

N00102.AR.003185  
NSY PORTSMOUTH  
5090.3a

ACCIDENT PREVENTION PLAN FOR REMEDIAL INVESTIGATION SAMPLING OPERABLE  
UNIT 8 ( OU 8) NSY PORTSMOUTH ME  
03/01/2015  
TETRA TECH INC

**ACCIDENT PREVENTION PLAN**  
**FOR**  
**REMEDIAL INVESTIGATION SAMPLING**  
**OPERABLE UNIT 8**  
**PORTSMOUTH NAVAL SHIPYARD**

**Prepared for:**

**Department of the Navy**  
**Naval Facilities Engineering Command**  
**Mid-Atlantic Division**  
**9742 Maryland Avenue**  
**Norfolk, Virginia 23511-3095**

**Submitted by:**

**Tetra Tech, Inc.**  
**234 Mall Boulevard, Suite 260**  
**King of Prussia, Pennsylvania 19406**

**Prepared under:**  
**Contract No. N62470-08-D-1001**  
**Contract Task Order WE32**

**Revision 0**  
**March 2015**

## TABLE OF CONTENTS

Section	Page
<b>ACRONYMS .....</b>	<b>VII</b>
<b>1.0 SIGNATURE SHEET .....</b>	<b>1-1</b>
<b>2.0 BACKGROUND INFORMATION .....</b>	<b>2-1</b>
2.1 CONTRACTOR .....	2-1
2.2 CONTRACT NUMBER .....	2-1
2.3 PROJECT NAME .....	2-1
2.4 PROJECT DESCRIPTION .....	2-1
2.5 LOCATION .....	2-1
2.5.1 Site Description .....	2-2
2.5.2 Site History .....	2-2
2.6 PHASES OF WORK REQUIRING ACTIVITY HAZARD ANALYSIS (AHA) .....	2-3
<b>3.0 STATEMENT OF SAFETY AND HEALTH POLICY .....</b>	<b>3-1</b>
3.1 TETRA TECH SAFETY STATISTICS .....	3-2
<b>4.0 RESPONSIBILITIES AND LINES OF AUTHORITY .....</b>	<b>4-1</b>
4.1 STATEMENT OF RESPONSIBILITY .....	4-1
4.2 IDENTIFICATION AND ACCOUNTABILITY .....	4-1
4.2.1 U.S. Navy Personnel .....	4-1
4.2.2 Tetra Tech Personnel .....	4-1
4.2.3 Subcontractors and Suppliers .....	4-6
4.3 STOP WORK AUTHORIZATION .....	4-6
4.4 COMPETENT AND QUALIFIED PERSON(S) .....	4-7
4.5 REQUIREMENT OF DESIGNATED COMPETENT PERSON ON SITE .....	4-7
4.6 REQUIREMENTS OF PRE-TASK SAFETY AND HEALTH ANALYSIS .....	4-7
4.7 LINES OF AUTHORITY .....	4-8
4.7.1 Policies and Procedures Regarding Noncompliance .....	4-8
4.7.2 Manager and Supervisor Accountability .....	4-9
<b>5.0 SUBCONTRACTORS AND SUPPLIERS .....</b>	<b>5-1</b>
5.1 IDENTIFICATION .....	5-1
5.2 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS .....	5-1
<b>6.0 TRAINING .....</b>	<b>6-1</b>
6.1 NEW HIRE HEALTH AND SAFETY ORIENTATION .....	6-1
6.2 MANDATORY TRAINING AND CERTIFICATIONS .....	6-1
6.3 SITE-SPECIFIC SAFETY AND HEALTH TRAINING .....	6-2
6.4 HAZARD COMMUNICATION TRAINING .....	6-3
6.5 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING .....	6-3
6.6 BLOODBORNE PATHOGENS TRAINING .....	6-3
6.7 TRAINING DOCUMENTATION .....	6-3
6.8 PERIODIC SAFETY AND HEALTH TRAINING .....	6-3
6.9 EMERGENCY RESPONSE TRAINING .....	6-4

## TABLE OF CONTENTS (Continued)

Section	Page
<b>7.0 SAFETY AND HEALTH INSPECTIONS .....</b>	<b>7-1</b>
7.1 SPECIFIC ASSIGNMENT OF RESPONSIBILITY FOR A MINIMUM DAILY JOB SITE SAFETY AND HEALTH INSPECTION DURING PERIODS OF WORK ACTIVITY .....	7-1
7.1.1 Proof of Inspector's Training/Qualifications .....	7-1
7.1.2 Inspection Frequency .....	7-1
7.1.3 Documentation Procedures.....	7-1
7.1.4 Deficiency Tracking System and Follow-up Procedures .....	7-1
7.1.5 External Inspections/Certifications .....	7-1
<b>8.0 ACCIDENT REPORTING .....</b>	<b>8-1</b>
8.1 EXPOSURE DATA.....	8-1
8.2 ACCIDENT INVESTIGATIONS, REPORTS, AND LOGS .....	8-1
8.3 IMMEDIATE NOTIFICATION OF MAJOR INCIDENTS .....	8-2
8.4 INCIDENT REPORTING PROCEDURES .....	8-2
8.4.1 TOTAL Incident Reporting System .....	8-2
8.4.2 How to Access TOTAL to Report an Incident .....	8-3
8.4.3 Portsmouth Naval Shipyard Contractor Significant Incident Report .....	8-4
<b>9.0 REQUIRED PLANS (PROGRAMS, PROCEDURES).....</b>	<b>9-1</b>
9.1 LAYOUT PLANS .....	9-1
9.2 EMERGENCY RESPONSE PLANS .....	9-1
9.2.1 Procedures and Tests .....	9-1
9.2.2 Spill Plans.....	9-1
9.2.3 Firefighting Plan .....	9-3
9.2.4 Posting of Emergency Telephone Numbers .....	9-4
9.2.5 Man Overboard/Abandon Ship .....	9-4
9.2.6 Medical Support (Onsite/Offsite).....	9-4
9.3 SUBSTANCE ABUSE POLICY.....	9-5
9.4 SITE SANITATION PLAN .....	9-6
9.5 ACCESS AND HAUL ROAD PLAN .....	9-6
9.6 RESPIRATORY PROTECTION PLAN .....	9-6
9.7 HEALTH HAZARD CONTROL PLAN .....	9-6
9.7.1 Chemical Exposure Potential.....	9-6
9.7.2 Potential Routes of Exposure.....	9-8
9.8 HAZARD COMMUNICATION PROGRAM .....	9-9
9.8.1 Safety Data Sheet .....	9-9
9.8.2 Chemical Inventory .....	9-9
9.8.3 Container Labeling .....	9-9
9.8.4 Training .....	9-9
9.9 PROCESS SAFETY MANAGEMENT PLAN .....	9-10
9.10 LEAD ABATEMENT PLAN .....	9-10
9.11 ASBESTOS ABATEMENT PLAN .....	9-10
9.12 RADIATION SAFETY PROGRAM.....	9-10
9.13 ABRASIVE BLASTING .....	9-10
9.14 HEAT/COLD STRESS MONITORING PLAN .....	9-10
9.14.1 Heat Related Disorders.....	9-11
9.14.1.1 Heat Rash .....	9-11
9.14.2 Cold Stress Related Disorders.....	9-16

## TABLE OF CONTENTS (Continued)

Section	Page
9.15	CRYSTALLINE SILICA MONITORING PLAN ..... 9-25
9.16	NIGHT OPERATIONS LIGHTING PLAN ..... 9-25
9.17	FIRE PREVENTION PLAN ..... 9-25
9.18	WILD LAND FIRE MANAGEMENT PLAN ..... 9-25
9.19	HAZARDOUS ENERGY CONTROL PLAN ..... 9-25
9.20	CRITICAL LIFT PLAN ..... 9-25
9.21	CONTINGENCY PLAN FOR SEVERE WEATHER..... 9-25
9.22	FLOAT PLAN ..... 9-25
9.23	SITE-SPECIFIC FALL PROTECTION & PREVENTION PLAN DEMOLITION PLAN..... 9-25
9.24	DEMOLITION PLAN ..... 9-26
9.25	EXCAVATION/TRENCHING PLAN ..... 9-26
9.26	EMERGENCY RESCUE (TUNNELING)..... 9-26
9.27	UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN..... 9-26
9.28	COMPRESSED AIR PLAN ..... 9-26
9.29	FORMWORK AND SHORING ERECTION AND REMOVAL PLANS ..... 9-26
9.30	PRECAST CONCRETE PLAN ..... 9-26
9.31	LIFT SLAB PLANS..... 9-26
9.32	STEEL ERECTION PLAN..... 9-26
9.33	SITE SAFETY AND HEALTH PLAN FOR HTRW WORK ..... 9-27
9.33.1	Site Description and Contamination Characterization ..... 9-27
9.33.2	Hazard/Risk Analysis ..... 9-27
9.33.3	Staff Organization, Qualifications and Responsibilities ..... 9-32
9.33.4	Training ..... 9-32
9.33.5	Personal Protective Equipment..... 9-33
9.33.6	Medical Surveillance ..... 9-34
9.33.7	Exposure Monitoring/Air Sampling Program..... 9-34
9.33.8	Heat and Cold Stress ..... 9-34
9.33.9	Standard Operating Procedures, Engineering Controls and Work Practices ..... 9-34
9.33.10	Site Control Measures..... 9-37
9.33.11	Personal Hygiene and Decontamination..... 9-40
9.33.12	Equipment Decontamination ..... 9-41
9.33.13	Emergency Equipment and First Aid ..... 9-42
9.33.14	Emergency Response and Contingency Procedures ..... 9-44
9.34	BLASTING SAFETY PLAN ..... 9-48
9.35	DIVING PLAN ..... 9-48
9.36	CONFINED SPACE PROGRAM..... 9-48
<b>10.0</b>	<b>RISK MANAGEMENT PROCESSES..... 10-1</b>
<b>11.0</b>	<b>REFERENCES, MATERIALS AND DOCUMENTATION ..... 11-1</b>

### LIST OF TABLES

3-1	Comparison of Tetra Tech, Inc. and 2011 BLS Data for NAICS Code 541 (TRIR and LWDIR Case Rates)	3-2
9-1	Permissible Heat Exposure Threshold Limit Values	9-14
9-2	Heat Strain Symptoms	9-15
9-3	Progressive Clinical Presentations of Hypothermia	9-17
9-4	Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature	9-19
9-5	Threshold Limit Values Work/Warm-Up Schedule for Four-Hour Shift	9-22
10-1	Activity Hazard Analysis (AHA)	10-2

### LIST OF FIGURES

2-1	Location Map
2-2	Site Map
3-1	OSHA 300A Forms
4-1	Organization Chart
8-1	Incident Report Forms
9-1	Emergency References
9-2	Route to Hospital
9-3	Medical Data Sheet
9-4	Requirements for Basic Unit First Aid Packages

### ATTACHMENTS

I	Site-Specific Training Documentation Form and Employee Training/Qualifications/ Medical Clearance
II	Contractor Significant Incident Form
III	Equipment Inspection Checklists
IV	Utility Locating And Excavation Clearance Standard Operating Procedure
V	OSHA Poster

---

## ACRONYMS

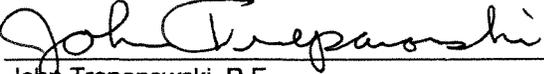
ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automatic Electronic Defibrillator
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
BLS	Bureau of Labor Statistics
°C	Centigrade or Celsius
CESCO	Certified Environmental and Safety Compliance Officer
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long - Term Environmental Action Navy
COC	Contaminants of Concern
CPG	Certified Professional Geologist
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSIR	Contractor Significant Incident Report Form
CSP	Certified Safety Professional
CTO	Contract Task Order
DART	Days Away/Restricted Duty/Transfer
dBA	decibels on the A scale
DEET	n,n-diethyl-meta-toluamide
DPT	Direct Push Technology
ECT%	Equivalent Chill Temperature
EM	Engineer Manual
°F	Fahrenheit
FEMA	Federal Emergency Management Agency
FOL	Field Operations Leader
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HR	Heart Rate
HSM	Health and Safety Manager
ICS	Incident Command System
IDW	Investigation-derived Waste
lbs	pounds
LWDIR	Lost Workday Incident Rate
MSDS	Material Safety Data Sheet

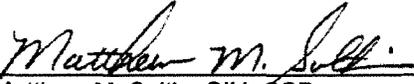
NAICS	North American Industry Classification System
NAVFAC	Navy Facilities Engineering Command
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
OT	Oral Temperature
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PE	Professional Engineer
PG	Professional Geologist
PHSM	Project Health and Safety Manager
PHSO	Project Health and Safety Officer
PM	Project Manager
PNS	Portsmouth Naval Shipyard
POC	Point of Contact
PPE	Personal Protective Equipment
RAC	Risk Assessment Code
RCIR	Recordable Case Incident Rate
RCRA	Resource Conservation and Recovery Act
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SDS	Safety Data Sheets
SOP	Standard Operating Procedure
SPF	Sun Protection Factor
SSHP	Site Safety and Health Plan
SSO	Site Safety Officer
SVOC	Semi-volatile Organic Carbons
TLV	Threshold Limit Value
TRIR	Total Recordable Incident Rate
TSS	Technical Support Services
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Carbons

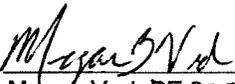
## 1.0 SIGNATURE SHEET

By their signature, the undersigned hereby certify that this Accident Prevention Plan (APP) has been prepared in accordance with the United States Department of Labor Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120(e) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard and 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 Portsmouth Naval Shipyard (PNS), Kittery, Maine

  
Date 4/30/15  
James K. Laffey, CE, SQ  
Senior Health and Safety Specialist-Plan Preparer (412) 921-8678

  
Date 5/8/15  
John Trepanowski, P.E.  
Vice President – Plan Approval (910) 491-9688

  
Date 4/30/15  
Matthew M. Soltis, CIH, CSP  
Vice President and Program Health and Safety Manager – Plan Concurrence (412) 921-8912

  
Date 5/1/2015  
Megan Ved, PE, EIT  
Project Manager - Plan Concurrence (412) 921-7271

## **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 Naval Facilities Engineering Command (NAVFAC), as defined under Contract No. N62470-08-D-1001; Contract Task Order Number (CTO) WE32.

### **2.3 PROJECT NAME**

Remedial Investigation

### **2.4 PROJECT DESCRIPTION**

This APP and Site Safety and Health Plan (SSHP) have been prepared to support activities for environmental services. It presents support to the technical approach described in the Sampling and Analysis Plan (SAP) for Operable Unit (OU) 8 Remedial Investigation Portsmouth Naval Shipyard. The specific tasks to be completed at the OU8 are collection of additional soil and groundwater samples needed to evaluate the nature and extent of contamination and to evaluate potential risks to human health and the environment. These actions include:

- Surface and subsurface soil samples will be collected from the proposed 18 soil sample locations.
- New monitoring wells will be installed, and groundwater samples will be collected from existing monitoring wells and two additional monitoring wells and analyzed
- A tidal study will be conducted to further characterize groundwater flow and tidal influence.

### **2.5 LOCATION**

PNS is a military facility with restricted access on an island located in the Piscataqua River, as shown on Figure 2-1. PNS is engaged in the conversion, overhaul, and repair of submarines for the Navy. PNS was established as a government facility in 1800, and served as a repair and building facility for ships during the Civil War. A large number of submarines have been designed, constructed, and repaired at this facility since 1917. PNS continues to service submarines as its primary military focus.

### **2.5.1 Site Description**

OU8 is located in the Controlled Industrial Area (CIA), in the western portion of PNS. OU8 is also known as Site 31 – Former West Timber Basin. The layout of OU8 is presented on Figure 2-2. OU8 is an industrial area surrounded by buildings and dry docks. The site is an area that was previously filled with various materials and is bounded on the east, west, and south by historical quay walls. There are two main buildings flanking OU8, Building 92 on the east and Building 174 on the west. An addition to Building 174 was completed in 2013, and intrusive activities underneath and within the building for environmental activities are prohibited. Additional utility corridors were also installed during new building construction, and utility corridors also existed previously on site. The abundance of utilities on site may present obstacles to future construction, potential sampling, and site use. Previous investigations at OU4 (offshore) monitoring stations MS-13 and MS-14 (shown on Figure 2-1) have shown that contaminants are not migrating to the offshore areas of OU8 at unacceptable levels.

### **2.5.2 Site History**

Naval warships built at PNS throughout the 19th Century were constructed with wood, and the wet storage and seasoning (drying) of the wood was conducted in the West Timber Basin. A new timber basin was constructed on the eastern side of the Shipyard, and by 1913, wet storage of timber in the West Timber Basin had ceased and was conducted in the new timber basin. In 1917, the former West Timber Basin's granite block quay wall was enclosed, the northern portion of the former timber basin was partially filled, and a metal washing plant, Building 110, was constructed to further extract essential scrap. Based on excavations and borings advanced at the site, the fill material appears to consist of bricks, metal debris, cinders, wood, gravel, and other waste materials. Some of the by-products of operations in the metal washing plant, which operated for approximately 3 years, may have been discarded into the former West Timber Basin, including metals, ash, and skimmings. Between 1920 and 1940, cleaning of steel plates and pickling continued in the area of Building 110.

The majority of filling of the former timber basin was completed by 1925, when only a small area in the southwestern corner had not been filled. By 1940, filling of the former timber basin was complete. Fill apparently included soil, rock, cinders, and other industrial debris. By 1940, Building 92 had been extended into the former West Timber Basin fill area. Around 1940, a metal plate yard was also constructed, which included a traveling crane, four pickling tanks, two washing aprons, and a potassium nitrate storage building (Building 157). There is no evidence of plating operations taking place at the site. Also in 1940, the metal washing plant was razed. The plate yard was active for 20 years and was the primary steel storage and pickling location at the Shipyard. The pickling tanks for the plate yard were removed from the site at an unknown time. Filling west of the former timber basin began sometime after

1941, and by 1947, the fill area west of OU8 extended to the current shoreline, and Buildings 174 and 175 had been built.

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

An Activity Hazard Analysis (AHA) has been developed for each planned activity and operation occurring in each major phase of work for the project. Each 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. Because each task is described and evaluated, workers should be better prepared to perform work safely. The Field Operations Leader (FOL)/Site Safety Officer (SSO) will discuss the risks and precautions associated with each task identified in the Work Plan. The AHAs for this project are located in Section 10.0 of the APP.

The specific tasks anticipated to be involved with this effort are listed below:

- Mobilization/demobilization
- Monitoring well installation and well development
- Soil sampling using direct push technology (DPT)
- Groundwater sampling using low-flow collection methods
  - Synoptic groundwater level measurements
  - Tidal study
  - In-situ hydraulic conductivity testing (slug tests)
- Decontamination
- Investigation-derived waste (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 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 (TRIR AND LWDIR CASE RATES)**

	<b>NAICS 541620 Professional and Business Services 2013</b>	<b>Tetra Tech 2012</b>	<b>Tetra Tech 2013</b>	<b>Tetra Tech 2014</b>
<b>Total Recordable Incident Rate (TRIR)</b>	1.00	0.67	0.69	0.51
<b>Lost Workday Incident Rate (LWDIR)</b>	0.40	0.10	0.15	0.12

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 300A attached as Figure 3-1.

#### Tetra Tech Man Hours Worked

2012	24,904,295
2013	24,812,849
2014	23,586,978

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

2011-2012	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 and subcontractor 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.

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

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

The Navy personnel primarily responsible for this project are Linda Cole, PE who is the Remedial Project Manager (RPM) and Matt Thyng who is the Facility Point of Contact (POC) along with Engineer Technician Joe Lavoie.

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

##### **4.2.2.1 Project Manager (PM)– Megan Ved**

The Tetra Tech Project manager (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 Health and Safety Manager (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.

Ms. Megan Ved has six years of professional experience as an engineer in the environmental field. Ms. Ved is responsible for preparation of Feasibility Studies, Remedial Action Completion Reports, and other engineering documents for Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA), and Petroleum Program sites. Her experience includes dealing with hazardous and non-hazardous wastes, water resources, monitoring air and water emissions, using various chemical treatment processes, and alternative energy. Through her experience Ms. Ved has developed strong communication, presentation, coordination, organizational, and data management skills.

Ms. Ved has analyzed the successfulness of remedial systems utilizing in situ and/or ex situ technologies such as chemical oxidation, bioremediation, soil flushing/washing, soil vapor extraction, air sparging, and groundwater circulation/recirculation through Technical Memoranda and Operating Properly and Successfully Reports. She also has experience in preparing Uniform Federal Policy - Sampling and Analysis Plans (UFP-SAPs) and Five Year Reviews for CERCLA sites.

- OSHA 1910.120 40-Hour HAZWOPER Training; November 2009
- OSHA 1910.120 8-Hour Annual Refresher Training; December 2014

#### **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, research and development, 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 (TSS) and as the HSM for the planned work addressed in this APP. His training experience includes:

- 40-Hour HAZWOPER Training, 29 Code of Federal Regulations (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
- Federal Emergency Management Agency (FEMA) Independent Study (IS)-200 Incident Command System (ICS) for Single Resources and Initial Action Incidents; July, 2009

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

The Project Health and Safety Officer (PHSO) is responsible for developing this APP in accordance with applicable OSHA and USACE 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 PPE 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 Project Health and Safety Officer (PHSO) for a wide variety of Environmental Investigation/Remediation Projects 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 site-specific Health and Safety Plans, 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 United States Environmental Protection Agency (USEPA) as an Incident Command System Instructor for IS 100 through 400. His training experience includes:

- OSHA Construction Safety and Health 30-hour Training #39-600709094; 2010
- OSHA 29 CFR 1910.120 40-hour HAZWOPER Training; 1990
- OSHA 29 CFR 1910.120 8-hour Annual Refresher Training; 2015
- OSHA 29 CFR 1910.120 Supervisory 1991 and Refresher Training; 2015

#### **4.2.2.4 Field Operations Leader/Site Safety Officer – Tim Evans**

The FOL/SSO is responsible for implementation of the project SAP 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 PPE
- Implementing Hazard Communication, Respiratory Protection Programs, and other health and safety programs as needed
- Providing site-specific training for onsite personnel
- Investigating accidents and injuries

Mr. Evans has over 21 years of professional experience. He is a senior geologist who provides geologic and hydrogeologic technical support principally for environmental investigation and remediation and geotechnical projects. He has been involved with underground storage tank (UST) sites, waste disposal (RCRA) sites, Superfund (CERCLA), and state voluntary cleanup programs for private, industrial, and government clients throughout the U.S. Mr. Evans serves as the professional geologist responsible for geologic work at multiple sites, government and commercial, in Maine and South Carolina. His training experience includes:

- OSHA 29 CFR 1910.120 40-Hour HAZWOPER Training; 1993
- OSHA 29 CFR 1910.120(e)(4) HAZWOPER Supervisor Training; 1996
- OSHA 29 CFR 1910.120 8-hour Annual Refresher Training; 2014
- U.S. Department of Transportation (USDOT) 49 CFR 172.704 Hazardous Materials Shipping Training; 2013

As the Site Safety Officer the FOL/SSO is also responsible for ensuring that corrective measures have been implemented, appropriate internal and PNS 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 PPE
- 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 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 SDSs 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.

#### **4.2.3 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. Drilling Subcontractors will conduct soil borings and install new wells. Registered Land Surveyors will survey the completed wells.

Individuals employed by subcontractors/vendors will receive:

- 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 HSM. Through observations and communication, all parties involved shall then develop, communicate, and implement corrective actions necessary and appropriate to modify the task and to resume work.

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

The competent and qualified person for environmental sampling on this project is Mr. Tim Evans. 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 many years of field supervision in environmental sampling, and safety and meets the requirements as defined in 29 CFR 1910.120 for knowledge of and experience in environmental sampling.

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

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

#### **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 PPE 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 (Tetra Tech and subcontractors) 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 APP, the Project Specific Work Plan, 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 develops and administers the corporate Health and Safety Program and ensures that all operating unit health and safety managers are periodically updated on corporate developments
- The HSM is responsible for health and safety administration in the operating unit and coordinates the health and safety program and develops unit specific health and safety guidance as required.
- 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
- PMs who are responsible for managing a particular project or job.
- SSOs 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.

## **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 Attachment I 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: To be completed when subcontracts have been executed.

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**

Personnel who may be exposed to hazardous conditions and who will participate in site activities are required to meet the training requirements outlined in 29 CFR 1910.120, HAZWOPER. Furthermore, 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 MANDATORY TRAINING AND CERTIFICATIONS**

Tetra Tech personnel qualification and training certification documentation will be obtained by the FOL and maintained on-site. Mandatory training and certifications applicable to this project include the following:

- 40 hours of introductory hazardous waste site training prior to performing work at PNS.
- 8 hours of refresher training within the past 12 months before being cleared for site work. (Field personnel who have had introductory training more than 12 months prior to site work must complete this training again).
- 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site personnel operating in a supervisory capacity.

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

### **6.3 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.

Prior to accessing active work areas of the sites or participating in any intrusive activities, site personnel and visitors will first be required to undergo a site-specific safety and health training session conducted by the FOL/SSO, which will include a review of the APP and signing of the Site-Specific Training Documentation form.

Before site activities begin, the Tetra Tech FOL/SSO will present a briefing for site personnel who will participate in on-site activities. The following topics will be addressed during the pre-work briefing:

- Names of the personnel listed in the organizational chart and designated alternates
- Site history
- Work tasks
- Hazardous chemicals that may be encountered
- Physical hazards that may be encountered
- PPE, including types of respiratory and hearing protection to be used for work tasks
- Mandatory training and certification requirements (e.g., HAZWOPER, first aid, etc.)
- Environmental surveillance (air monitoring) equipment use and maintenance
- Action levels and situations requiring an upgrade or downgrade of level of protection
- Site control measures including site communications and control zones
- Decontamination procedures
- Emergency communication signals and codes, including incident reporting procedures
- Environmental accident/emergency procedures
- Personnel exposure and accident emergency procedures
- Fire and explosion emergency procedures
- Emergency telephone numbers
- Emergency routes

Any other health and safety-related issues that may arise before site activities begin will be covered during the pre-work briefing.

#### **6.4 HAZARD COMMUNICATION TRAINING**

In accordance with the OSHA Hazard Communication Standard (29 CFR 1920.1200 and 29 CFR 1926.59), copies of SDSs 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, 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.

#### **6.5 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING**

The FOL/SSO will identify those individuals who have current first aid and CPR training. The emergency response agencies listed in this APP are capable of providing the most effective emergency medical response, and as such, are designated as the primary responders in the event of an first aid emergency. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time.

#### **6.6 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 OSHA Bloodborne Pathogen Standard, 29 CFR 1910.1030.

#### **6.7 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.

#### **6.8 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.

## **6.9 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 \$2,000 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 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
- Suspected hazardous substance exposure over the allowable exposure limit
- 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 permit or permit equivalent exceedance
- Unexpected contact with damage to aboveground or below ground utilities

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 or Tetra Tech subcontractors under Tetra Tech's immediate direction shall be reported and investigated.

TOTAL is an intuitive system that guides users through the necessary steps to report an incident within 24 hours of its occurrence. TOTAL is a tool to better track incidents, analyze root causes, implement corrective action plans, and share lessons learned. 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.

#### **8.4.3 Portsmouth Naval Shipyard Contractor Significant Incident Report**

The attached (Attachment II) Contractor Significant Incident Form (CSIR) is to be used by contractors to record the results of accident/incidents investigations and shall be provided to the contracting officer within the required timeframe.

## **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**

This project will not erect any temporary facilities. The primary activities of the project will occur outside. The sampling supplies and recordkeeping activity will be supported using site vehicles.

### **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 RPM and the POC will be notified if these response agencies are contacted.

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

In the event of an emergency situation, the FOL/SSO will initiate evacuation procedures. The personnel will evacuate and assemble in a safe area, as identified by the FOL/SSO in cooperation with site contact Matt Thying or Joe Lavoie. Prior to start of work at any project site, the FOL/SSO will identify and mark the location of an evacuation assembly area for the sampling location if a site evacuation is ordered or initiated. For efficient and safe site evacuation and assessment of the emergency situation, the FOL/SSO will notify PNS Emergency Services (Fire, Police, Emergency Medical Services). Under no circumstances will incoming personnel or visitors be allowed to proceed to the sampling area once the emergency signal has been given. The FOL/SSO must establish clear access for emergency equipment and ensure that the operations has been shut down once the alarm has been sounded. As soon as possible, and while the safety of the personnel is being confirmed, PNS emergency agency notification will commence. The FOL/SSO will brief site personnel each day as to the location of the evacuation assembly area if it changes. Prior to the start of activities at the site, the FOL/SSO will establish access route from the sampling site to the evacuation assembly area. The FOL/SSO will prepare a drawing, or map, that diagrams these safe access routes. The FOL/SSO will use this same map to diagram egress from the evacuation assembly area to the facility gate which is to be used as an exit.

#### **9.2.2 Spill Plans**

It is anticipated that bulk quantities of potentially hazardous materials (greater than 55-gallons) may be handled during the site activities. As needed, 55-gallon drums or roll-off containers may be used to contain IDW generated during sampling activities. The containers will be labeled with the site name and

address, the type of contents, and the date the container was filled as well as an identified contact person. As warranted, samples will be collected and analyzed to characterize the material and determine appropriate disposal measures, as described in the project-specific SAP. Once characterized the containers will be removed from the staging area and disposed of in accordance with Federal, State and local regulations by PNS.

#### **9.2.2.1 Potential Spill Areas**

Should containers contain liquid wastes, potential spill areas will be monitored in an ongoing attempt to prevent and control the spread of contamination into the environment. Heavy equipment re-fueling areas will be monitored and spill control equipment be kept on the re-fueling vehicle in the event that a fuel spill occurs. Areas designated for handling, loading, and unloading of potentially contaminated water and debris present limited potential for leaks or spills. Liquid waste other than IDW and decontamination fluids is not anticipated.

#### **9.2.2.2 Leak and Spill Detection**

Drums will be arranged in compliance with RCRA requirements (aisle between rows, stack limitations, secured area.) To establish an early detection of potential spills or leaks, periodic inspections by the FOL/SSO will be conducted during working hours to visually confirm that containers are not leaking. If a leak is detected, the first approach will be to transfer the container contents using a hand pump into a new container.

Other provisions for the transfer of container contents will be made and appropriate emergency contacts will be notified, if necessary. In most instances, leaks will be collected and contained using absorbents such as Oil-dry, vermiculite, and/or sand, which may be stored at the staging area in a conspicuously marked drum. Sufficient spill cleanup materials will be available in the drum area. This material too, will be containerized for disposal pending analyses. Inspections will be documented in the Project Logbook.

#### **9.2.2.3 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.

#### **9.2.2.4 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 PNS POC immediately.

The following equipment will 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.
- Drums. 55-gallon USDOT 1A1 and/or 1A2
- 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 near the work or sampling preparation site. Fire extinguishers will also be located in each piece of mobile construction equipment and in the crew pickup trucks. 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 USDOT 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 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 rely on the PNS Emergency Services to provide medical support. The FOL/SSO will ensure that the local EMS is reasonably accessible and in near proximity to the workplace.

For non-emergency medical issues, Tetra Tech personnel are instructed to perform a drive-by of the nearest hospital prior to commencing site activities. This ensures that the hospital is accessible and available and that the most efficient route 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 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

#### **9.2.6.2 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.

### **9.3 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. Restrooms, 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**

The health hazards associated with this project are physical and chemical hazards associated with multimedia sampling and monitoring well installation. The APP describes the mitigation measures to reduce these hazards. Detailed task-specific hazards and controls are provided in the AHAs in Section 10.0.

##### **9.7.1 Chemical Exposure Potential**

Environmental sampling at OU8 was previously conducted. Surface soil, subsurface soil, and groundwater samples were collected in areas with past industrial activities that may have resulted in potential contamination of soil. Consistent with the presence of debris-like materials in the subsurface, the highest levels of polycyclic aromatic hydrocarbons (PAHs) and metals were detected in the

subsurface. Only metals and PAHs were detected in site soils at concentrations exceeding industrial risk-based screening levels. Several metals were detected in groundwater at concentrations in excess of residential screening levels (based on drinking water standards). The site history did not indicate a reason to suspect volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticide, or Polychlorinated Biphenyl (PCB) contamination, and this was confirmed because there were no risk-based screening level exceedances for these compounds. Therefore, based on site history and exceedances of screening levels, metals (primarily lead, but also arsenic, aluminum, potassium, iron, manganese, and mercury) and PAHs are chemicals potentially associated with OU8.

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

#### **9.7.1.1 Metals**

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

**Lead** - Although children are primarily at risk, lead poisoning is also dangerous for adults. Even exposure to amounts of lead too low to cause symptoms in the short term may increase the risk of high blood pressure and mental decline in the future. Symptoms in adults may include:

- Pain, numbness or tingling of the extremities
- Muscular weakness
- Headache
- Abdominal pain
- Memory loss
- Mood disorders
- Reduced sperm count, abnormal sperm
- Miscarriage or premature birth in pregnant women
- Fatigue

### **9.7.1.2 Polycyclic Aromatic Hydrocarbons**

PAHs include anthracene, benzo[a]anthracene, benzo[a]pyrene, chrysene, fluoroanthene. Acute exposures may result in difficulty breathing, respiratory failure and skin and eye burns. Chronic exposure may damage the liver, kidneys, lungs and skin. Many of these substances are recognized for their cancer causing properties. Overexposure to these substances has shown to be a skin, eye, and mucous membrane irritant. Some of these substances are considered a photosensitizer and mild allergen and considered mildly to moderately toxic by ingestion. The majority of these substances are petroleum based pitch which is considered insoluble. These substances will commingle with soils and sediments which minimizes mobility and exposure potential. Ingestion exposure routes still exist. But this route can be controlled through use of PPE, good work hygiene practices, and diligent application of decontamination procedures.

### **9.7.2 Potential Routes of Exposure**

There are four main routes of exposure by which chemicals can contact and/or enter the body. Many chemicals can cause direct effects at the point of contact, such as irritation of the skin, eyes, mouth or nose. Some chemicals can also be absorbed into the body and cause harmful effects on other body systems like the blood, liver or nervous system.

#### **9.7.2.1 Ingestion and Skin Contact**

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

- No hand-to-mouth activities on site (eating, drinking, smoking, etc.)
- Washing hands upon leaving the work area and prior to performing any hand to mouth activities

Wearing proper gloves whenever handling potentially-contaminated media, including soils, hand tools, and sample containers.

#### **9.7.2.2 Inhalation**

Given the activities being performed and the concentrations of contaminants, the probability that the contaminants will be present in significant concentrations to present an inhalation hazard during planned

site activities is unlikely. For this reason, air and dust monitoring will not be necessary. If dust is observed, area wetting techniques will be utilized to minimize dust generation.

## **9.8 HAZARD COMMUNICATION PROGRAM**

Site operations will be compliant with the provisions of the OSHA Hazard Communication 29 CFR 1910.1200(f) Standard. The OSHA Hazard Communication Standard is aligned with the United Nations' Global Harmonized System of Classification and Labeling of Chemicals.

### **9.8.1 Safety Data Sheet**

Tetra Tech and subcontractor personnel will provide Safety Data Sheets (SDS) 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 SDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

### **9.8.2 Chemical Inventory**

The 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 and will verify that the container is properly labeled with the following information:

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

### **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 hazardous waste work depending on the project schedule. Work performed when ambient air temperatures are below 50 degrees Fahrenheit (°F) or 10 degrees Celsius (°C) 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 (21°C) 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 (21°C) 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 that is below 77°F (25° C) if possible.
- 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 9-1**  
**PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES**

Work-Rest Regimen	Work Load		
	Light	Moderate	Heavy
Continuous	80.0°F (26.7°C)	80.0°F (26.7°C)	77.0°F (25.0°C)
75% Work - 25% Rest, Each Hour	87.0°F (30.6°C)	82.4°F (28°C)	78.6°F (25.9°C)
50% Work - 50% Rest, Each Hour	88.5°F (31.4°C)	85.0°F (29.4°C)	82.2°F (27.9°C)
25% Work - 75% Rest, Each Hour	90.0°F (32.2°C)	88.0°F (31.1°C)	86.0°F (30.0°C)

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(37.2°C). 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 (37.6°C) 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 9-2.
- 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 Sun Protection Factor (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 9-2**

**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 PNS Fire Department/Ambulance and 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 9-3. 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 9-3**

**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 9-4.
- 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 9-4**

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

Estimated Wind Speed (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 In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER 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 9-5.

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.
- If the air temperature is -17.5°C (0°F) or less, the hands should be protected by mittens.
- 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.

**TABLE 9-5**

**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.

- 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.
- 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 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.

**9.22 FLOAT PLAN**

Not applicable.

**9.23 SITE-SPECIFIC FALL PROTECTION & PREVENTION PLAN DEMOLITION 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 SSHP establishes policies and procedures to protect workers and the public from the potential hazards posed during field operations at PNS. 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**

OU8 is an industrial area surrounded by buildings and dry docks. The site is an area that was previously filled with various materials and is bounded on the east, west, and south by historical quay walls. Based on site history and exceedances of screening levels, metals and PAHs are chemicals potentially associated with OU8 sources.

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

The anticipated hazards, recommended control measures, required PPE, and decontamination measures for each site task are discussed in detail on the AHA in Section 10.0.

AHA issued for site mobilization/demobilization, various sampling and investigative activities, and decontamination activities (see Section 10) using elements defined in this section.

##### **9.33.2.1 General Safe Work Practices**

In addition to the task-specific safe work practices may be identified in the AHA issued for this task. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Refrain from 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.
- Wash hands and face prior to breaks and prior to lunch and associated hand to mouth activities.

- Keep the work area clean.
- Be familiar with and adhere to all instructions provided within this site-specific APP.
- Be aware of the location of the nearest telephone and all emergency telephone numbers. See Section 9.0, Figure 9-1.
- Attend briefings on anticipated hazards, equipment requirements, AHA, emergency procedures, and communication methods before going on site.
- Use the “buddy system”.
- Observe coworkers for signs of heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

### **9.33.2.2 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 PNS. 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.

#### **9.33.2.2.1 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.

#### 9.33.2.2.2 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., overhead coring device) is in use. This will prevent minor injuries caused by bumping one's head while working around and under equipment. 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.

#### 9.33.2.2.3 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.

#### 9.33.2.2.4 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:

- In general, 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.

### **9.33.2.3 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.

#### **9.33.2.3.1 Insects**

Insects, including mosquitos and to a lesser extent, wasps, hornets, spiders, 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 n,n-diethyl-meta-toluamide (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.

#### 9.33.2.3.2 Mosquitoes

Mosquitoes are guaranteed to be joining us wherever we go, whatever we do. There are more than 50 different species of mosquitoes found in Northeast United States. Most aren't interested in biting mammals including people. During mobilization activities work to identify mosquito breeding grounds, educate field staff on safety precautions, and attempt to eliminate mosquito-based threats in the work area.

"While bug zappers and swatters have their places, the best preventative measures can be taken before young mosquitoes take flight. "The ideal time is while they are in larval stage because they are so concentrated," he said.

There are two diseases that scientists are most concerned with: West Nile Virus and Eastern Equine Encephalitis (EEE or Triple E). The latter was first identified in 1938 in Massachusetts. There is no treatment for either ailment, with young children and older adults being among the highest risk demographics.

Follow the Three D's of mosquito prevention.

- **Drain.** Mosquito larva develops in pools of stagnant water in about a week. By removing anything capable of collecting excess water on the worksite, you help mitigate the number of mosquitoes in the work environment. This includes open trash barrels, loose tarps, and tires.
- **Dress.** When possible, dress in long sleeves, pants, and hats to reduce the amount of exposed skin available to mosquitoes. The bloodsuckers are attracted to darker colors and human body odor, so make sure you and your clothes are clean.
- **Defend.** Using bug repellent is an excellent way to keep mosquitoes off. Daly recommends DEET, but if you prefer more natural solutions, try oil of lemon eucalyptus.

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

See Section 4.0 of the APP.

#### 9.33.4 **Training**

See Section 6.0 of this APP.

### **9.33.5 Personal Protective Equipment**

The levels of personal protection to be used for work tasks at the PNS 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 US 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

- Splash or Rain Suits
- Shirts and long pants
- Water resistant shoe/boots with slip-resistant soles
- Tyvek® coverall type suits if a chance of soiling clothing

#### **9.33.6 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.

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

Not Applicable.

#### **9.33.8 Heat and Cold Stress**

See Section 9.14 of this APP.

#### **9.33.9 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.

#### **9.33.9.1 Material Handling Procedures**

Handling and storing materials involve many operations including 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 (>50 lb) or awkward loads.
  - If site personnel are not capable of lifting 50 lbs., seek assistance from a team member to split the load.
- Make sure the path of travel is clear prior to the lift.

#### **9.33.9.2 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 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.

### **9.33.9.3 Comprehensive AHA of Treatment Technologies**

See Section 10.0 of the APP.

### **9.33.10 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.

#### **9.33.10.1 Control Zones**

Hazardous waste sites can be divided into different zones as needed to meet operational and safety objectives; however, normally three zones are established: the exclusion zone, the contamination reduction zone (CRZ), and the support zone. It is the responsibility of the SSO to implement and maintain the work zone barriers.

Delineation of these three zones should be based on sampling and monitoring results and on an evaluation of potential routes of contaminant dispersion in the event of a release. Movement of personnel and equipment across these zones should be minimized and restricted to specific access control points to prevent cross-contamination from contaminated areas to clean 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. The three zones are discussed below.

#### **9.33.10.2 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:

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.

#### **9.33.10.3 Contamination Reduction Zone**

The 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.

#### **9.33.10.4 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.

#### **9.33.10.5 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., Department of Defense, 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 PM 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.

#### **9.33.10.6 Site Security**

Site security will be maintained by fencing, posting signs, and limiting access control points. A system of controls will be established to establish a separation of the work activity from anyone not involved in the work on-site. Security controls also identify authorized persons and to approve site visitors. Site personnel will accompany visitors at all times and advise them of the appropriate protective equipment.

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 at the base boundaries restricting the general public. The second line of security will take place at the work site referring interested parties to the POC. The POC will serve as a focal point for base personnel, interested parties, and serve as the final line of security and the primary enforcement contact.

#### **9.33.10.7 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 into cell phones prior to beginning work.

### **9.33.11 Personal Hygiene and Decontamination**

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

#### **9.33.11.1 Responsibilities**

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.

#### **9.33.11.2 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, polyvinyl chloride (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.

### **9.33.11.3 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.

### **9.33.11.4 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 Exclusion Zone (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.

### **9.33.11.5 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.

### **9.33.12 Equipment Decontamination**

Sampling equipment will be decontaminated as stated per the requirements in the Sampling and Analysis Plan and/or Work Plan. SDS for any decontamination solutions (Alconox, 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.

#### **9.33.12.1 Heavy Equipment Decontamination**

The heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. 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 or the SSO will be responsible for evaluating equipment arriving on site and that which is to leave the site. No equipment will be authorized access or exit without this authorization.

Evaluation will consist of:

- Visual inspection
- Scanning equipment with monitoring instruments

#### **9.33.13 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 9-4 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.

- 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 onsite and shall be immediately available for use in the event of an emergency. 2A:10BC for general support activities.
  
- If fuel will be transferred from portable fuel cans, they will be Underwriters Laboratory 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.

#### **9.33.13.1 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.

### **9.33.14 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 POC.

The local PNS 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 POC 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

#### **9.33.14.1 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 PNS Emergency Response personnel prior to the commencement of work to ensure that Tetra Tech emergency action activities are compatible with PNS emergency response procedures.
- Determine how to identify the PNS Incident Commander so coordination may take place immediately in the event of an emergency.
- 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 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.

#### **9.33.14.2 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 PNS emergency services arrive on site. Other site personnel will provide support and follow direction from the PNS Incident Commander.

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

Emergency situations may be encountered during site activities.

##### **9.33.14.3.1 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.

#### 9.33.14.3.2 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; shipyard emergency, fire or explosion.

In the event of an emergency requiring evacuation or a shipyard ordered evacuation, personnel will immediately stop activities and return to shore to the designated landing area and assembly area unless doing so would pose additional risks. When evacuation to the docking/assembly is not possible, personnel will proceed to a designated alternate location and remain until further notification from the Tetra Tech FOL/SSO or the PNS Emergency Services Incident Commander. Once at the alternate location the PNS Incident Commander will be notified thru the Site Contacts. Assembly areas and alternate areas 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 and changes will be reiterated during daily safety meetings. Whenever possible, the assembly area will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the assembly location until directed otherwise by the Tetra Tech FOL/SSO or the PNS Incident Commander. The FOL/SSO will perform a head count at this location to account for and to confirm the location of site personnel. PNS 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 assembly areas 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.

#### 9.33.14.3.3 Emergency Alarm Systems

Tetra Tech personnel will be working in close proximity to each other at PNS. 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.

#### **9.33.14.4 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

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

See Figure 9-2 for route to hospital from dock.

#### **9.33.14.6 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.

**Table 10-1  
Activity Hazard Analysis (AHA)**

ACTIVITY/WORK TASK:	<b>Site Mobilization - Demobilization</b>	Overall Risk Assessment Code (RAC) (Use highest code)				<b>L</b>		
	SIGNATURES	Activity #		AHA #	<b>1</b>			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-08-D-1001</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE32</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
PRIME CONTRACTOR:	<b>Tetra Tech, Inc.</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
SUBCONTRACTOR:			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
DATE OF PREPARATORY MEETING:			Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
DATE OF INITIAL INSPECTION:		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	
CONTRACTOR COMPETENT PERSON:								
SITE SAFETY and HEALTH OFFICER:								
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>								
		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						
<b>ACTIVITY / PHASE</b>	<b>HAZARDS</b>	<b>CONTROLS</b>					<b>RAC</b>	
Vehicle operation conducted while <ul style="list-style-type: none"> <li>In route to or from the site</li> <li>Performing duties associated with the project or in a motor vehicle.</li> </ul>	1. Vehicle Accident <ul style="list-style-type: none"> <li>Unauthorized drivers</li> <li>Vehicle/equipment failure</li> </ul>	1. Ensure driver is "authorized" per the Tetra Tech Vehicle Safety Program 2. Have driver's license and Tetra Tech Identification, and insurance information available. 3. Prior to use, walk around your vehicle make sure you have adequate tire pressure, no lights are broken, etc. 4. Set driver's seat and mirrors for maximum comfort and visibility. 5. Examine gauges to ensure operational fluids are at desired levels; check brakes, steering in the parking lot. 6. Preset radio stations, secure wires for auxiliary IPod or similar devices so this is not attempted while driving. 7. Place cell phone out of reach to avoid temptation of answering. 8. Pre-set address for GPS or similar devices					L	
	2. Driving a motor vehicle	1. Obey established speed limits. 2. Follow posted traffic signs						L

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Site Mobilization/Demobilization**  
**Page 2 of 4**

ACTIVITY / PHASE	HAZARDS	CONTROLS	RAC
	<ul style="list-style-type: none"> <li>• Distracted driving</li> <li>• Speeding</li> </ul>	<ol style="list-style-type: none"> <li>3. Avoid distracted driving:               <ul style="list-style-type: none"> <li>• Never use cell phones</li> <li>• Never eat</li> <li>• Never play with the radio</li> <li>• Never engage in any distracting activity</li> </ul> </li> <li>4. If you receive a telephone call, let it go to voice mail or pull over and answer it.</li> <li>5. Practice defensive driving.</li> <li>6. Always permit adequate room between you and the driver in front of your vehicle. Use the 4-second rule               <ul style="list-style-type: none"> <li>• Pick a spot when the car in front of passes this spot it should take you another 4 seconds before you reach that spot.</li> </ul> </li> <li>7. Exercise extra caution when in school and work zones,</li> <li>8. Secure any loose items to prevent movement or loss</li> </ol>	
	3. Vehicle accident	<ol style="list-style-type: none"> <li>1. Move vehicle, if possible, from the travel lanes.</li> <li>2. Turn on your emergency flashers.</li> <li>3. Do not step into traffic when exiting the vehicle.</li> <li>4. Wear high visibility vest</li> <li>5. Place your warning triangle (100-feet behind your vehicle)</li> <li>6. Contact the FOL and the SSO.</li> <li>7. Be respectful to the local authorities.</li> <li>8. DO NOT attempt to argue whose fault.</li> <li>9. DO NOT admit fault.</li> <li>10. Secure all valuables.</li> <li>11. Take the keys from the ignition if you leave your vehicle for any reason.</li> <li>12. Complete the Tetra Tech IR-C form (Figure 8-1) to make sure you have gathered all of the pertinent information.</li> </ol>	L
<ul style="list-style-type: none"> <li>• Assembling equipment and supplies</li> </ul>	1. Equipment specific	<ol style="list-style-type: none"> <li>1. Conduct initial site acceptance inspection prior to performing any work at this site.</li> <li>2. Use the equipment inspection checklist in Attachment III.</li> </ol>	L
<ul style="list-style-type: none"> <li>• Performing initial/exit inspections of the intended work areas</li> </ul>	2. Minor cuts, abrasions or contusions	1. Wear cut-resistant gloves when handling items with sharp or rough edges.	L
	3. Heavy lifting (muscle strains and pulls)	<ol style="list-style-type: none"> <li>1. Practice safe lifting techniques. Use mechanical lifting devices such as a dolly whenever possible</li> <li>2. Ensure clear path of travel.</li> <li>3. Have a good grasp on object. Perform "test lift" to gauge ability to safely</li> </ol>	L

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1**  
**Activity Hazard Analysis**  
**Site Mobilization/Demobilization**  
**Page 3 of 4**

ACTIVITY / PHASE	HAZARDS	CONTROLS	RAC
<ul style="list-style-type: none"> <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> <li>• Conducting site geographic surveys</li> </ul>		make the lift. 4. Lift with legs not back. Obtain help when needed to lift large, bulky, or heavy items).	
	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. 2. In high traffic areas, wear a high-visibility vest, shirt or jacket.	L
	5. Slips, Trips, Falls	1. Wear appropriate foot protection to prevent slips and trips. 2. Use caution when working on uneven and wet surfaces.	L
	6. Intermittent high noise levels	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. 2. FOL/SSO is responsible for determining and designating when hearing protection is required. 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).	L
	7. Inclement weather	1. The FOL/SSO will temporarily suspend activities and return to shore in the event of electrical storms or high winds. 2. It is preferred that supported systems such as lightning detection devices or emergency weather broadcasts are employed. 3. NO PLACE outside is safe when thunderstorms are in the area!! 4. If you hear thunder, lightning is close enough to strike you. 5. When you hear thunder, immediately move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up. 6. Stay in safe shelter at least 30 minutes after you hear the last sound of thunder.	L
	8. Implement Site Specific Hazard Communication Program	1. Complete the chemical inventory for the project. 2. Procure SDSs for chemicals used exclusively on this project. 3. Label containers used onsite for hazardous materials. 4. Identification of any additional hazard communication training requirements.	L

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Site Mobilization/Demobilization**  
**Page 4 of 4**

<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel name(s)</b>	<b>Inspection Requirements</b>
<p><b>Personal Protective Equipment:</b>  <u>Minimum:</u> nitrile surgeon's type gloves, safety toe boots, safety glasses  <u>Optional items:</u> Hardhat, hearing protection.  <u>HTRW:</u> PAHs and metals</p>	<p>OSHA 40 HAZWOPER training.            8-hour annual refresher training.            8-hour supervisory training for supervisors.            Also Review of AHA during tailgate safety briefing with the intended task participants.</p> <p>PPE training in proper use, care, storage, and limitations has been covered in 40 hour HAZWOPER training.</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>

I have read and understand this AHA:

<b>Name (Printed)</b>	<b>Signature</b>	<b>Date</b>

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1 (Continued)  
Activity Hazard Analysis (AHA)**

ACTIVITY/WORK TASK:	<b>Soil Boring using DPT, including soil and groundwater sampling</b>	Overall Risk Assessment Code (RAC) (Use highest code)				<b>M</b>		
	SIGNATURES	Activity #		AHA #	<b>2</b>			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-08-D-1001</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE32</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
PRIME CONTRACTOR:	<b>Tetra Tech, Inc.</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
SUBCONTRACTOR:			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
DATE OF PREPARATORY MEETING:			Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
DATE OF INITIAL INSPECTION:		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	
COMPETENT PERSON:								
SITE SAFETY and HEALTH OFFICER:								
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard". Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>								
		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						
<b>JOB STEPS</b>	<b>HAZARDS</b>	<b>CONTROLS</b>				<b>RAC</b>		
Drill/DPT Rig set up and operation	1. Struck By	<ol style="list-style-type: none"> <li>Hard hats and high visibility vests for all personnel in work area.</li> <li>Control work area (use flaggers, signage, barricades, and/or other means) and restrict all non-essential personnel from the area.</li> <li>Inspect rig and ensure that all equipment, augers, rods and tools will be properly secured during transport.</li> </ol>				L		
	2. Tip Over	<ol style="list-style-type: none"> <li>Do not permit rig to attempt to traverse severely sloping terrain.</li> <li>Use a ground guide along with a functioning back-up alarm during equipment backing.</li> <li>Once rig is sited, deploy outriggers to properly block and level the rig and secure parking brake.</li> </ol>				L		
	3. Slips, Trips, Falls	<ol style="list-style-type: none"> <li>Clear trees, roots, weeds, limbs and other ground hazards from the Drill/DPT location.</li> <li>Practice good housekeeping to keep the ground around the Drill/DPT site clear of obstructions, equipment and other tripping hazards.</li> </ol>				L		

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Soil Boring using DPT including Soil and Groundwater Sampling**  
**Page 2 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
		3. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces.	
	4. Minor cuts, or abrasions	1. When handling equipment and tools wear cut-resistant gloves when handling items with sharp or rough edges.	L
	5. Heavy lifting (muscle strains and pulls)	1. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible). 2. Ensure clear path of travel, good grasp on object, perform "test lift" to gauge ability to safely make the lift 3. Lift with legs, obtain help to lift large, bulky, or heavy items.	L
	6. Insect bites	1. Shake out boots before donning. 2. Use insect repellants (products containing DEET should be applied to exposed skin, products containing Permethrin should be applied to clothing only. Follow manufacturer's recommendations for application). 3. Tape up pants leg to work boot joints with duct tape. Wear light-colored clothing to better see and remove any insects. Perform close body inspections at least daily upon leaving the site.	L
	7. Inclement weather	1. If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the FOL/SSO will suspend outside activities. 2. <i>NO PLACE</i> outside is safe when thunderstorms are in the area!! 3. If you hear thunder, lightning is close enough to strike you. 4. When you hear thunder, <i>immediately</i> move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up. 5. Stay in safe shelter at least 30 minutes after you hear the last sound of thunder.	L
Drill/DPT Operations	1. Intermittent high noise levels	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. 2. SSO responsible for determining and designating when hearing protection is required. 3. Hearing protection is to consist of either ear muffs or ear plugs that have an NRR of at least 25 dB.	L
	2. Contact with equipment	1. Ensure that workers are thoroughly trained and competent to perform	M

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Soil Boring using DPT including Soil and Groundwater Sampling**  
**Page 3 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
	moving parts	their assigned task with the equipment used in investigation. 2. Ensure that back-up alarms are functional on equipment. 3. The equipment operators, supervisor, and FOL/SSO are responsible to ensure that the equipment is properly inspected prior to being permitted onsite. (see Attachment III Equipment Inspection Checklist) 4. Ensure that all moving parts are guarded if such parts are exposed. Check/test all emergency stop controls.	
	3. Contact/striking underground or overhead utilities	1. Movement of rig with mast raised will be strictly prohibited. 2. Inspect for buried and overhead utilities in the vicinity of the Drill/DPT location. 3. Verify the location of utility lines in accordance with the Tetra Tech SOP Utility Locating and Excavation Clearance (Attachment IV). 4. Plan the move with the local utility companies if utility lines must be moved. 5. Pre-survey the height of equipment and height of utility lines to determine which lines must be removed or raised. 6. Equipment should not come within 20 feet of existing overhead utility lines.	L
	4. Pressurized hydraulic lines could rupture, causing release of hot hydraulic fluid.	1. Inspect all hydraulic lines before placing rig in service. 2. Any damaged hoses or connections must be replaced before unit is used. 3. Immediately shut down equipment if lines rupture. 4. If rupture occurs, as quickly as possible, berm the liquid to minimize the area over which the liquid spreads. 5. Ensure that all pressurized lines have whip checks.	L
	5. Workers could trip or fall by the borehole	1. Cap and flag open boreholes. 2. If left unattended, protect all open boreholes as any open excavation.	L
	Handling drill rods and augers	1. Struck by/entanglement	1. Be prepared for sudden shifting when removing rod sections. 2. Restrict non-essential personnel from approaching working area.
2. Overhead hazards	1. All personnel within the radius of the Drill/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. 2. Practice good housekeeping to keep the ground around the site clear of	L	

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1**  
**Activity Hazard Analysis**  
**Soil Boring using DPT including Soil and Groundwater Sampling**  
**Page 4 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
		obstructions, equipment and other tripping hazards. 3. Wear appropriate foot protection to prevent slips and trips. 4. Use caution when working on uneven and wet ground surfaces. 5. Keep a wide base and assure secure footing while attempting to handler auger flights and tooling.	
	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 by using mechanical lifting devices such as a dolly whenever possible. 2. Ensure clear path of travel 3. Have a good grasp on object. 4. Perform "test lift" to gauge ability to safely make the lift. 5. Lift with legs not back. 6. Obtain help when needed to lift large, bulky, or heavy items	L
Soil sampling from acetate sampling liners.	1. Cuts and lacerations – when cutting acetate liners without the proper material handling devices.	1. Always cut away from yourself and others. Do not place items to be cut in your hand or on your knee. 2. Change blades as necessary to maintain a sharp cutting edge as many accidents result dull cutting attachments. 3. Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife/saw hand, where possible. When cutting acetate liners use the tubing retention tub to secure the tube. 4. Use the knife intended for that purpose. Geoprobe® makes a kit for this purpose.	L
	2. Chemical exposure	1. Wear surgeons' gloves when handling potentially-contaminated media and samples. Avoid contact with potentially-contaminated media to the extent possible. 2. Practice good personal hygiene (hands and face washing) when exiting work area. 3. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). 4. Exposure via dermal contact and ingestion represent some limited concern during this task. 5. If dust is observed, area wetting techniques will be utilized to minimize dust generation.	L
Groundwater sampling	1. Chemical exposure	1. Wear surgeons' gloves when handling potentially-contaminated media	L

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1**  
**Activity Hazard Analysis**  
**Soil Boring using DPT including Soil and Groundwater Sampling**  
**Page 5 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
<ul style="list-style-type: none"> <li>• Prepare sample bottles with preservatives and labels.</li> <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>	<ul style="list-style-type: none"> <li>• Contact with and burns from acids used for sample preservation</li> <li>• Contact with potentially contaminated groundwater</li> </ul>	<p>and samples. Avoid contact with potentially-contaminated media to the extent possible.</p> <ol style="list-style-type: none"> <li>2. Practice good personal hygiene (hands and face washing) when exiting work area.</li> <li>3. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.).</li> <li>4. Exposure via dermal contact and ingestion represent some limited concern during this task.</li> </ol>	
	<ol style="list-style-type: none"> <li>2. Tripping potential on air/sample discharge line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Organize line to keep out of way as much as possible, mark potential tripping hazards with caution tape or safety cones.</li> </ol>	L
	<ol style="list-style-type: none"> <li>3. Back strain when transporting coolers full of collected samples.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use proper lifting techniques.</li> <li>2. Get assistance when possible, especially for containers heavier than 50 lbs.</li> </ol>	L
EQUIPMENT TO BE USED		INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>DPT Rig, bore rods, auger flights, acetate cutting device and sharp knives, hand tools (dollies, hand carts, etc.)            Sampling equipment, sample bottles, coolers, pumps.  <b>Safety Equipment:</b></p> <ol style="list-style-type: none"> <li>1. A 20-pound dry chemical ABC fire extinguisher readily available.</li> <li>2. Spill-control kit available at drilling location.</li> <li>3. First-aid kit, eyewash (meeting the ANSI Z358.1 criteria), and an emergency air horn nearby.</li> </ol> <p><b>Monitoring Instruments:</b></p>		<p>Visual inspection prior to use by user.</p>	<ol style="list-style-type: none"> <li>1. Review of AHA during pre-task tailgate safety briefing with all intended task participants.</li> <li>2. Personnel must be trained in use of drilling equipment.</li> <li>3. The Drill/DPT operator must have current certifications to operate the equipment.</li> </ol>

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1**  
**Activity Hazard Analysis**  
**Soil Boring using DPT including Soil and Groundwater Sampling**  
**Page 6 of 6**

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p><b>Personal Protective Equipment:</b> <u>Minimum:</u> Safety toe boots, safety glasses, hardhat. <u>Optional items:</u> Hearing protection Nitrile surgeon’s style gloves and Tyvek if there is a change to soil clothing.  <b>HTRW:</b> metals and PAHs</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>	<p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees’ 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in any onsite activities, and will be confirmed by visual observations of worker activities.</p>

I have read and understand this AHA:

Name (Printed)	Signature	Date

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1 (Continued)  
Activity Hazard Analysis (AHA)**

ACTIVITY/WORK TASK:	<b>Monitoring Well Installation and Well Development</b>	Overall Risk Assessment Code (RAC) (Use highest code)				<b>L</b>		
	SIGNATURES	Activity #			AHA #	<b>3</b>		
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-08-D-1001</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE32</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
PRIME CONTRACTOR:	<b>Tetra Tech, Inc</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
SUBCONTRACTOR:			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
DATE OF PREPARATORY MEETING:			Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
DATE OF INITIAL INSPECTION:		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	
CONTRACTOR COMPETENT PERSON:		Review each "Hazard" with identified safety "Controls" and determine (RAC)						
SITE SAFETY and HEALTH OFFICER		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard". Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>								
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>								
<b>JOB STEPS</b>	<b>HAZARDS</b>	<b>CONTROLS</b>				<b>RAC</b>		
Drill Rig set up and operation	1. Struck By	1. Hard hats and high visibility vests for all personnel in work area. 2. Control work area (use flaggers, signage, barricades, and/or other means) and restrict all non-essential personnel from the area. 3. Inspect rig and ensure that all equipment, augers, rods and tools will be properly secured during transport.				L		
	2. Tip Over	1. Do not permit rig to attempt to traverse severely sloping terrain. 2. Use a ground guide along with a functioning back-up alarm during equipment backing. 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 Drill/DPT location. 2. Practice good housekeeping to keep the ground around the Drill/DPT site clear of obstructions, equipment and other tripping hazards. 3. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces.				L		

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Monitoring Well Installation and Well Development**  
**Page 2 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
	4. Minor cuts, or abrasions	1. When handling equipment and tools wear cut-resistant gloves when handling items with sharp or rough edges.	L
	5. Heavy lifting (muscle strains and pulls)	1. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible. 2. Ensure clear path of travel, good grasp on object, perform "test lift" to gauge ability to safely make the lift 3. Lift with legs, obtain help to lift large, bulky, or heavy items.	L
	6. Insect bites	1. Shake out boots before donning. 2. Use insect repellants (products containing DEET should be applied to exposed skin, products containing Permethrin should be applied to clothing only. Follow manufacturer's recommendations for application). 3. Tape up pants leg to work boot joints with duct tape. Wear light-colored clothing to better see and remove any insects. Perform close body inspections at least daily upon leaving the site.	L
	7. Inclement weather	1. If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the FOL/SSO will suspend outside activities. 2. <i>NO PLACE</i> outside is safe when thunderstorms are in the area!! 3. If you hear thunder, lightning is close enough to strike you. 4. When you hear thunder, <i>immediately</i> move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up. 5. Stay in safe shelter at least 30 minutes after you hear the last sound of thunder.	L
Drill Rig Operations	1. Intermittent high noise levels	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. 2. SSO responsible for determining and designating when hearing protection is required. 3. Hearing protection is to consist of either ear muffs or ear plugs that have an NRR of at least 25 dB.	L
	2. Contact with equipment moving parts	1. Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. 2. Ensure that back-up alarms are functional on equipment. 3. The equipment operators, their supervisor and the FOL/SSO are responsible to ensure that the equipment is properly inspection prior to being permitted onsite. (see Attachment III Equipment Inspection Checklist) 4. Ensure that all moving parts are guarded if such parts are exposed. 5. Check/test all emergency stop controls.	M

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Monitoring Well Installation and Well Development**  
**Page 3 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
	3. Contact/striking underground or overhead utilities	<ol style="list-style-type: none"> <li>1. Movement of rig with mast raised will be strictly prohibited.</li> <li>2. Inspect for buried and overhead utilities in the vicinity of the Drill/DPT location.</li> <li>3. Verify the location of utility lines in accordance with the Tetra Tech SOP Utility Location and Excavation Clearance (Attachment IV).</li> <li>4. Plan the move with the local utility companies if utility lines must be moved.</li> <li>5. Pre-survey the height of equipment and height of utility lines to determine which lines must be removed or raised.</li> <li>6. Equipment should not come within 20 feet of existing overhead utility lines.</li> </ol>	L
	4. Pressurized hydraulic lines could rupture, causing release of hot hydraulic fluid.	<ol style="list-style-type: none"> <li>1. Inspect all hydraulic lines before placing rig in service. Any damaged hoses or connections must be replaced before unit is used.</li> <li>2. Immediately shut down equipment if lines rupture.</li> <li>3. If rupture occurs, as quickly as possible, berm the liquid to minimize the area over which the liquid spreads.</li> <li>4. Ensure that all pressurized lines have whip checks.</li> </ol>	L
	5. Workers could trip or fall by the borehole	<ol style="list-style-type: none"> <li>1. Cap and flag open boreholes.</li> <li>2. If left unattended, protect all open boreholes as any open excavation.</li> </ol>	L
Handling drill rods and augers	1. Struck by/entanglement	<ol style="list-style-type: none"> <li>1. Be prepared for sudden shifting when removing rod sections.</li> <li>2. Restrict non-essential personnel from approaching working area.</li> </ol>	L
	2. Overhead hazards	<ol style="list-style-type: none"> <li>1. All personnel within the radius of the Drill/DPT rig must wear ANSI approved hard hats.</li> </ol>	L
	3. Slips, Trips, Falls	<ol style="list-style-type: none"> <li>1. Clear trees, roots, weeds, limbs and other ground hazards from the location.</li> <li>2. Practice good housekeeping to keep the ground around the site clear of obstructions, equipment and other tripping hazards.</li> <li>3. Wear appropriate foot protection to prevent slips and trips.</li> <li>4. Use caution when working on uneven and wet ground surfaces.</li> <li>5. Keep a wide base and assure secure footing while attempting to handler auger flights and tools.</li> </ol>	L
	4. Contusions, cuts, or abrasions	<ol style="list-style-type: none"> <li>1. When handling auger flights and tools, wear cut-resistant heavy cotton or leather work gloves when handling items with sharp or rough edges.</li> </ol>	L
	5. Heavy lifting (muscle strains and pulls).	<ol style="list-style-type: none"> <li>1. Practice safe lifting techniques by using mechanical lifting devices such as a dolly whenever possible.</li> <li>2. Ensure clear path of travel</li> <li>3. Have a good grasp on object. Perform "test lift" to gauge ability to safely make the lift.</li> </ol>	L

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1**  
**Activity Hazard Analysis**  
**Monitoring Well Installation and Well Development**  
**Page 4 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
		4. Lift with legs not back. 5. Obtain help when needed to lift large, bulky, or heavy items	
HSA Operations	1. Auger start up and operation	1. Auger will be engaged only when the hot zone is cleared and site personnel notified. 2. Site personnel will not approach a rotating auger. 3. Use a long handled flat head shovel when removing auger cuttings. Stay away from the augers when rotating. 4. Prevent shovel from lodging into the augers and kicking out. 5. Do not wear loose clothing when working with augers.	L
	2. Cleaning augers	1. Augers will be cleaned only when they are stopped and in neutral. 2. They will not be restarted until the worker has given a verbal "all clear" to the operator, and the operator has visually determined that the worker is clear of the auger. 3. Only long-handled shovels will be used to remove cuttings from the auger.	L
Monitoring Well installation	1. Slips, Trips, Falls	1. Clear trees, roots, weeds, limbs and other ground hazards from the location. 2. Practice good housekeeping to keep the ground around the site clear of obstructions, equipment and other tripping hazards. 3. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. Keep a wide base and assure secure footing while attempting to handler auger flights and tooling.	L
	2. 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
	3. Heavy lifting (muscle strains and pulls).	1. Practice safe lifting techniques by using mechanical lifting devices such as a dolly whenever possible. 2. Ensure clear path of travel 3. Have a good grasp on object. Perform "test lift" to gauge ability to safely make the lift. 4. Lift with legs not back. Obtain help when needed to lift large, bulky, or heavy items	L
	4. Exposure to potential site contaminants <ul style="list-style-type: none"> <li>• Inhalation</li> <li>• Skin contact</li> <li>• Absorption</li> <li>• Ingestion</li> </ul>	1. Monitoring with portable photoionization detector (PID) or flame ionization detector (FID) 2. Calibrate monitoring equipment twice/day. <ul style="list-style-type: none"> <li>• In the morning prior to use to ensure the operational status</li> <li>• In the evening in order to compensate results for any instrument drift due to battery loss.</li> </ul> 3. Establish background levels to be incorporated into the monitoring results. 4. Periodically screen the borehole and any samples collected with a PID equipped with a 10.6 eV Ultra Violet (UV) lamp. 5. If readings above daily-established background levels (BGLs) are noted in borehole, monitor	L

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Monitoring Well Installation and Well Development**  
**Page 5 of 6**

JOB STEPS	HAZARDS	CONTROLS	RAC
		<p>worker breathing zone (BZ) areas.</p> <p>6. If readings in worker BZ areas exceed:</p> <ul style="list-style-type: none"> <li>• PID Action Level: 10 ppm above BG in BZ areas for any exposure in one work day or FID 2.75 ppm</li> </ul> <p>7. Monitoring will be conducted in the breathing zone of the Driller to collect data for the worst case scenario in order to evaluate air emissions from this source point.</p>	
Soil sampling	1. Cuts and lacerations – when cutting acetate liners without the proper material handling devices.	<p>1. Always cut away from yourself and others. Do not place items to be cut in your hand or on your knee.</p> <p>2. Change blades as necessary to maintain a sharp cutting edge as many accidents result dull cutting attachments.</p> <p>3. Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife/saw hand, where possible. When cutting acetate liners use the tubing retention tub to secure the tube.</p> <p>4. Use the knife intended for that purpose. Geoprobe® makes a kit for this purpose.</p>	L
	2. Chemical exposure	<p>5. Wear surgeons' gloves when handling potentially-contaminated media and samples. Avoid contact with potentially-contaminated media to the extent possible.</p> <p>6. Practice good personal hygiene (hands and face washing) when exiting work area. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.).</p> <p>7. Exposure via dermal contact and ingestion represent some limited concern during this task.</p> <p>8. If dust is observed, area wetting techniques will be utilized to minimize dust generation.</p>	L
Decontamination	1. Chemical contamination	<p>1. When handling soils and potentially contaminated equipment</p> <p>2. Wear surgeon's gloves when handling potentially-contaminated media and samples</p> <p>3. Avoid contact with potentially-contaminated media to the extent possible.</p> <p>4. These are disposable, change out as necessary to avoid break through.</p> <p>5. When exiting the exclusion zone, wash the outer gloves to remove any residual contamination.</p> <p>6. This will also permit disposal in the general refuse.</p> <p>7. Remove gloves, wash hands and face to minimize any potential introduction of contaminants into the body.</p> <p>8. Leave consumable materials such as cigarettes, snuff chewing tobacco, candies, medications, etc. in the break area to avoid potential contact.</p> <p>9. Practice good personal hygiene (hands and face washing) when exiting work area, avoiding any hand-to-mouth activities in the work (eating, drinking, smoking, etc.).</p> <p>10. Practice good housekeeping to avoid the spread of contamination.</p>	L

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1  
Activity Hazard Analysis  
Monitoring Well Installation and Well Development  
Page 6 of 6**

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>Drill Rig, bore rods, sharp knives, hand tools (dollies, hand carts, etc.), ventilation fan  <b>Safety Equipment:</b></p> <ul style="list-style-type: none"> <li>• A 20-pound dry chemical ABC fire extinguisher readily available.</li> <li>• Spill-control kit available at drilling location.</li> <li>• First-aid kit, eyewash, and an emergency air horn nearby.</li> <li>• Portable eye wash bottle.</li> </ul> <p><b>Monitoring Instruments:</b> PID or FID</p>	<p>Visual inspection prior to use by user.</p>	<ol style="list-style-type: none"> <li>1. Review of AHA during pre-task tailgate safety briefing with the intended task participants.</li> <li>2. Personnel must be trained in use of drilling equipment.</li> <li>3. The drill operator must have current certifications to operate the equipment.</li> <li>4. Review operating manuals of monitoring instruments.</li> </ol>
<p><b>Personal Protective Equipment: Minimum:</b> Safety toe boots, safety glasses, work gloves.  <b>Optional items:</b> Hardhat, hearing protection, nitrile surgeon's style gloves and Tyvek if there is a change to soil clothing.  <b>HTRW:</b> PAHs and metals</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>	<p>PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees' 40 hour HAZWOPER training, which is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in any onsite activities, and will be confirmed by visual observations of worker activities.</p>

I have read and understand this AHA:

Name (Printed)	Signature	Date

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

**Table 10-1 (Continued)  
Activity Hazard Analysis (AHA)**

ACTIVITY/WORK TASK:	Groundwater Sampling including, synoptic groundwater level measurements, tidal study In-situ hydraulic conductivity testing (slug tests)	Overall Risk Assessment Code (RAC) (Use highest code)				L		
	SIGNATURES	Activity #		AHA #	3			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	N62470-08-D-1001	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	WE32		Frequent	Likely	Occasional	Seldom	Unlikely	
PRIME CONTRACTOR:	Tetra Tech, Inc		Catastrophic	E	E	H	H	M
SUBCONTRACTOR:			Critical	E	H	H	M	L
DATE OF PREPARATORY MEETING:			Marginal	H	M	M	L	L
DATE OF INITIAL INSPECTION:		Negligible	M	L	L	L	L	
CONTRACTOR COMPETENT PERSON:		ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)						
SITE SAFETY and HEALTH OFFICER		Review each "Hazard" with identified safety "Controls" and determine (RAC)						
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
M = MODERATE RISK (CM or ET or PAR)								
L = LOW RISK (ET or PAR)								
		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						
<b>JOB STEPS</b>	<b>HAZARDS</b>	<b>CONTROLS</b>				<b>RAC</b>		
Site Set Up	1. Inclement weather	1. If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the FOL/SSO will suspend outside activities. 2. NO PLACE outside is safe when thunderstorms are in the area!! 3. If you hear thunder, lightning is close enough to strike you. 4. When you hear thunder, immediately move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up. 5. Stay in safe shelter at least 30 minutes after you hear the last sound of thunder.				L		
	2. Minor cuts abrasions handling equipment and tools	1. Wear cut-resistant gloves when handling items with sharp or rough edges.				L		
	3. Slips, Trips, Falls	1. Clear intended work areas and walking paths of roots, weeds, limbs and other ground				L		

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Groundwater Sampling**  
**Page 2 of 3**

JOB STEPS	HAZARDS	CONTROLS		RAC
		hazards. 2. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. 3. Ensure that work boots have adequately-aggressive sole design. 4. Use caution when working on uneven and wet ground.		
	4. Insect bites, snake bites, and contact with poisonous plants.	1. Shake out boots before donning. 2. Use insect repellants. Products containing DEET should be applied to exposed skin. Products containing Permethrin should be applied to clothing only. Follow manufacturer's recommendations. 3. Tape up pants leg to work boot joints with duct tape and wear light-colored clothing to better see and remove any insects. 4. Avoid potential nesting areas (brush, deadfall, etc.) where insects or snakes may be present. 5. Perform close body inspections at least daily upon leaving the site.		L
Taking groundwater samples using a small battery-operated pump and placing into sample containers	1. Exposure to contaminants	1. Wear surgeon's gloves when handling potentially-contaminated media and samples. 2. Avoid contact with potentially-contaminated media to the extent possible. 3. Follow good decontamination and practice good personal hygiene (hands and face washing) when exiting work area. 4. Hand-to-mouth activities in the work area will be prohibited (eating, drinking, smoking, etc.). 5. Exposure via dermal contact and ingestion represent some limited concern during this task. 6. If dust is observed, area wetting techniques will be utilized to minimize dust generation.		L
EQUIPMENT		INSPECTION	TRAINING	
Peristaltic pump, tubing, sample collection tools and containers (jars, spatulas, spoons, etc.) <b>Safety Equipment:</b> Portable eye wash bottle <b>Monitoring Instruments:</b> none		Visual inspection prior to use by user.	Training/experience in proper sample collection, handling and chain of custody requirements.	
<b>Personal Protective Equipment: <u>Minimum:</u></b> nitrile surgeon's type gloves, safety toe boots,		Initial PPE inspection performed by SSO.	OSHA 40 hour HAZWOPER training, plus appropriate 8-hour annual refresher training for the task participants. Supervisors must have	

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1  
Activity Hazard Analysis  
Groundwater Sampling  
Page 3 of 3**

EQUIPMENT	INSPECTION	TRAINING
<p>safety glasses  <b>Optional items:</b> Hardhat, hearing protection.  Wear chemical-resistant coveralls (e.g., Tyvek) or aprons and surgeon's nitrile gloves under leather/cotton work gloves. High-visibility vests when near active traffic areas. Steel toe/shank boots are required when working in areas where there is a danger of foot injuries due to falling or rolling objects or of objects piercing the sole.(provided that the footwear satisfies ANSI Z-41 requirements for protective footwear) shall be used  <b>HTRW:</b> metals and PAHs</p>	<p>Ongoing (prior to each use) inspections responsibilities of PPE users.</p>	<p>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>

I have read and understand this AHA:

Name (Printed)	Signature	Date

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1 (Continued)  
Activity Hazard Analysis (AHA)**

ACTIVITY/WORK TASK:	<b>Decontamination</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>L</b>			
	SIGNATURES	Activity #		AHA #	<b>3</b>			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-08-D-1001</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE32</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
PRIME CONTRACTOR:	<b>Tetra Tech, Inc</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
SUBCONTRACTOR:			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
DATE OF PREPARATORY MEETING:			Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
DATE OF INITIAL INSPECTION:		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	
CONTRACTOR COMPETENT PERSON:								
SITE SAFETY and HEALTH OFFICER								
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>								
		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						
<b>JOB STEPS</b>	<b>HAZARDS</b>	<b>CONTROLS</b>					<b>RAC</b>	
Personal Decontamination <ul style="list-style-type: none"> <li>Equipment drop</li> <li>Segregated removal of PPE (wash and rinse reusable items, dispose of non-reusable items)</li> </ul>	1. Slips, Trips, Falls	1. Select intended decon area that is clear of obstructions. 2. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. 3. Wear appropriate foot protection to prevent slips and trips. 4. Use caution when working on uneven and wet surfaces					L	
	2. Exposure to contaminated media	1. Follow good decontamination practices <ul style="list-style-type: none"> <li>Work from top down and outside in.</li> <li>Nitrile gloves are to be the last item of PPE removed.</li> </ul> 2. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity.					L	
<b>Equipment to be Used</b>	<b>Training Requirements and Competent or Qualified Personnel names(s)</b>			<b>Inspection Requirements</b>				
Hand tools (hand brushes, garden sprayers, etc.)	None required.			Visual inspection prior to use by user. Check wooden handles for				

**IAW EM 385 01.A.13 Contractor-Required AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA"  
The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person's**

**Table 10-1**  
**Activity Hazard Analysis**  
**Decontamination**  
**Page 2 of 2**

<b>Equipment to be Used</b>	<b>Training Requirements and Competent or Qualified Personnel names(s)</b>	<b>Inspection Requirements</b>
		cracks or splinters.
<p><b>Personal Protective Equipment:</b>  <b>Minimum:</b> Safety glasses, nitrile gloves  <b>Optional items:</b> Hardhat,  <b>HTRW:</b> PAHs and metals</p>	<p>OSHA 40 HAZWOPER training.              8-hour annual refresher training.              8-hour supervisory training for supervisors.              Also Review of AHA during tailgate safety briefing with the intended task participants.</p> <p>PPE training in proper use, care, storage, and limitations has been covered in 40 hour HAZWOPER training. This is to be verified by the SSO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.</p>	<p>Initial PPE inspection performed by SSO. Ongoing (prior to each use) inspections responsibilities of PPE users.</p>

I have read and understand this AHA:

<b>Name (Printed)</b>	<b>Signature</b>	<b>Date</b>

**IAW EM 385 01.A.13 Contractor-Required AHA “Work will not begin until the AHA for the work activity has been accepted by the GDA”**  
**The AHA shall be reviewed and modified as necessary to address changing site condition, operations or change of competent/qualified person’s**

## 11.0 REFERENCES, MATERIALS AND DOCUMENTATION

United States Army Corps of Engineers (USACE). 15 October 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 posted or maintained at the site for quick reference purposes. For this project, the items so noted below will be maintained 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 (SDSs) (maintained)** - The SDSs 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 USDOT 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).

**Site Clearance (maintained)** - This list is found within the training section of the APP. This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities. This list will be maintained in a vehicle onsite during operations.

**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.

**Hearing Conservation Standard (29 CFR 1910.95) (posted)** - This standard will be posted any time hearing protection or other noise abatement procedures are used.

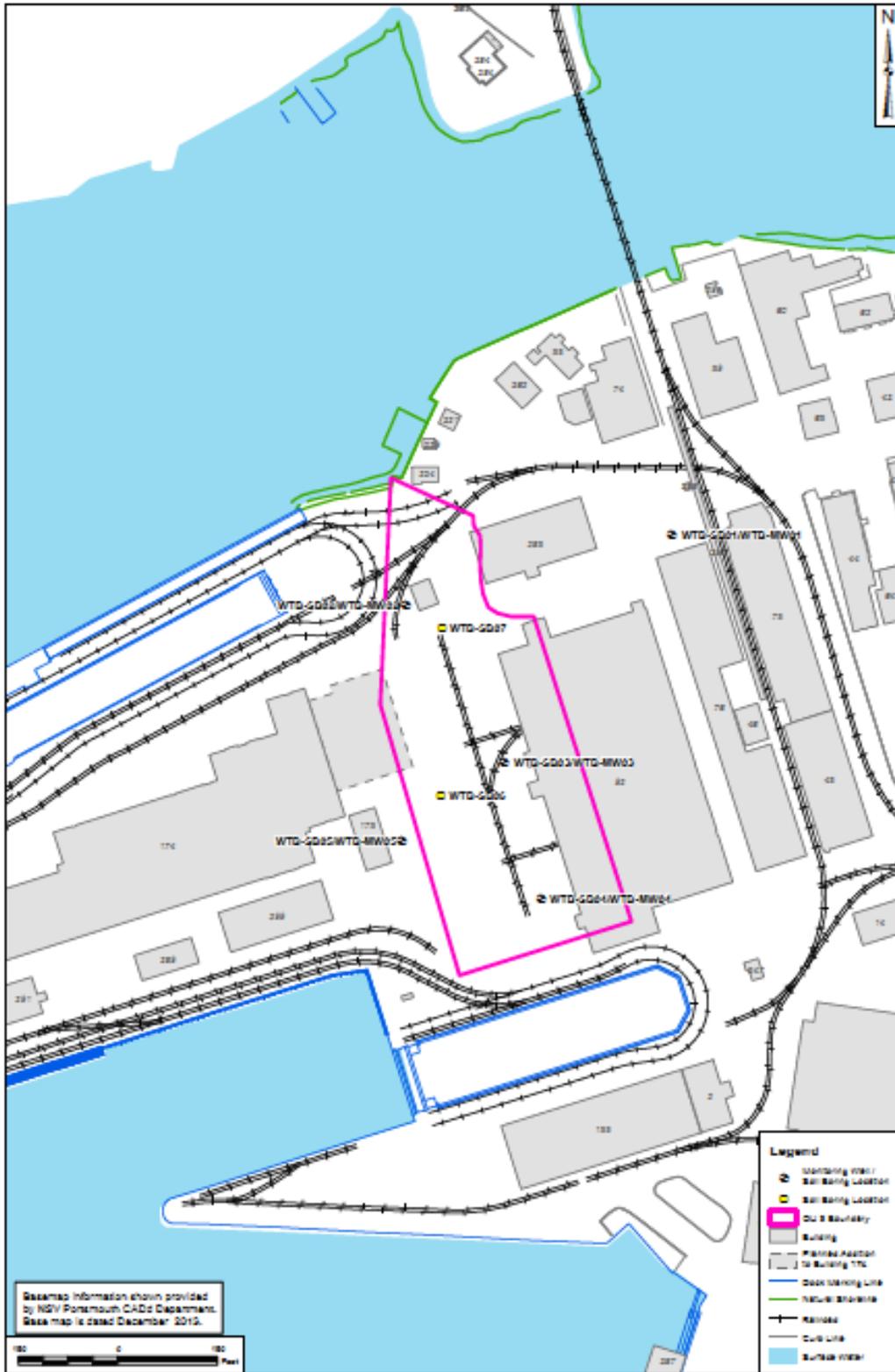
**Personnel Monitoring (maintained)** - Results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

## **FIGURES**

**FIGURE 2-1  
LOCATION MAP**



**FIGURE 2-2  
SITE MAP**



**FIGURE 3-1  
OSHA 300A FORMS**

**OSHA's Form 300A (Rev. 01/2004)  
Summary of Work-Related Injuries and Illnesses**

Year 2012



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

Form approved OMB no. 1210-0176

*All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete.*

*Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."*

*Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.*

**Number of Cases**

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	13	21	50
(G)	(H)	(I)	(J)

**Number of Days**

Total number of days away from work	Total number of days of job transfer or restriction
707	915
(K)	(L)

**Injury and Illness Types**

Total number of... (M)			
(1) Injury	77	(4) Poisoning	0
(2) Skin Disorder	5	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	2

**Post this Summary page from February 1 to April 30 of the year following the year covered by the form**

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

**Establishment information**

Your establishment name Tetra Tech, Inc.

Street 3475 East Foothill Boulevard

City Pasadena State CA Zip 91107

Industry description (e.g., Manufacture of motor truck trailers)  
Environmental Consulting Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)  
\_\_\_\_\_

OR North American Industrial Classification (NAICS), if known (e.g., 336212)  
5 4 1 6 2 0

**Employment information**

Annual average number of employees 12,250

Total hours worked by all employees last year 24,904,295

**Sign here**

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Chetan M. McLean  
Company executive

VP Corporate H&S  
Title

625 351 4654  
Phone

January 31, 2013  
Date

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2013



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

Form approved OMB no. 1218-0175

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete.

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	19	13	54
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
617	588
(K)	(L)

Injury and Illness Types

Total number of... (M)	
(1) Injury	77
(2) Skin Disorder	5
(3) Respiratory Condition	0
(4) Poisoning	0
(5) Hearing Loss	0
(6) All Other Illnesses	4

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 38 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name Tetra Tech, Inc. (ENTERPRISE WIDE)

Street 3475 East Foothill Blvd.

City Pasadena State California Zip 91107

Industry description (e.g., Manufacture of motor truck trailers)  
Environmental Consulting Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)  
\_\_\_\_\_

OR North American Industrial Classification (NAICS), if known (e.g., 336212)  
5 4 1 6 2 0

Employment information

Annual average number of employees 13,120

Total hours worked by all employees last year 24,812,849

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Chetan M. Mishra  
Company executive

VP, Corp H&S  
Title

626 351 4664

Phone

27-Jan-14

Date

# OSHA's Form 300A (Rev. 01/2004) Summary of Work-Related Injuries and Illnesses

Year 2014



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

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

## Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	14	12	34
(G)	(H)	(I)	(J)

## Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
505	458
(K)	(L)

## Injury and Illness Types

Total number of...			
(M)			
(1) Injury	58	(4) Poisoning	0
(2) Skin Disorder	1	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	1

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

## Establishment information

Your establishment name Tetra Tech, Inc. All Enterprise Report

Street 3475 East Foothill Blvd

City Pasadena State California Zip 91107

Industry description (e.g., Manufacture of motor truck trailers)  
Professional, Scientific and Technical Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

5 4 1

## Employment information

Annual average number of employees 12,093

Total hours worked by all employees last year 23,586,978

## Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

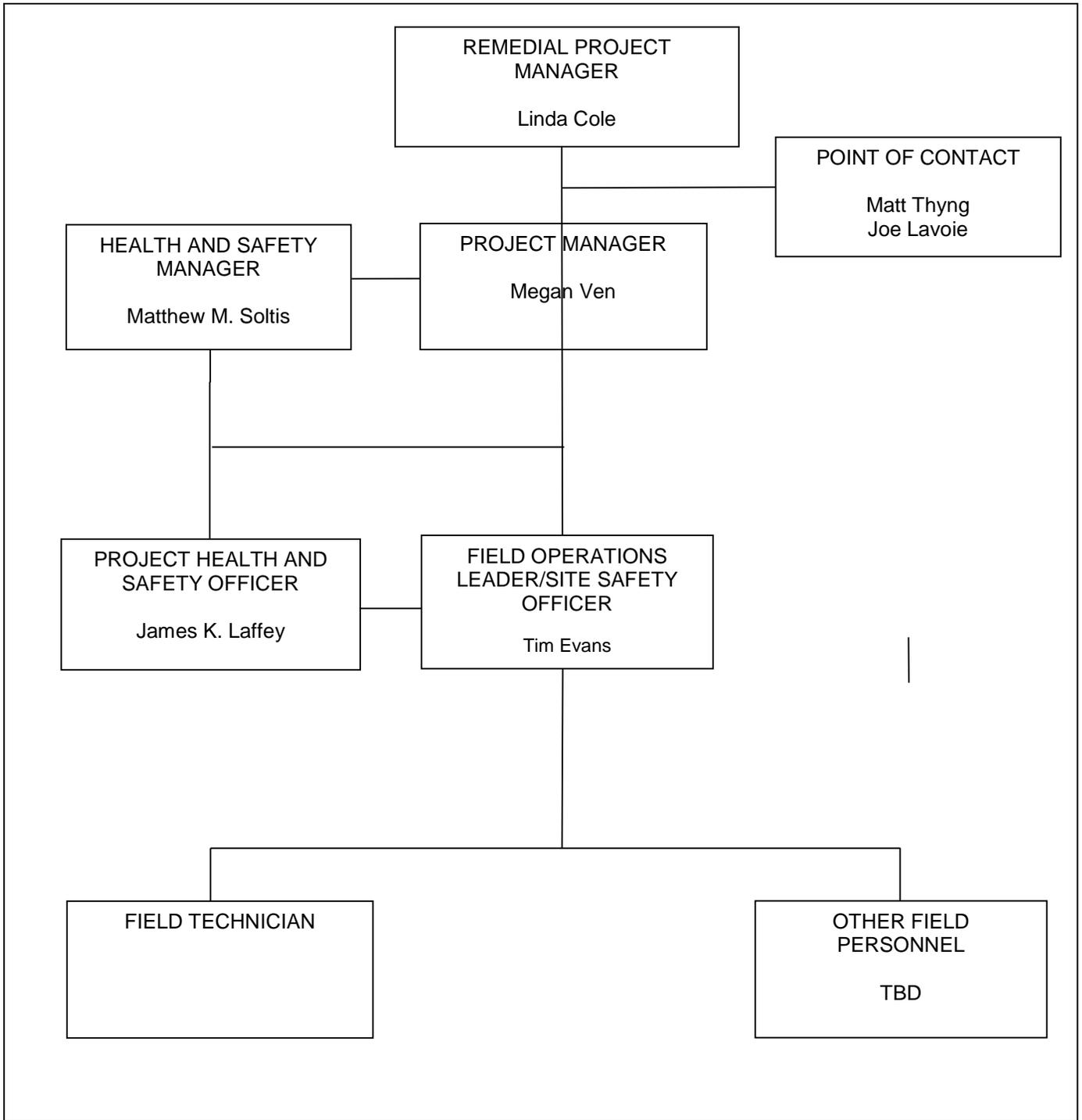
Christina M. McClain  
Company executive

VP, Corporate H&S  
Title

626 470 2542  
Phone

January 31, 2015  
Date

**FIGURE 4-1**  
**ORGANIZATION CHART**  
**FIELD ACTIVITIES AT PNS**



**FIGURE 8-1**

**INCIDENT REPORT FORMS**



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**

<b>Level - 1</b>	<p><b>Definition:</b> A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office.</p> <p>The following events may trigger a Level 1 RCA:</p> <ul style="list-style-type: none"> <li>▪ Work related fatality</li> <li>▪ Hospitalization of one or more employee where injuries result in total or partial permanent disability</li> <li>▪ Property damage in excess of \$75,000</li> <li>▪ When requested by senior management</li> </ul>
------------------	--

<b>Level - 2</b>	<p><b>Definition:</b> A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided.</p> <p>The following events will require a Level 2 RCA:</p> <ul style="list-style-type: none"> <li>▪ OSHA recordable lost time incident</li> <li>▪ Near miss incident that could have triggered a Level 1 RCA</li> <li>▪ When requested by senior management</li> </ul>
------------------	---

Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause identified within each area of inquiry.

**NOTIFICATIONS**

Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other: _____				

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



INSTRUCTIONS:

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

Incident Report Number: (From the IR Form)

EMPLOYEE INFORMATION

Company Affiliation

Tetra Tech Employee? [ ] TetraTech subcontractor employee (directly supervised by Tt personnel)? [ ]

Full Name Company (if not Tt employee)

Street Address, City, State and Zip Code Address Type

Home address (for Tt employees) [ ]
Business address (for subcontractors) [ ]

Telephone Numbers

Work: Home: Cell:

Occupation (regular job title) Department

Was the individual performing regular job duties? Time individual began work

Yes [ ] No [ ] AM [ ] PM [ ] OR Cannot be determined [ ]

Safety equipment

Provided? Yes [ ] No [ ] Type(s) provided: [ ] Hard hat [ ] Protective clothing
Used? Yes [ ] No [ ] If no, explain why [ ] Gloves [ ] High visibility vest
[ ] Eye protection [ ] Fall protection
[ ] Safety shoes [ ] Machine guarding
[ ] Respirator [ ] Other (list)

NOTIFICATIONS

Name of Tt employee to whom the injury or illness was first reported Was H&S notified within one hour of injury or illness?

Yes [ ] No [ ]

Date of report H&S Personnel Notified

Time of report Time of Report

If subcontractor injury, did subcontractor's firm perform their own incident investigation?

Yes [ ] No [ ] If yes, request a copy of their completed investigation form/report and attach it to this report.

**INJURY / ILLNESS DETAILS**

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

---



---



---

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

---



---



---



---

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

---



---

**MEDICAL CARE PROVIDED**

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

---

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

**Name of physician or health care professional**

**Facility Name**

---



---

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

**Type of Care?**

---



---

Was individual treated in emergency room? Yes  No

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

**Telephone Number**

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

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

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

**SIGNATURES**

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

**Affected individual (print)**

**Affected individual (signature)**

**Telephone Number**

**Date**

---



---



---



---

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



INSTRUCTIONS:

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

Incident Report Number: (From the IR Form)

TYPE OF INCIDENT (Check all that apply)

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

INCIDENT DETAILS

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

Blank lines for describing incident results.

Response Actions Taken:

Blank 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.

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

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

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

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.

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 and 2 details, Insurance, Agent info).



DRIVER INFORMATION
Vehicle Number 1 - Tetra Tech Vehicle
Vehicle Number 2 - Other Vehicle
Driver's Name, Address, Phone Number, Date of Birth, Driver's License #, Licensing State, Gender, Citation #, Citation Description
PASSENGERS IN VEHICLES (NON-INJURED)
List all non-injured passengers (excluding driver) in each vehicle.
Vehicle Number 1 - Tetra Tech Vehicle
Vehicle Number 2 - Other Vehicle
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?
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?
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 thin black border, intended for drawing a diagram of the incident.

**FIGURE 9-1**

**EMERGENCY REFERENCES  
PORTSMOUTH NAVAL SHIPYARD**

<b>AGENCY</b>	<b>TELEPHONE NUMBER</b>
Police (Shipyards)	(207) 438-2444*
Fire Department and Ambulance (Shipyards)	(207) 438-2333*
Portsmouth Regional Hospital Emergency Department	(603) 433-4042
WorkCare™ Incident Intervention Program	(888) 449-7787
Poison Control Center	800-222-1222
Chemtrec	800-424-9300
National Response Center	800-424-8202
Dig Safe (Maine and New Hampshire)	888-344-7233
PNS Site Contact Matt Thyng	(207) 438-6618 – office (207) 210-4530 - cell
Engineer Technician Joe Lavoie	(207) 252-0059 - cell
Navy RPM Linda Cole	(757) 341-2011 - office
Tetra Tech PM Megan Ved	(412) 921-7271 – office
Tetra Tech FOL, Tim Evans	(412) 921-7281 - office
Tetra Tech PHSO James K. Laffey	(412) 921-8678 - office (412) 370-0907 - cell
CLEAN HSM Matthew M. Soltis	(412) 921-8912 - office (412) 260-6681 - cell

\*Phone calls from Base phones use last 4 digits.

FIGURE 9-2

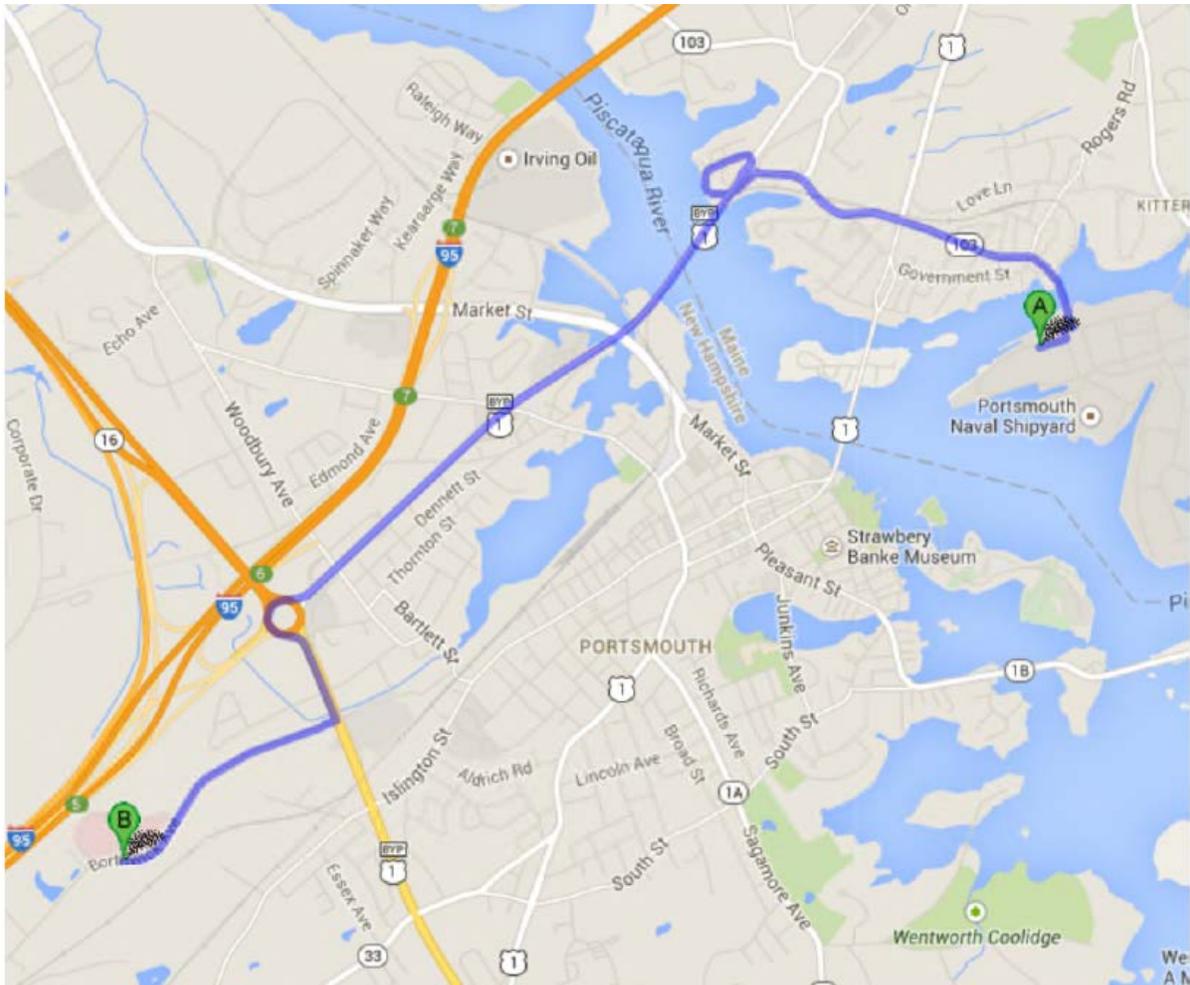
ROUTE TO HOSPITAL

333 Borthwick Ave Portsmouth, NH 03801

**A** Decatur Ave

- |   |        |
|---|--------|
| 1. Head east on Decatur Ave toward Ridgley St                       | 381 ft |
| 2. Turn left onto Ridgley St.                                       | 157 ft |
| 3. Take the 1st right onto Decatur Ave                              | 128 ft |
| 4. Take the 1st left onto Walker St                                 | 0.7 mi |
| 5. Continue onto Government St                                      | 0.1 mi |
| 6. Continue straight onto Bridge St                                 | 0.1 mi |
| 7. Slight left toward Oak Terrace                                   | 0.1 mi |
| 8. Continue onto Oak Terrace  | 0.1 mi |
| 9. Continue straight  | 453 ft |
| 10. Slight right onto US-1 BYP S (Entering New Hampshire)           | 1.7 mi |
| 11. At the traffic circle, take the 3rd exit and stay on US-1 BYP S | 0.4 mi |
| 12. Turn right onto Borthwick Ave                                   | 0.7 mi |

**B** 333 Borthwick Ave Portsmouth, NH 03801



**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 June 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 9-4**

**REQUIREMENTS FOR BASIC UNIT FIRST AID PACKAGES**

<b>Unit first aid item</b>	<b>Minimum Size or Volume (metric)</b>	<b>Minimum Size or Volume (US)</b>	<b>Item quantity per unit package</b>	<b>Unit package size</b>
*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 19 cm <sup>2</sup>	1 fl. oz. total 2.9 in <sup>2</sup>	1 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

## **ATTACHMENTS**

**ATTACHMENT I**

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

**TO BE ATTACHED BY PM/FOL/SSO**

**(40-Hour HAZWOPER Certificates; 8-Hour HAZWOPER Refresher  
Certificates; First Aid/CPR Certificates; employee resumes as  
required)**



Insert employee documents here.

**ATTACHMENT II**

**CONTRACTOR SIGNIFICANT INCIDENT FORM**

**Insert CSIR here**

**ATTACHMENT III**

**EQUIPMENT INSPECTION CHECKLISTS**

## Power Tools Checklist

Inspector \_\_\_\_\_ Date \_\_\_\_\_

Facility and Area \_\_\_\_\_

Electric Power Tools	OK	Action Required	Date Corrected
Is the plug and insulation on the cord intact with no exposed wires?			
Is the tool approved for use in hazardous atmospheres? (as required)			
For tools used in tanks or wet areas: Is the tool low voltage or battery powered? Is there ground fault circuit interrupter protection?			
Is the tool motor in good condition?			
Is the ground prong in good condition (for three-wire grounded tools)?			
If the tool isn't three-wire ground protected, is it double insulated?			
Are there any visible cracks or defects in the tool housing?			
Is there a trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for moving parts of saws, grinders, and similar tools?			
Is there a blade brake on lawn mowers, hedge trimmers, and similar tools?			
Do moveable guards operate freely?			
<b>Pneumatic Power Tools</b>			
Is the compressed air hose in good condition with no visible cracks, bubbles, or kinks?			
Do the hose connections to the tool and to the compressor fit snugly so there are no noticeable air leaks?			
If the air hose is recoilable, does it pull out and retract freely?			
Are there pressure reduction devices (to less than 30 psig) on all fittings designed to blow compressed air for cleaning?			
Is there a safety chain at all hose fittings to prevent whipping of the hose if a connection comes loose?			
Is a safety check valve in the air hose at or near compressor connection that will shut off or bypass the air flow if a break occurs in the air hose?			
Are there any visible cracks or defects in the tool housing?			
Is there a trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for all moving parts of saws, grinders, and similar tools?			
Do moveable guards operate freely?			
<b>Gasoline Power Tools</b>			
Are there signs of fuel leakage around the gasoline tank or fuel line?			
Is the tool motor in good conditions?			
Are there any visible cracks or defects in the tool housing?			
Is there a handle or trigger lock or guard to prevent accidental activation of the tool?			
Are there effective guards whenever possible for all moving parts of saws, trimmers, edgers, and similar tools?			
Is there a blade brake on lawn mowers, hedge trimmers, and similar tools?			
Is there a tip guard on chain saws?			
Do moveable guards operate freely?			
Are there fire extinguishers or other fire suppression equipment nearby?			
Are mufflers in good condition?			
Are spark plugs and wire connections in good condition?			
<b>Hydraulic Power Tools</b>			
Are there signs of fluid leakage around hydraulic lines, cylinders, reservoirs, pumps, or other system components?			
Are hydraulic lines in good condition with no visible cracks, bubbles, or kinks?			
Are all hydraulic line connections secure?			
Are there any visible cracks or defects in the tool housing?			

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

Comments:

### Equipment Inspection Checklist for Drill Rigs

Company: \_\_\_\_\_

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

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

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

Project Name: \_\_\_\_\_

Project No#: \_\_\_\_\_

Yes	No	NA	Requirement	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Emergency Stop Devices	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Emergency Stop Devices (At points of operation)</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Have all emergency shut offs identified been communicated to the field crew?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <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	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Cab, mirrors, safety glass?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Seat Belts?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Is the equipment equipped with audible back-up alarms and back-up lights?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Horn and gauges</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Brake condition (dynamic, park, etc.)</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Tires (Tread) or tracks</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Windshield wipers</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Exhaust system</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Steering (standard and emergency)</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Wheel Chocks?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Are tools and material secured to prevent movement during transport? Especially those within the cab?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Are there flammables or solvents or other prohibited substances stored within the cab?</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Fluid Levels: <ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	High Pressure Hydraulic Lines <ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Mast Condition <ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Safety Guards – <ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Operator Qualifications <ul style="list-style-type: none"> <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"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>PPE Required for Drill Rig Exclusion Zone</p> <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"/>	<p>Other Hazards</p> <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

**ATTACHMENT IV**

**UTILITY LOCATING 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 implement ability 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 APP.

#### **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 scapes 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 1):

**FIGURE 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.

Figure 2 provides the required minimum clearances for working in proximity to overhead power lines.

**FIGURE 2  
MINIMUM CLEARANCE DISTANCE**

<b>Nominal Voltage</b>	<b>Minimum Clearance</b>
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 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.

**FIGURE 3  
UTILITY CLEARANCE FORM**

Client:		Project Name:			
Project No.:		Completed By:			
Location Name:		Work Date:			
Excavation Method/Overhead Equipment:					
1.	Underground Utilities			Circle One	
	a	Review of existing maps?	Y	N	N/A
	b	Interview local personnel?	Y	N	N/A
	c	Site visit and inspection?	Y	N	N/A
	d	Excavation areas marked in the field?	Y	N	N/A
	e	Utilities located in the field?	Y	N	N/A
	f	Located utilities marked/added to site maps?	Y	N	N/A
	g	Client contact notified?	Y	N	N/A
		Name :	Telephone:	Date:	
	h	State One-Call agency called?	Y	N	N/A
		By:	Ticket #:	Date:	
	i	Geophysical survey performed?	Y	N	N/A
		By:	Method:	Date:	
	j	Hand excavation performed (w/ concurrent use of utility detection vice)? device	Y	N	N/A
	By:	Total depth (feet):	Date:		
k	Trench/excavation probed?	Y	N	N/A	
	By:	Depth/frequency:	Date:		
2.	Overhead Utilities Present Absent				
	a	Determination of nominal voltage	Y	N	N/A
	b	Marked on site maps	Y	N	N/A
	c	Necessary to lockout/insulate/re-route	Y	N	N/A
	d	Document procedures used to lockout/insulate/re-route	Y	N	N/A
	e	Minimum acceptable clearance:	Y	N	N/A
3. Notes:					
Approval:				Date:	
Field Operations Leader Date				Date:	

C: PM/Project File  
Program File

ATTACHMENT V

**OSHA POSTER**

# Job Safety and Health

## It's the law!

# OSHA

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

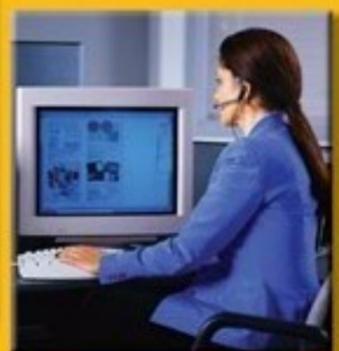
### EMPLOYEES:

- 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