760 mmHg) for 50% product

**Evaporation Rate:** No data

**Solubility in Water:** Complete

---

## 10. Stability and Reactivity

**Chemical Stability:** Stable under normal condition of use with slow gas release.

**Conditions to Avoid:** Heat/Sources or heat, and contamination.

**Materials to Avoid:** Metals  
Acids  
Bases  
Salts of metals  
Reducing agents  
Organic materials  
Flammable substances

**Hazardous Decomposition Products:** Oxygen: Decomposition releases steam and heat

---

## 11. Toxicological Information

**Oral:** LD<sub>50</sub>, rat, 1232 mg/kg for 35% product  
LD<sub>50</sub>, rat, 841mg/kg for 60% product

**Dermal:** LD<sub>50</sub>, rabbit, >2000 mg/kg for 35% product

**Inhalation:** LC<sub>50</sub>, 4 hours, rat 2000 mg/m<sup>3</sup>  
LC<sub>0</sub>, 1 hour, mouse 2170 mg/m<sup>3</sup>

**Irritation:** Rabbit, serious damage (eyes) for 70% product  
Rabbit, irritant (skin) for <50% product  
Rabbit, corrosive (skin) 1 hour for 50% product  
Mouse, respirator irritation (RD<sub>50</sub> ), 665 mg/m<sup>3</sup>

**Sensitization:** Guinea pig, non-sensitizing (skin)

## 12. Ecological Information

**Ecotoxicological Information:** Toxic for aquatic organisms. Nevertheless, hazard for the environment is limited due to product properties:

No bioaccumulation  
Considerable abiotic and biotic degradability.  
No toxicity of degradation products.

---

## 13. Disposal Considerations

**Waste Treatment:** Consult current federal, state and local regulations regarding the proper disposal of this product.

**Package Treatment:** Consult current federal, state and local regulations regarding the proper disposal emptied containers.

**RCRA Hazardous Waste:** Listed as D001 (ignitable, D002 (corrosive)).

---

## 14. Transport Information

**D.O.T. Proper Shipping Name:**

**UN Number:** UN 2014

**Hazard Class:** 5.1

**Label(s):** Oxidizer (corrosive)

**Packing Group:** II

**Placard:** Oxidizer (5.1) {Corrosive (8)}

**Reportable Quantity:** 100 lbs

**Emergency Information:** ERG 140

---

## 15. Regulatory Information

**TSCA Inventory 8(b):** Yes

**SARA Title III Section 302/303:** Yes Reportable quantity: 1,000 lbs  
Threshold  
planning quantity: 1,000 lbs

**SARA (313) Chemicals:** Yes immediate health hazard  
Fire hazard

**CERCLA:** Unlisted substance, reportable quantity 100 lbs

Characteristic: Ignitability (D001)

Corrosivity (D002)

**OSHA:** Requirements for process safety management must be followed anytime at least 7,500 lbs or product at concentrations of at least 52% are used or stored.

**Canadian WHMIS Classification:** C – Oxidizing material  
E – Corrosive  
F – Dangerously reactive material

**Canadian DSL:** Non-Confidential # 6754

**State Component Listing:**

| State | Comment   |
|-------|---|
| CA    | Airborne Contaminants & Emissions Inventory<br>Hazardous Substance List |
| CT    | Hazardous Material Safety   |
| IL    | Chemical Safety Act<br>Toxic Substances Disclosure to Employees Act     |
| IN    | Occupational H & S Standards – Air                                      |
| KY    | Occupational H & S Standards – Air                                      |
| LA    | Right to Know List  |
| MA    | Oil and Hazardous Materials List<br>Right to Know List                  |
| MN    | Hazardous Substance List  |
| NJ    | Right to Know List<br>Spill Tax List                                    |
| NC    | Exposure Limits for Air Contaminants                                    |
| NY    | Release Reporting List of Hazardous Substances                          |
| PA    | Right to Know List  |
| RI    | Right to Know List  |

**Labeling according to Directive:**

|           |       |  |
|-----------|-------|--|
| Symbols   | C     | Corrosive  |
| Phrases R | 34    | Causes Burns   |
| Phrases S | 1/2   | Keep locked and out of reach of children             |
|           | 3     | Keep in cool place                                   |
|           | 28.1  | After contact with skin, wash immediately with water |
|           | 36/39 | Wear Suitable protective clothing                    |
|           |       | Eye/face protection                                  |
|           | 45    | In case of accident, seek medical advice             |

## 16. Other Information

### Notice:

OSHA STANDARD 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a Hazard Communication Program including training, labeling, Material Safety Data Sheets, and access to written records. We request that you, and it is your legal duty, make all information in this Material Safety Data Sheet available to your employees.

### Key Legend Information:

|                 |   |
|-----------------|---|
| N/A:            | Not Available   |
| N/R:            | Not Rated   |
| ND:             | Not Determined  |
| ACGIH:          | American Conference of Governmental Industrial Hygienists |
| OSHA:           | Occupational Safety and Health Administration             |
| TLV:            | Threshold Limit Value                                     |
| PEL:            | permissible Exposure Limit                                |
| TWA:            | Time Weighted Average                                     |
| STEL:           | Short Term Exposure Limit                                 |
| NTP:            | National Toxicology Program                               |
| IARC:           | International Agency for Research on Cancer               |
| SARA Title III: | Superfund Amendments and Reauthorization Act              |
| CERCLA:         | Comprehensive Response, Compensation and Liability Act    |
| TSCA:           | Toxic Substance Control Act                               |

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This Material Safety Data Sheet was prepared to comply with OSHA Hazard Communication standard, (20 CFR 1910.1200). This supersedes any previous information.

# **BIOX<sup>®</sup> U**

## **Material Safety Data Sheet**

---

### **1. Chemical Product and Supplier Identification**

**Product Name:** BIOX<sup>®</sup> U

**Chemical Name:** Proprietary Compound

**Trade Names:** BIOX<sup>®</sup> U

**Formulator:** Biox Services, LLC  
700 N. Sacramento Blvd, Suite 101  
Chicago, IL 60612

**Office:** (773) 299-1949  
(8:00 a - 5:00 p CST M-F)

**MSDS Number:** U

**Effective Date:** April 1, 2014

**NOT VALID TWO YEARS AFTER EFFECTIVE DATE OR AFTER ISSUANCE OF  
SUPERSEDING MSDS, WHICHEVER IS EARLIER**

---

### **2. Composition/Information on Ingredients**

**Components:** Chemical identity withheld as a trade secret

---

### **3. Hazards Identification**

**Emergency Overview:** Irritant to skin, eye and respiratory tract. White Crystalline odorless powder. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. Product is not flammable, but noxious gases ammonia and Carbon Dioxide are formed in a fire.

**Potential Health Effects:** Avoid inhalation of dust particles. Avoid contact with skin and eyes.

**Inhalation:** Material may irritate the upper respiratory tract. Symptoms may include coughing, shortness of breath, sore throat or runny nose.

**Eye contact:** Material may cause irritation with symptoms such as tearing.

**Skin contact:** Prolonged contact may cause irritation with symptoms such as redness, swelling, itching and pain.

**Ingestion:** Small amounts (such as tablespoonful) swallowed during normal handling operations are not likely to cause injury. Swallowing large amounts may cause injury.

---

## 4. First-Aid Measures

**Inhalation:** If exposed to dust, causes irritation or distress. Remove victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen, if available. If victim is not breathing, administer CPR (cardiopulmonary resuscitation). Seek medical attention.

**Eye contact:** Flush eyes with large quantities of running water for a minimum of 15 minutes. If victim is wearing contact lenses, remove them. Hold eyelids apart during the flushing to ensure rinsing of entire surface of the eye and lids with water. **Do Not** let victim rub eye(s). Do not attempt to neutralize with chemical agents. Oils/ointments should not be used at this time. Get Medical attention if eye irritation occurs.

**Skin contact:** Immediately wash with soap and water for a minimum of 15 minutes. Wash clothing before reuse and discard footwear, which cannot be cleaned. Get immediate medical attention if irritation occurs.

**Ingestion:** If appreciable quantities are swallowed, call a physician or Poison Control Center Immediately. If small quantities are accidentally ingested, drink one to two glasses of water and call a physician or Poison Control Center. **Do not induce vomiting or give anything by mouth to someone who is unconscious, having convulsions, or unable to swallow.**

---

## 5. Fire-Fighting Measures

**Flash point** Not applicable

**Flammability:** Not applicable

**Auto-flammability:** Not applicable

**Danger of explosion** Noxious gases, ammonia NH<sub>3</sub> and Carbon Dioxide (CO<sub>2</sub>) are formed in a fire.

**Common extinguishing Methods:** Water should be used to cool this material, if

decomposition is caused from heating. For the main fire, water, dry chemical, carbon dioxide, halon or fog can be used.

- Special precautions:** Not applicable.
- Specific hazards:** Not applicable.
- Fire fighting instructions:** Respiratory and eye protection required for fighting personnel as well as full protective gear.
- 

## 6. Accidental Release Measures

- Cleanup methods:** Utilize recommended protective clothing and equipment. Clean spills in a manner that does not disperse dust into the air. Sweep or scoop up but avoid using combustibles (such as wood, paper, oil, etc.) for cleaning spills. If spilled material is intermixed with combustibles, it may be desirable to wet with water and mix with wet sand before pickup for disposal. Place collected material in bags or other containers for waste disposal. Spill area can be washed with water. Collect wash water for approved disposal. Keep from entering water or ground water. Collect the product with a suitable means avoiding dust formation.
- 

## 7. Handling and Storage

- Handling:** Avoid breathing dust. Avoid getting in eyes or on skin. Wash thoroughly after handling. Protect packages against physical damage.
- Storage:** Store in a cool, dry place away from direct sunlight, heat, and incompatible materials. Do not store near acids, organics and other oxidizable materials or where flammable or combustible materials are stored. Reseal containers immediately after use. Store away from food and beverages. Immediately remove and dispose of any spilled material
- 

## 8. Exposure Controls/Personal Protection

- Engineering controls:** Use local ventilation if dusting is a problem, to maintain air levels below the recommended exposure limit.

ACGIH<sup>7</sup> TLV "Particles not otherwise  
classified"  
10 mg/m<sup>3</sup>

OSHA PEL  
Inert or Nuisance Dust - 15 mg/mm<sup>3</sup>

ACGIH<sup>7</sup> and TLV<sup>7</sup> are registered trademarks of the American Conference of Governmental Industrial Hygienists.

- Eye/face protection:** Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. It is generally regarded as good practice to wear a minimum of safety glasses with side shields when working in industrial environments.
- Skin protection:** Skin contact should be minimized through use of gloves and suitable long sleeved clothing (i.e., shirts and pants). Consideration must be given both to durability as well as permeation resistance.
- Respiratory protection:** When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the latest OSHA standard (29 CFR 1910.134) and/or ANSI Z88.2 recommendations.
- Other precautions:** For operations where skin contact can occur, wear clothing (such as boots, apron or coveralls) to limit skin contact. A safety shower and eye wash facility should be available. Employees should wash their hands and face before eating, drinking or using tobacco products.

---

## 9. Physical and Chemical Properties

- Appearance:** White Crystalline Powder
- Odor:** Odorless
- pH:** pH: 1.8 (1% solution)
- Melting Point:** 117<sup>0</sup>C
- Vapor Pressure:** Not applicable
- Vapor Density:** Not applicable
- Boiling point:** Not applicable
- Bulk Density:** 1000 kg/m<sup>3</sup>
- Solubility in Water:** 96-g/100 ml (20<sup>0</sup>C)
-

## 10. Stability and Reactivity

|  |   |
|--|---|
| <b>Chemical Stability:</b>               | This product is considered stable.  |
| <b>Conditions to Avoid:</b>              | Excessive temperatures.   |
| <b>Materials to Avoid:</b>               | Bases<br>Oxidizing agents<br>Reducing agents  |
| <b>Hazardous Decomposition Products:</b> | Fumes of NH <sup>3</sup> and CO <sup>2</sup> are released when heated at high temperatures. |
| <b>Hazardous Polymerization:</b>         | Does not occur.   |

---

## 11. Toxicological Information

|  |   |
|--|---|
| <b>Eye Effects:</b>                          | Irritating to eyes. Provokes tears.   |
| <b>Skin Effects:</b>                         | Causes burns to skin.   |
| <b>Dermal Toxicity:</b>                      | N/A   |
| <b>Inhalation Effects:</b>                   | N/A   |
| <b>Sensitization:</b>                        | N/A   |
| <b>Ingestion Effects:</b>                    | LD 50/oral/mouse = 5840 mg/kg   |
| <b>Carcinogenicity/Mutagenicity:</b>         | Not listed as a carcinogen by NTP, IARC or OSHA. No information available for Mutagenicity. |
| <b>Reproductive Effects:</b>                 | No information found.   |
| <b>Neurotoxicity:</b>                        | No information found.   |
| <b>Target Organs:</b>                        | No information found.   |
| <b>Additional Toxicological Information:</b> | None  |

---

## 12. Ecological Information

|   |   |
|---|---|
| <b>Biodegradability:</b>                | Not biodegradable   |
| <b>Ecotoxicity:</b>                     | May be harmful to aquatic organisms (pH). Eutrophication. |
| <b>Biological Oxygen Demand (BODS):</b> | No data found for this product.                           |
| <b>Chemical Oxygen Demand:</b>          | No data found for this product.                           |

**Activated Sludge Respiration  
Inhibition Test:**

No data found for this product.

**Additional Ecological Information:**

Bioaccumulation: Does not bioaccumulate.  
Mobility: Soluble in water. Forms phosphoric acid and urea.

---

### 13. Disposal Considerations

**Waste Disposal Method:** Consult an expert on the disposal of recovered material. Ensure disposal is in compliance with government requirements and ensure conformity of local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

**Container Disposal Information:** Consult an expert on the disposal of container. Ensure disposal is in compliance with government requirements and ensure conformity of local disposal regulations. Notify the appropriate authorities immediately.

---

### 14. Transport Information

**D.O.T. Proper Shipping Name:** CORROSIVE SOLID, N.O.S., 8, UN 1759, II

**UN Number:** UN 1759

**Hazard Class:** Not regulated by D.O.T.

**Label(s):** None

**Packing Group:** II

---

### 15. Regulatory Information

**TSCA Inventory List:** Listed/Non-reportable

**CERCLA Hazardous Substance (40 CFR Part 302)**

**Listed substance:** No

**Unlisted substance:** No

**Sara, Title III, Sections 302/303 (40 CFR Part 355- Emergency Planning and Notification)**

**Hazard category:** Does not contain ingredients listed as extremely hazardous substances.

**Sara, Title III, Sections 311/312 (40 CFR Part 370- Hazardous Chemical Reporting: Community Right-To-Know)**

**Extremely hazardous substance:** No

**WHMIS Classification:** Not listed

**Canadian Domestic Substances List:** Not listed

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

---

## 16. Other Information

### Notice:

OSHA STANDARD 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a Hazard Communication Program including training, labeling, Material Safety Data Sheets, and access to written records. We request that you, and it is your legal duty, make all information in this Material Safety Data Sheet available to your employees.

### Key Legend Information:

|                 |   |
|-----------------|---|
| N/A:            | Not Available   |
| N/R:            | Not Rated   |
| ND:             | Not Determined  |
| ACGIH:          | American Conference of Governmental Industrial Hygienists |
| OSHA:           | Occupational Safety and Health Administration             |
| TLV:            | Threshold Limit Value                                     |
| PEL:            | permissible Exposure Limit                                |
| TWA:            | Time Weighted Average                                     |
| STEL:           | Short Term Exposure Limit                                 |
| NTP:            | National Toxicology Program                               |
| IARC:           | International Agency for Research on Cancer               |
| SARA Title III: | Superfund Amendments and Reauthorization Act              |
| CERCLA:         | Comprehensive Response, Compensation and Liability Act    |
| TSCA:           | Toxic Substance Control Act                               |

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This supersedes any previous information.

**ATTACHMENT III**

**UTILITY LOCATION AND  
EXCAVATION CLEARANCE  
STANDARD OPERATING PROCEDURE**

## **1.0 PURPOSE**

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

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. This procedure must be reviewed by anyone potentially involved with underground or overhead utility locating and avoidance activities.

## **2.0 SCOPE**

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

## **3.0 GLOSSARY**

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

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

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

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

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

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

#### **4.0 RESPONSIBILITIES**

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

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

**Site Safety Officer (SSO)** – Responsible to provide technical assistance and verify full compliance with this procedure. The SSO is also responsible for reporting any deficiencies to the PM.

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

**Site Personnel** – Responsible for performing their work activities in accordance with this procedure and the HASP.

#### **5.0 PROCEDURES**

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

## 5.1 BURIED UTILITIES

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

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

- A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.
- A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scars and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility locations shall be added to project maps upon completion of this exercise and returned to the PM.
- If the planned work is to be conducted on private property the FOL must identify and contact appropriate facility personnel before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.
- If the work location is on public property, the agency that performs utility clearances must be notified). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign

a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.

- Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

**FIGURE III-1  
UTILITY MARKING COLOR CODE**

| COLOR  | SERVICE                   |
|--------|---------------------------|
| White  | excavation location       |
| Red    | electrical                |
| Yellow | gas, oil, steam           |
| Orange | telephone, communications |
| Blue   | water, irrigation, slurry |
| Green  | sewer, drain              |

- Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this procedure.
- At each location where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.
- Any utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Contactors shall not make any repairs or modifications to existing utility lines without prior permission of the PM. All repairs require that the line be locked-out/tagged-out prior to work.

## 5.2 OVERHEAD POWER LINES

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

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

FIGURE III-3  
MINIMUM CLEARANCE DISTANCE

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

## 6.0 UNDERGROUND LOCATING TECHNIQUES

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

### 6.1 GEOPHYSICAL METHODS

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar.

#### 6.1.1 Electromagnetic Induction

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

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

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

### **6.1.2      Magnetics**

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

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

### **6.1.3      Ground Penetrating Radar**

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

## **6.2            PASSIVE DETECTION SURVEYS**

### **6.2.1      Acoustic Surveys**

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

## **6.2.2 Thermal Imaging**

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

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

## **6.3 INTRUSIVE DETECTION SURVEYS**

### **6.3.1 Vacuum Excavation**

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

### **6.3.2 Hand Excavation**

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities.

### **6.3.3 Tile Probe Surveys**

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at

that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

#### **6.4 INTRUSIVE ACTIVITIES SUMMARY**

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

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

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

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



**ATTACHMENT IV**

**EQUIPMENT INSPECTION CHECKLIST**

### 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"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <b>Emergency Stop Devices</b> <ul style="list-style-type: none"> <li>• Emergency Stop Devices (At points of operation)</li> <li>• Have all emergency shut offs identified been communicated to the field crew?</li> <li>• Has a person been designated as the Emergency Stop Device Operator?</li> </ul>  |          |
| <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <b>Highway Use</b> <ul style="list-style-type: none"> <li>• Cab, mirrors, safety glass?</li> <li>• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?</li> <li>• Seat Belts?</li> <li>• Is the equipment equipped with audible back-up alarms and back-up lights?</li> <li>• Horn and gauges</li> <li>• Brake condition (dynamic, park, etc.)</li> <li>• Tires (Tread) or tracks</li> <li>• Windshield wipers</li> <li>• Exhaust system</li> <li>• Steering (standard and emergency)</li> <li>• Wheel Chocks?</li> <li>• Are tools and material secured to prevent movement during transport? Especially those within the cab?</li> <li>• Are there flammables or solvents or other prohibited substances stored within the cab?</li> <li>• Are tools or debris in the cab that may adversely influence operation of the vehicle (in and around brakes, clutch, gas pedals)</li> </ul> |          |
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <b>Fluid Levels:</b> <ul style="list-style-type: none"> <li>• Engine oil</li> <li>• Transmission fluid</li> <li>• Brake fluid</li> <li>• Cooling system fluid</li> <li>• Hoses and belts</li> <li>• Hydraulic oil</li> </ul>  |          |

**Equipment Inspection Checklist for Drill Rigs**

Page 2

Unit/Serial No#: \_\_\_\_\_

Inspection Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

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

**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   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Reduction in Rope diameter <math>\pi</math><br/>           (5/16 wire rope &gt; 1/64 reduction nominal size -replace)<br/>           (3/8 to 1/2 wire rope &gt; 1/32 reduction nominal size-replace)<br/>           (9/16 to 3/4 wire rope &gt; 3/64 reduction nominal size-replace)</li> </ul> |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Number of broken wires<br/>           (6 randomly broken wires in one rope lay)<br/>           (3 broken wires in one strand)</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Number of wire rope wraps left on the Running Drum at nominal use (<math>\geq 3</math> required)</li> </ul>   |          |
| <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"/> | <ul style="list-style-type: none"> <li>Lubrication of wire rope (adequate?)</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Kinks, bends – Flattened to &gt; 50% diameter</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Hemp/Fiber rope (Cathead/Split Spoon Hammer)   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Minimum <math>\frac{3}{4}</math>; maximum 1 inch rope diameter (Inspect for physical damage)</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Rope to hammer is securely fastened</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Safety Guards –  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Hot pipes and surfaces exposed to accidental contact?</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>High pressure lines</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Nip/pinch points</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Operator Qualifications  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Does the operator have proper licensing where applicable, (e.g., CDL)?</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Does the operator, understand the equipment's operating instructions?</li> </ul>  |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Is the operator experienced with this equipment?</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <ul style="list-style-type: none"> <li>Is the operator 21 years of age or more?</li> </ul>   |          |

**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"> <li>• Hardhat</li> <li>• Safety glasses</li> <li>• Work gloves</li> <li>• Chemical resistant gloves _____</li> <li>• Steel toed Work Boots</li> <li>• Chemical resistant Boot Covers</li> <li>• Apron</li> <li>• Coveralls Tyvek, Saranex, cotton) _____</li> </ul>   |          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Other Hazards <ul style="list-style-type: none"> <li>• Excessive Noise Levels? _____ dBA</li> <li>• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)                             <ul style="list-style-type: none"> <li>- MSDSs available?</li> </ul> </li> <li>• Will On-site fueling occur                             <ul style="list-style-type: none"> <li>- Safety cans available?</li> <li>- Fire extinguisher (Type/Rating - _____ )</li> </ul> </li> </ul> |          |

Approved for Use     Yes     No     See Comments

\_\_\_\_\_  
 Site Health and Safety Officer

\_\_\_\_\_  
 Operator

### Equipment Inspection Checklist for DPT Rigs

Company: \_\_\_\_\_

Unit/Serial No#: \_\_\_\_\_

Inspection Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time: \_\_\_\_ :

Equipment Type: \_\_\_\_\_

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

Project No#: \_\_\_\_\_

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

**Equipment Inspection Checklist for Drill Rigs**

Page 2

Unit/Serial No#: \_\_\_\_\_

Inspection Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

| Yes  | No   | NA   | Requirement   | Comments |
|--|--|--|---|----------|
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>                             | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>                             | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>                             | Fluid Levels: <ul style="list-style-type: none"> <li>• Engine oil</li> <li>• Transmission fluid</li> <li>• Brake fluid</li> <li>• Cooling system fluid</li> <li>• Hoses and belts</li> <li>• Hydraulic oil</li> </ul>   |          |
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | High Pressure Hydraulic Lines <ul style="list-style-type: none"> <li>• Obvious damage</li> <li>• Operator protected from accidental release</li> <li>• Coupling devices, connectors, retention cables/pins are in good condition and in place</li> </ul>  |          |
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> | Mast Condition <ul style="list-style-type: none"> <li>• Structural components/tubing</li> <li>• Connection points</li> <li>• Pins</li> <li>• Welds</li> <li>• Outriggers</li> <li>• Operational</li> <li>• Plumb (when raised)</li> </ul>   |          |
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | Safety Guards – <ul style="list-style-type: none"> <li>• Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?</li> <li>• Hot pipes and surfaces exposed to accidental contact?</li> <li>• High pressure lines</li> <li>• Nip/pinch points</li> </ul> |          |
| <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/>   | Operator Qualifications <ul style="list-style-type: none"> <li>• Does the operator have proper licensing where applicable, (e.g., CDL)?</li> <li>• Does the operator, understand the equipment’s operating instructions?</li> <li>• Is the operator experienced with this equipment?</li> <li>• Is the operator 21 years of age or more?</li> </ul>   |          |

**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"/> | PPE Required for Drill Rig Exclusion Zone <ul style="list-style-type: none"> <li>• Hardhat</li> <li>• Safety glasses</li> <li>• Work gloves</li> <li>• Chemical resistant gloves _____</li> <li>• Steel toed Work Boots</li> <li>• Chemical resistant Boot Covers</li> <li>• Apron</li> <li>• Coveralls Tyvek, Saranex, cotton) _____</li> </ul>   |          |
| <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"/> | Other Hazards <ul style="list-style-type: none"> <li>• Excessive Noise Levels? _____ dBA</li> <li>• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)                             <ul style="list-style-type: none"> <li>- MSDSs available?</li> </ul> </li> <li>• Will On-site fueling occur                             <ul style="list-style-type: none"> <li>- Safety cans available?</li> <li>- Fire extinguisher (Type/Rating - _____ )</li> </ul> </li> </ul> |          |
| <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"/> |  |          |

Approved for Use     Yes     No     See Comments

\_\_\_\_\_  
Site Health and Safety Officer

\_\_\_\_\_  
Operator

**ATTACHMENT V**

**OSHA POSTER**

# Job Safety and Health

## It's the law!



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

### EMPLOYEES:

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

### EMPLOYERS:

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

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



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

1-800-321-OSHA  
[www.osha.gov](http://www.osha.gov)

OSHA 3165-12-06R