Base Realignment and Closure
Program Management Office West
33000 Nixie Way, Building 50
San Diego, California  92147

CONTRACT NO. N62473-12-D-2006
CTO No. 0011

FINAL
ACCIDENT PREVENTION PLAN

December 2016

DCN:  UMAC-2006-0011-0012

INSTALLATION RESTORATION PROGRAM SITE 1
FORMER MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA
FINAL
ACCIDENT PREVENTION PLAN

December 2016

INSTALLATION RESTORATION PROGRAM SITE 1
FORMER MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA

DCN: UMAC-2006-0011-0012

Prepared by:

TETRA TECH EC, INC.
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San Diego, California  92101-8536
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<tr>
<td>AED</td>
<td>automatic external defibrillator</td>
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<td>AEGCP</td>
<td>assured equipment grounding control program</td>
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<td>activity hazard analysis</td>
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<td>Accident Prevention Plan</td>
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<td>bgs</td>
<td>below ground surface</td>
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<td>bpm</td>
<td>beats per minute</td>
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<td>Cal-OSHA</td>
<td>California Occupational Safety and Health Administration</td>
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<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CIH</td>
<td>Certified Industrial Hygienist</td>
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<td>CIRS</td>
<td>Contractor Incident Reporting System</td>
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<td>COR</td>
<td>Contracting Officer’s Representative</td>
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<td>Installation Restoration Program</td>
</tr>
<tr>
<td>MEC</td>
<td>munitions and explosives of concern</td>
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<tr>
<td>MCAS</td>
<td>Marine Corps Air Station</td>
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<tr>
<td>MPPEH</td>
<td>material potentially presenting an explosive hazard</td>
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<td>MRP</td>
<td>Munitions Response Program</td>
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<tr>
<td>NAVFAC SW</td>
<td>Naval Facilities Engineering Command Southwest</td>
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<tr>
<td>NAVSEA</td>
<td>Naval Sea Systems Command</td>
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<tr>
<td>NEC</td>
<td>National Electrical Code</td>
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<tr>
<td>NRTL</td>
<td>nationally recognized testing laboratory</td>
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<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>PEL</td>
<td>permissible exposure limit</td>
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<tr>
<td>PM</td>
<td>Project Manager</td>
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<tr>
<td>POC</td>
<td>point of contact</td>
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<tr>
<td>PPE</td>
<td>personal protective equipment</td>
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<td>QP</td>
<td>qualified person</td>
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<tr>
<td>RAC</td>
<td>Risk Assessment Code</td>
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<td>RI</td>
<td>Remedial Investigation</td>
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<td>RPM</td>
<td>Remedial Project Manager</td>
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<tr>
<td>SDS</td>
<td>Safety Data Sheets</td>
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<tr>
<td>SHM</td>
<td>Safety and Health Manager</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<td>SSHO</td>
<td>Site Safety and Health Officer</td>
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<td>SSHP</td>
<td>Site Safety and Health Plan</td>
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<tr>
<td>SUXOS</td>
<td>Senior UXO Supervisor</td>
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<tr>
<td>SZ</td>
<td>support zone</td>
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<td>TCRA</td>
<td>Time-Critical Removal Action</td>
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<tr>
<td>TIC</td>
<td>The Irvine Company</td>
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<tr>
<td>TP</td>
<td>Technical Publication</td>
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<tr>
<td>TtEC</td>
<td>Tetra Tech EC, Inc.</td>
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<tr>
<td>UL</td>
<td>Underwriter’s Laboratory</td>
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<tr>
<td>USACE</td>
<td>U.S. Army Corps of Engineers</td>
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# ABBREVIATIONS AND ACRONYMS

(Continued)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>UXO</td>
<td>unexploded ordnance</td>
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<tr>
<td>UXOSO</td>
<td>UXO Safety Officer</td>
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<tr>
<td>WBGT</td>
<td>wet bulb globe temperature</td>
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<td>WNV</td>
<td>West Nile virus</td>
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1.0 SIGNATURE SHEET

FINAL
ACCIDENT PREVENTION PLAN

December 2016

INSTALLATION RESTORATION PROGRAM SITE 1
FORMER MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA

CONTRACT NO. N62473-12-D-2006
CTO No. 0011
DCN: UMAC-2006-0011-0012

Prepared by:

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12/22/16  
Date

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Program Manager  
Phone: 619-471-3532  

12/22/16  
Date

Concurrence by:  
Roger Margotto, CIH, CSP  
TtEC, Inc. Program Health and Safety Manager  
Phone: 619-471-3503  

12/22/17  
Date
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2.0 BACKGROUND INFORMATION

2.1 CONTRACTOR

Contractor: Tetra Tech EC, Inc. (TtEC)

2.2 CONTRACT NUMBER

Contract Number: N62473-12-D-2006, Task Order 0011

2.3 PROJECT NAME

Installation Restoration Program (IRP) Site 1 (the Site), Former Marine Corps Air Station (MCAS) El Toro, California

2.4 DESCRIPTION AND SITE HISTORY

2.4.1 IRP Site 1

Former MCAS El Toro covers approximately 4,738 acres in a semi-urban area of southern California. IRP Site 1 is located in the northeast portion of the site in the foothills of the Santa Ana Mountains (Figure 2-1). IRP Site 1 is situated within a tributary canyon of the Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level (Figure 2-2). IRP Site 1 includes the Northern and Southern Explosive Ordnance Disposal (EOD) Training Ranges (16.9 and 16.6 acres, respectively) and a Buffer Zone (37 acres), among other features, for a total area of approximately 74 acres. The Adjacent Property portion of IRP Site 1 covers approximately 56 acres and is located immediately to the west of IRP Site 1 (Figure 2-2).

2.4.2 EOD Training Range

EOD training was conducted at IRP Site 1 from 1952 until the closure of MCAS El Toro in 1999. Military ordnance used at the Site included hand grenades, land mines, cluster bombs, smoke bombs, and rocket-propelled munitions. Civilian commercial-grade explosives, such as dynamite, and plastic and gelatinous explosives also have been used at IRP Site 1. Trenches and pits were periodically excavated and munitions were detonated. The trenches and pits were then filled with soil. Subsequently, the trenches were re-excavated to conduct additional munitions detonation activities. Limited historical information suggests that rocket motors or jet-assisted take-off units also were handled at IRP Site 1.

An estimated 300,000 gallons of petroleum fuels were burned at the Site from 1952 through 1993. In 1982, approximately 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) reportedly was burned in trenches located in the northern portion of the Site. In addition, there are
unconfirmed reports that some low-level radioactive material was handled at the Site. The potential presence of radionuclides at the Site was investigated, and, based on the investigation findings, the site received unrestricted release from the California Department of Public Health in September 2007.

The majority of recent military EOD training took place at the Northern EOD Training Range. The Orange County Sheriff’s Department and various federal agencies used the Southern EOD Training Range for EOD training.

Several demolition pits and a range building are present at IRP Site 1. In addition, a former observation bunker constructed from metal ammunition cans was present prior to the 2007 Santiago Fire. Since thick brush in the area was removed by the fire, munitions characterization activities were conducted in 2008; as part of those activities, the soil in the ammunition cans was characterized and properly disposed.

The Department of Justice, Federal Bureau of Investigation (FBI) also used IRP Site 1 for training purposes. The FBI’s activities included bomb technician training, post-blast investigation training, and emergency response operations. These activities involved the use of explosive devices and products.

2.4.3 Adjacent Property

The Adjacent Property covers approximately 56 acres (Figure 2-2). In 2008, munitions characterization activities (identification and removal) were conducted in areas that were not previously accessible for investigation; during these activities, 25 munitions and explosives of concern (MEC) items were identified and removed. A time-critical removal action (TCRA) was conducted in 2010 to further reduce the potential of explosive hazards associated with munitions on the Adjacent Property. For purposes of the TCRA, the Adjacent Property was subdivided into three Areas (Areas A, B, and C), based, in part, on results from the 2008 munitions characterization and on the relative probability of encountering MEC. These areas are described below:

- Area A, property owned by The Irvine Company (TIC), was designated as having a relatively high probability of material potentially presenting an explosive hazard (MPPEH) being encountered, based primarily on its close proximity to the western boundary of the EOD Training Range. Area A includes the hillside west of, and immediately adjacent to, IRP Site 1.

- Area B, property owned by the Orange County Flood Control District, was designated as having a relatively low probability of MPPEH being encountered. Area B extends westward from the western boundary of Area A, and includes the Agua Chinon Wash, Retarding Basin, and areas northeast of the basin. No munitions items were reported to be found during the construction or subsequent ongoing maintenance activities conducted within the retarding basin.
Area C, property owned by TIC, was also designated as having a relatively low probability of MPPEH being encountered. Area C includes the area west of the Agua Chinon Wash Retarding Basin. This area was included in the 2010 TCRA, because, during the 2008 munitions characterization activities, one 2-inch by 4-inch metal fragment was identified and removed from this area.

2.5 MAJOR PHASES OF WORK

The scope of work for this IRP Site 1 is to complete the MEC- and naphthalene-impacted soil mitigation at the EOD Training Range, which was started during the Remedial Investigation (RI)/Feasibility Study, and complete the MEC/MPPEH investigation and mitigation of the Adjacent Property, which were started during the TCRA (AECOM 2010).

Specifically, institutional controls (restricting access) will be implemented at IRP Site 1. Excavation of naphthalene-impacted soils in the area of EOD Training Range soil boring B-1 will be performed to a depth of 10 feet below ground surface (bgs). The Adjacent Property MEC activities will consist of a biological survey to identify potential threatened or endangered species of plants and/or animals. Following the biological survey, approximately 35.5 acres of soils from Areas A, B, and C (combined) will be removed to a depth of 12 inches bgs and screened in a screening plant to remove the metallic debris. The soils will also be screened and inspected for the presence of MEC/MPPEH during the debris removal process. The debris- and MEC-free soils will be temporarily stockpiled, and a digital geophysical mapping (DGM) survey will be performed across the exposed ground surface. One hundred percent of the targets will be investigated to 18 inches. When the screening and DGM surveys have been completed, the soil that was removed and screened will be used as backfill over the site, and the site will be restored per the Work Plan.

Recovered MEC/MPPEH will be inspected by the Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) and UXO Safety Officer (UXOSO) to determine if it is safe to move. If they agree that it is safe to move, recovered material will be carried to a designated collection point within the exclusion zone (EZ) and TtEC will use donor explosives to treat MEC/MPPEH on site in accordance with the Work Plan and approved Explosives Safety Submission (ESS) (TtEC 2015).

Protocols and processes for munitions operations at the site, including the identification, management, handling, and disposition of any munitions-related items discovered at the site, are presented in the Work Plan (TtEC 2016). The ESS prepared for this project provides the detailed basis and requirements for safety and protection factors related to MEC/MPPEH based on current site knowledge.

Safety is the primary concern during activities in which items with an explosive hazard could be encountered or when naphthalene-impacted soils are encountered and handled. Personnel engaged
in these efforts will adhere to the provisions of this Accident Prevention Plan (APP) and the guidelines provided in the following documents:

- Naval Sea Systems Command OP 5, Ammunition and Explosives Ashore (NAVSEA 2011)
- U.S. Department of Defense (DoD) 4145.26-M, Contractors’ Safety Manual for Ammunition and Explosives (DoD 2008a)
- DoD 6055.09-STD, Ammunition and Explosives Safety Standards (DoD 2008b)
- DoD Explosives Safety Board (DDESB) Technical Publication (TP) 16, Methodologies for Calculating Primary Fragment Characteristics (DDESB 2009)
- United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1 (USACE 2014)
- Project-Specific ESS (TtEC 2015)

Potential explosive hazards will be minimized through the use of safe work practices, engineering controls, and adherence to procedures. The SUXOS will have overall responsibility and accountability for all munitions-related items. Only UXO-trained personnel will be responsible for identifying, handling, and/or removing munitions-related items.

The currently anticipated definable features of work (DFW) or major activities based on currently known or defined information, each requiring an activity hazard analysis (AHA), are as follows:

- Mobilization, Site Preparation, and Demobilization
- Field Equipment Armoring (Welding) – not a DFW but drafted as a task AHA
- Surface Clearance
- MEC/MPPEH-Impacted Soil Excavation
- Naphthalene-Impacted Soil Excavation
- Mechanical Screening and Stockpiling
- DGM Surveys
- MEC and MPPEH Investigation and Removal/Disposal

Work for any task, activity, or DFW will not begin until the AHA, with an assigned Risk Assessment Code (RAC) for the work activity, has been accepted by the Remedial Project Manager (RPM), and the Naval Facilities Engineering Command Southwest (NAVFAC SW) Safety Officer, and is discussed with all personnel engaged in the activity, including TtEC, subcontractor(s), and the government on-site representatives at preparatory and initial control phase meetings. Appendix A to this APP includes preliminary or “seed” AHAs for of the major phases of work listed above. TtEC and its subcontractors will refine these preliminary AHAs and/or develop new AHAs that will be submitted to the RPM for review/comment prior to beginning each DFW.
3.0 STATEMENT OF SAFETY AND HEALTH POLICY

TtEC is committed to providing our employees a safe and healthful workplace. It is the goal of TtEC to continue excellent safety performance on all work that we undertake. TtEC will perform work in a manner that is consistent with our Zero Incident Performance® philosophy. We plan to perform the work in a manner that integrates safety and health considerations so that we eliminate risk of workers’ injuries or illnesses, environmental releases/impacts, or property damage. In addition to the line and staff management functions described in this APP, each individual performing work under this contract is responsible for his/her own personal health and safety and for assisting in ensuring the health and safety of coworkers. This employee responsibility includes observing specified health and safety requirements and communicating with the designated Safety and Health Manager (SHM), SUXOS, and UXOSO, as appropriate, 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, to observe specified safety requirements and restrictions, or to properly use identified protective equipment may lead to injury or illness. Accordingly, 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 hazard reports. Our Corporate Safety and Health Policy Statement is included as Appendix B to this APP.

3.1 CONTRACTOR ACCIDENT EXPERIENCE

Table 3-1 (in the Tables section provided at the end of this APP) presents safety statistics for TtEC for the last three calendar years compared to the national averages for our industry. This comparison uses data collected by the U.S. Department of Labor, Bureau of Labor Statistics for different types of employers, segregated by North American Industry Classification System codes.
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4.0 RESPONSIBILITIES AND LINES OF AUTHORITY

The roles and responsibilities of specific individuals for work performed in accordance with this APP are described in the following sections.

4.1 STATEMENT OF RESPONSIBILITY

TtEC is ultimately responsible for the implementation of its Environmental Health and Safety (EHS) Program for TtEC employees, subcontractors, and all others on the worksite. No person will 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 identifies the roles and responsibilities of TtEC corporate-level and project-level personnel and subcontractors who are conducting field activities during the additional RI at IRP Site 1. Resumes for industrial hygiene personnel and safety personnel listed in the roles below, and for personnel designated as Competent Persons (CPs) or qualified persons (QPs) for specific tasks requiring a CP or QP, as defined by U.S. Occupational Safety and Health Administration (OSHA) or in Engineer Manual (EM) 385-1-1 and designated in these roles by TtEC project management staff in the AHAs, will be provided upon request under separate cover, and are not included with this APP. The credentials for the TtEC SHM are on file with the Contracting Officer for this contract.

4.2.1 Project Management

It is the responsibility of line management, managers, and supervisors to ensure that project activities are executed in accordance with TtEC’s EHS programs, procedures, and applicable regulations. Line managers have primary EHS responsibility and rely on EHS personnel to support them in fulfilling this responsibility. Line managers have the responsibility to integrate loss control principles into operations, and to ensure that:

- TtEC safety culture is preserved by demonstrating commitment and program involvement; safety remains a major project goal and is not subordinated to other demands.
- Project-specific continuous improvement goals and objectives are developed based on EHS events and issues and are communicated to TtEC’s employees and subcontractors.
- Projects are implemented in compliance with federal and state EHS laws and regulations, DoD guidance, and TtEC EHS program requirements.
• EHS plans are developed, approved, and implemented in accordance with TtEC’s requirements.
• Personnel understand the requirements of the project’s EHS plan(s) and each individual understands his/her responsibility for plan implementation.
• Personnel have the required training and capabilities to perform the assigned tasks.
• Corporate professionals or external resources, such as private consultants, are available for project support as needed.
• Project staff members are aware of, and have access to, technical information that TtEC maintains, various EHS databases, and online regulatory subscription services as applicable.
• Additional EHS reference books and technical information are made available to project staff upon request.
• Facilities and equipment meet TtEC and government regulations.
• Work rules are enforced.
• Inspections and incident investigations are conducted per EHS program requirements.
• Effective corrective actions are implemented in a timely manner following inspections, audits, incident investigations, etc.
• Employees, including subcontractors, are not only encouraged but also required to notify their supervisor(s) of any actual or potential health and safety hazards in the workplace and to develop safe work methods and controls to be implemented in project AHAs.
• Employees and subcontractors are assured they will be rewarded (not reprimanded) for reporting health and safety concerns.
• Clients are notified of TtEC’s incident reporting procedures.
• Appropriate disciplinary action is implemented by line supervision when necessary.
• Management responsibilities necessary to maintain a safe, healthful, and environmentally compliant workplace are identified in each procedure of TtEC’s EHS program.

4.2.2 Project Manager

With respect to the EHS program, it is the responsibility of the Project Manager (PM), Ian Roberts, to:

• Ensure implementation of this APP through coordination with the SUXOS, UXOSO, and SHM.
• Conduct quarterly inspections jointly with the SHM when required.
• Participate in the incident investigations.
• Ensure the APP has the required approvals before any site work is conducted.
• Ensure the SHM and SUXOS are informed of project scope changes that require modifications to the APP.
• Assume overall project responsibility for health and safety.
• Ensure adequate resources are provided to the field staff to carry out their responsibilities as outlined in this APP and associated Site Safety and Health Plan (SSHP).

4.2.3 Corporate Safety and Health Manager

The SHM, Roger Margotto, Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), will review and approve this APP and any amendments prior to their adoption. The SHM will assist with implementation of the APP and provide project support on health and safety issues. The SHM will verify field personnel training, medical surveillance, and respirator fit test requirements, as required. The SHM will advise the UXOSO and SUXOS regarding industrial hygiene concerns, interpretation and evaluation of analytical exposure data, and other safety-related issues, as needed. Subcontractor EHS plans will be reviewed by the SHM. It is also the SHM’s responsibility to:

• Provide for the development and approval of the APP and SSHP.
• Serve as the primary contact to review any health and safety matters that arise.
• Approve revised or new safety protocols for field operations.
• Approve individuals who are assigned UXOSO responsibilities.
• Approve the UXOSO to fulfill other project roles.
• Approve any revisions to this APP and its AHAs.
• Approve upgrading or downgrading of personal protective equipment (PPE).
• Assist in the investigation of incidents.
• Visit the project as needed to audit the effectiveness of the APP/SSHP.

4.2.4 Unexploded Ordnance Safety Manager

The UXO Safety Manager, David Keller, is responsible for overseeing munitions- and ordnance-related safety and health programs. In addition, the UXO Safety Manager will:

• Assign all UXO technicians, including SUXOS and UXOSO, and verify all training, certification and experience, and other requirements.
• Report any MEC/MPPEH or donor explosives safety and health issues to the SHM.
• Advise the SHM and PM, as well as the SUXOS and UXOSO, regarding any concerns and other safety related issues, as needed.
• Have discretionary authority to shut down MEC-/MPPEH-related field operations.
4.2.5 Senior UXO Supervisor

An SUXOS must have the same minimum qualifications as a UXO Technician III and be able to fully perform all of the functions enumerated for the UXO Technicians I, II, and III whom he/she supervises. The SUXOS will meet all training and certification requirements per DDESB TP 18. It is the SUXOS’, David Williams, responsibility to:

- Direct all MPPEH operations and supervise multiple project teams performing MPPEH-related activities.
- Implement and enforce all plans related to MPPEH operations and this APP.
- Certify MEC/MPPEH is ready to turn in for disposal in accordance with current policies.
- Ensure site personnel comply with the APP.
- Coordinate with the UXOSO and SHM on matters regarding site safety and health.
- Maintain control of the work area and prevent any unauthorized persons from entering controlled work zones. If the unauthorized persons refuse to leave, the field crew personnel shall cease operations and notify the local authorities who will remove these individuals.
- Halt or modify any work conditions or remove personnel from the task site if conditions are unsafe.
- Ensure all task site personnel understand and comply with all safety requirements.
- Monitor the performance of team members, including issues pertaining to safety and quality control.
- Be responsible for overall direction of on-site intrusive activities.
- Be responsible for the day-to-day work at the site.
- Be responsible for implementing and enforcing all work plans.
- Conduct daily activities, such as:
  - Supervising employees in daily operations
  - Overseeing the implementation of specified levels of PPE
  - Identifying potential problem areas and making corrective action recommendations to the PM
  - Implementing all corrective actions, and maintaining a daily log of work activities, including noting any extraordinary occurrences.
- Conduct weekly safety inspections jointly with the UXOSO.
- Conduct incident investigations.
- Initiate corrective actions for observed safety violations.
- Conduct daily safety meetings.
• Ensure completion of the project on schedule and within budget, in accordance with the permits and project plans.
• Ensure that appropriate change management procedures are in place.
• Ensure compliance with all EHS requirements, including corporate policies, programs, and procedures; OSHA, and California OSHA (Cal-OSHA), as appropriate, construction management requirements; USACE EM 385-1-1 requirements; and any client-specific requirements included in this plan.
• Ensure all site UXO technicians meet training and certification requirements per DDESJB TP 18.
• Ensure that adequate site security, appropriate for the activities being performed, is maintained.
• Ensure that an adequate labor force is assigned to the project with the proper training, education, experience, skills, tools, equipment, and materials to complete the tasks and minimize potential impacts to the environment.
• Act as Emergency Coordinator (EC) for all emergencies.
• Prepare and submit (electronically) the Daily Contractor Production Report to the RPM and the TtEC PM.

4.2.6 UXO Safety Officer

For this project, the UXOSO must have the same minimum qualifications as a UXO Technician III. The UXOSO must also meet the requirements for Site Safety and Health Officer (SSHO) and will fulfill the duties and responsibilities as defined in corporate procedures, and will be required to be on site during hazardous or toxic waste operations. The UXOSO will have completed the 30-hour OSHA construction safety class or equivalent. The UXOSO will have 5 years of construction experience (a minimum of 1 year experience implementing EHS procedures at cleanup operations) and will have had 24 hours of formal health and safety training in the last 4 years. The UXOSO reports to the SHM, and, with regard to MEC/MPPEH safety, reports to the UXO Safety Manager, and assists both managers with the on-site implementation of relevant TtEC EHS programs and procedures (presented in Appendix C). The UXOSO helps to ensure that operations are performed in compliance with applicable client- and site-specific requirements and government regulations. The UXOSO (including SSHO responsibility) is a full-time responsibility. The UXOSO will be present at the project site in order to have full mobility and reasonable access to all major work operations.
As UXOSO, this individual must be able to perform all functions enumerated for UXO Sweep Personnel and UXO Technicians I, II, and III. The UXOSO will implement this APP in the field. The UXOSO’s authority and responsibilities include, but are not limited to, the following:

- Implement the approved MPPEH and explosives safety program in compliance with all DoD, federal, state, and local statutes and codes.
- Analyze MPPEH and explosives operational risks, hazards, and safety requirements.
- Enforce personnel limits and safety EZs for MEC clearance operations, and munitions and explosives transportation and storage.
- Ensure that TtEC employees and subcontractors understand the requirements of the TtEC EHS program and procedures through training and communications.
- Assist the SUXOS with implementation of the APP and SSHP.
- Conduct daily EHS briefings in accordance with corporate procedures.
- Conduct daily informal inspections of the project site and recording observations in the logbook.
- Ensure that TtEC employees and subcontractors understand the requirements of the TtEC EHS program and procedures through training and communications.
- Assist with implementation of the APP.
- Conduct daily EHS briefings in accordance with corporate procedures.
- Conduct daily informal inspections of the project site and recording observations in the logbook.
- Update the Safety and Health Deficiency Log on a daily basis.
- Assist the SUXOS with weekly health and safety inspections. Ensure corrective actions identified are being addressed and corrected.
- Exercise stop work authority when warranted by conditions, in accordance with the project plans.
- Ensure that TtEC site personnel have received required EHS regulatory and program training, in accordance with corporate procedure training.
- Support the PM and SUXOS in accident and incident investigations.
- Function as a technical resource for all environmental, safety, loss control, and industrial hygiene issues.
- Ensure that the specific responsibilities for EHS personnel identified in the TtEC EHS programs and the EHS plan(s) are fulfilled.
- Perform on-site exposure monitoring to determine/adjust appropriate levels and use of PPE.
- Perform site surveillances, hazard identification, and health risk analysis.
• Implement procedures and programs to eliminate risk to site personnel, including initiating changes to the plan.
• Act as EC when the SUXOS is not immediately available to perform this role.
• Implement site control measures.
• Maintain the field health and safety logbook.
• Provide summaries of field operations and progress to the SHM.

4.2.7 Field Crew Personnel – Various

Field crew personnel include the other persons entering the work site for the purpose of assisting in the completion of the project. This includes, but is not limited to, engineers, surveyors, facility representatives, TtEC management personnel, subcontractors, regulatory personnel, and site workers. Only qualified UXO technicians will be authorized to handle MPPEH.

It is the responsibility of field crew personnel to:

• Report any unsafe or potentially hazardous conditions to the SUXOS.
• Maintain knowledge of the information, instructions, and emergency actions contained in this APP.
• Comply with rules, regulations, and procedures set forth in this APP and any instituted revisions.
• Initiate the incident reporting chain by notifying supervisor when involved in an incident/accident (if able to do so).
• Prevent admittance to work sites by unauthorized personnel (if the unauthorized persons refuse to leave, the field crew personnel will cease operations and notify the SUXOS, who will notify the RPM for guidance).
• Perform daily inspections of tools and equipment, including PPE, prior to use.
• Conduct a daily operations check of electronic equipment and annotate the findings in the team’s logbook.
• Assist the SUXOS with implementation and compliance with the APP/SSHP.

4.2.8 Subcontractors and Suppliers/Vendors

TtEC directs the subcontractor’s supervisor regarding the work and the manner in which the tasks are to be performed. Subcontractors are responsible for assigning specific tasks to their employees; ensuring 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 EHS plans. Subcontractors will attend TtEC’s daily health and safety meeting prior to starting fieldwork.
4.2.9 Competent Persons and Qualified Persons

CPs for anticipated health and safety-related issues that may arise on the project will be designated by the PM and stated by name in the AHA where a CP is specifically required by task. Subcontractor personnel will provide CPs as required where their tasks require a CP. The subcontractor CPs will also be designated by name in the AHA when required. For tasks that require a QP, the AHA will also designate the QP by name.

The resumes for QPs or CPs designated by TtEC management in the AHAs will be provided to the RPM for review prior to any work starting on site when a task relative to the competency is being performed.

No work will occur on site unless the SSHO or alternate is present on the job site. The competent and/or qualified person for a specific task must be present on the project site where the task requiring a CP/QP is being performed.

4.2.10 Risk Management Process

This plan requires the preparation of an AHA for each task, activity, or DFW. This plan also requires that these task analyses are reviewed with all workers and that workers acknowledge their review of the safety and health requirements for each task. Where subcontractors are used to perform certain work activities, the SUXOS will ask the subcontractor to provide an initial AHA for review, or the UXOSO will work with the subcontractor workers in the preparation of the AHA or update of existing AHAs as necessary.

Preliminary or “seed” AHAs for these activities are included with this APP (see Appendix A). The preliminary AHAs are not as activity-specific as they are intended to be, especially if subcontractors have not been identified or specific equipment needs have not yet been fully evaluated. Prior to start of work activities, these preliminary or “seed” AHAs will be further refined by the persons who will perform the work, and the remaining AHAs from the subcontractor will be developed by the subcontractor and reviewed by TtEC and the Navy. All AHAs will be prepared and internally reviewed and approved by the SHM, then will be submitted to the RPM at or prior to preparatory meetings, and prior to work being performed. As new activities or tasks are identified or the work environment of the task changes, new or revised AHAs are prepared by TtEC. New AHAs will be submitted to the SHM and RPM for review prior to start of the operation, and any revisions to existing AHAs will be submitted to the SHM and the RPM for review only if the RAC increases from that of the original AHA (e.g., a medium becomes a high or a low becomes a medium).

Each worker performing tasks described in an AHA must receive training in the AHA and be allowed to make comments and suggestions regarding the AHA to ensure that all hazards are properly identified and that control measures are in place to mitigate these hazards. Retraining will occur if/when AHAs are modified.
4.3 LINES OF AUTHORITY

An organization chart depicting the lines of authority is included as Figure 4-1. TtEC will require that the personnel and subcontractors follow the requirements in this APP, and verify that this requirement is being met.

4.3.1 Policies Regarding Noncompliance

TtEC has a discipline program that is discussed in all new employee orientations and is also written in the TtEC Project Orientation, Rules and Safety Guidelines Handbook (TtEC 2014), a booklet that is given to every company employee. Briefly, the rules implement a progressive disciplinary program. However, if at any time there is a significant compromise of safety procedures, immediate termination of an employee is allowed by the procedure. The UXOSO will immediately report to the PM and SHM observations of noncompliance in the performance of the subcontractor or workers.

4.3.2 Manager and Supervisor Accountability for Safety

TtEC EHS 1-1 of the Corporate Safety Program requires that:

“Line Management, the Project Manager, and supervisors, ensure that all company activities are executed in accordance with TtEC EHS programs, procedures, and applicable regulations. Line managers have primary EHS responsibility and have EHS personnel support to help them fulfill this responsibility.”
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5.0 SUBCONTRACTORS AND SUPPLIERS/VENDORS

The roles and responsibilities of subcontractors and suppliers/vendors for work performed in accordance with this APP are described in the following sections.

5.1 IDENTIFICATION OF SUBCONTRACTORS AND SUPPLIERS/VENDORS

Engineering/Remediation Resources Group, Inc., a subcontractor to TtEC for the work performed under this APP, will complete the following DFWs/activities:

- Mobilization, site preparation, and demobilization
- Excavation and mechanical screening
- MEC scanning of excavated material and backfill

5.2 MEANS FOR CONTROLLING AND COORDINATING SUBCONTRACTORS

TtEC directs the subcontractor’s supervisor on the tasks to be performed and the manner in which tasks are performed. Subcontractor supervisors 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, PPE, and equipment to safely complete activities in accordance with this APP, and their SHM-reviewed individual EHS plans. Subcontractors’ EHS plans are reviewed by the SHM, and, if used, must be as stringent or more stringent that TtEC EHS Plans.

5.3 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS/VENDORS

Individuals employed by subcontractors and suppliers/vendors will receive a site-specific briefing regarding the site-specific physical, chemical, or biological hazards present on the work site; required safety activities; and their individual roles and responsibilities for safety practices. While on site, all subcontractor supervisors will ensure their crews perform tasks that they are contracted to perform and that they follow, at a minimum, this APP and the task/activity AHAs. The SUXOS will observe their performance, and have the contractor’s supervisors ensure compliance.

Subcontractors are responsible for complying with this APP and all applicable federal, state, and local regulations. Subcontractor personnel must receive a briefing from the UXOSO prior to accessing the project work site. They must fulfill the requirements described in this APP and must acknowledge receipt of the plan and the hazard communication briefing. On-site subcontractors are responsible for providing their personnel with appropriate PPE as specified in the plan; however, it is the ultimate responsibility of the SUXOS to ensure the APP is followed. Prior to the commencement or continuation of work, subcontractor and third-party personnel have the
authority to request a work area hazard assessment by the SUXOS. Any member of the work party observing an imminent safety hazard or potentially dangerous situation will immediately suspend field activities.

Most subcontractors have their own EHS plans and/or corporate policies that are specific to their specialty services. TtEC management is responsible for ensuring that subcontractor employees follow the policies and procedures of TtEC and this APP. If subcontractors’ EHS plans are more restrictive, the subcontractor supervisors must ensure that their EHS plans are also followed.

Hazards not listed in this APP, but known by the subcontractor or known to be associated with a subcontractor’s specialty, must be identified and addressed prior to beginning work, both in the subcontractor’s EHS plan and during the daily health and safety briefing. The contractor will inform the UXOSO of these hazards and assist in the development and/or revision of AHAs.
6.0 TRAINING

The following training is required on this project.

6.1 NEW HIRE ENVIRONMENTAL HEALTH AND SAFETY TRAINING

All new hire employees will receive TtEC’s EHS orientation training at the time of initial hire. Subcontractors will notify the UXOSO of any new hire employees they have on site and will ensure they have had an EHS orientation class.

6.2 ON-THE-JOB TRAINING

In addition to the required initial training, each employee will receive three days of directly supervised on-the-job training (i.e., close supervision during the first three days working in the field). This training will address the duties the employees are expected to perform.

6.3 PERIODIC SAFETY AND HEALTH TRAINING

In order to maintain competency, in addition to completing the 30-hour Construction Safety training, the UXOSO will receive 8 hours of documented formal, online, or self-study safety- and health-related coursework every year. All project personnel will receive site orientation training at the start of work. This training will be repeated as necessary whenever work activities and site conditions change. Workers with specific training and qualifications will receive recurrent training as required by regulation or certification credential requirement.

6.4 UXO TECHNICIAN TRAINING AND QUALIFICATION

UXO personnel will be trained and qualified in accordance with DDES B TP 18 for the position to which they are assigned.

6.5 HAZARDOUS WASTE OPERATIONS TRAINING AND REFRESHER

All site workers who work within an EZ and may be exposed to chemical hazards are required, in accordance with 29 Code of Federal Regulations (CFR) 1910.120/1926.65 to have completed 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training. An 8-hour refresher course is also required on an annual basis. This includes workers who interact directly with or break the surface of the soil or screen the soil have some risk for contact with MEC/MPPEH and may have the potential for contact with other site contaminants, if present in surface or subsurface soils. Supervisors, such as the SUXOS, UXOSO, and UXO Technician III, must also have completed 8 hours of relevant supervisory health and safety training and first aid cardiopulmonary resuscitation (CPR)/bloodborne pathogen training.
6.6 HAZARD COMMUNICATION TRAINING

In accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200 and 29 CFR 1926.59), copies of Safety Data Sheets (SDSs) for hazardous chemical materials that are used during site operations or that may be present on site will be available from the on-site UXOSO. The UXOSO will conduct hazard communication (HAZCOM) training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59, EM 385-1-1 (current version), and the HAZCOM program. Training will include, but will not be limited to, all hazards or potential hazards associated with work activities and any hazardous chemical materials brought to or found on the site.

6.7 SITE-SPECIFIC TRAINING

Prior to commencement of field activities, the UXOSO will provide site-specific orientation training on each element of this APP to all personnel assigned to the site. Site-specific training will address the activities, procedures, monitoring, and equipment for the work operations. Training will include site layout, hazards, evacuation route(s), emergency services at the site, and the HAZCOM program, and will highlight all provisions contained within the APP. This training will also allow field workers to clarify anything they do not understand and to reinforce each individual’s responsibilities regarding health and safety for his or her particular activity. If additional training is required for completion of field tasks during the site work, then the SHM or UXOSO will either conduct the training or manage site personnel to ensure that tasks are conducted by appropriately trained personnel.

Personnel will also be trained in the site-specific emergency response plan, including the employee alarm system; evacuation procedures, routes, meeting places, and accountability; control of fuel sources; fire extinguisher education; minor spill control and cleanup procedures; reporting requirements; and rescue operations, as applicable.

Prior to accessing the site, all personnel will attend an explosive safety briefing. Training will be coordinated with the UXOSO. Authorized visitors participating in short duration visits to the site will be under full escort as allowed.

6.8 FIRST AID AND CARDIOPULMONARY RESUSCITATION

The UXOSO will identify those individuals who have current first aid and CPR training. At a minimum, two people (including the UXOSO and SUXOS) will have current CPR/first aid certification. The names of all CPR/first aid-qualified workers will be posted on the site bulletin board in the field office and maintained in each site vehicle. An automatic external defibrillator (AED), which would require additional training is available, is currently not anticipated to be present on site.
6.9 BLOODBORNE PATHOGENS TRAINING

Individuals on site who have first aid and CPR certification and who may provide first aid and/or CPR will have completed training in accordance with the TtEC Bloodborne Pathogens Program and the annual OSHA Bloodborne Pathogen Standard found in 29 CFR 1910.1030.

6.10 USE OF PORTABLE FIRE EXTINGUISHERS

Project personnel will receive OSHA-compliant fire extinguisher education (29 CFR 1910.157[g]) for the use of portable fire extinguishers to respond to incipient stage fires. Typically, this training is given during site orientation.

6.11 HEARING PROTECTION

Users of personal hearing protection will receive OSHA hearing conservation program and hearing protector use training (29 CFR 1910.95[i],[k]). Typically, this training is given during site orientation.

6.12 HAZARDOUS MATERIALS TRANSPORTATION TRAINING

United States Department of Transportation (DOT) training is required for all persons who prepare DOT shipping papers (including hazardous waste manifests), labels, and packages, and/or mark containers for purposes of transportation. When applicable, the project Waste Management Plan will include specific requirements for this training and any other required training for management of waste, including hazardous waste.

6.13 ON-SITE HEALTH AND SAFETY BRIEFINGS AND AHA REVIEW

Project personnel and visitors will participate in daily on-site health and safety briefings conducted by the SUXOS, UXOSO, or designee to assist site personnel in safely conducting their work activities. The briefings will include information on new operations, changes in work practices, or changes in the site’s environmental conditions, including AHAs, if modified. The briefings will also provide a forum to facilitate conformance with safety requirements, identify performance deficiencies related to safety during daily activities or as a result of safety inspections, and review any events (near misses, injuries, material releases, etc.). Work will be stopped and a safety briefing will be conducted following any event that could compromise the safety of personnel or the environment.

6.14 TRAINING CERTIFICATES

Copies of the required training certificates and licenses (as applicable) will be maintained on site by the UXOSO and will be made available for government inspection upon request. Subcontractors will provide TtEC with copies upon request.
6.15 APP/SSHP ACCEPTANCE FORM

The APP/SSHP Acceptance Form (see below) is to be signed by all workers entering the project site to document site-specific training. Each AHA will have a signature page, as well.

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<tr>
<th>TETRA TECH EC, Inc.</th>
<th>APP/SSHP ACCEPTANCE FORM</th>
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<td>I have read and understand the policies and procedures listed in the Accident Prevention Plan and Site Safety and Health Plan. I will comply with the provisions therein.</td>
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7.0 SAFETY AND HEALTH INSPECTIONS

Vehicle inspections will be performed daily on any vehicles and heavy equipment by the operator in accordance with TtEC Procedure CP-7 (Appendix C). Weekly site inspections will be completed by the UXOSO and SUXOS in accordance with TtEC Procedure EHS 3-03 (Appendix C). Subcontractor personnel and/or craft personnel may be asked to participate in inspections. Daily inspections on the day(s) of scheduled field activities will be performed by the UXOSO and will be noted in the site activity logbook and/or TtEC field inspection forms. The referenced field inspection forms are included in Appendix D. If any deficiencies are identified during the inspections, they will be noted on a deficiencies log as required in EM 385-1-1, Section 01.A.12d, and corrected. Deficiencies to safety devices or equipment will be corrected before use or the safety devices/equipment will be removed from service until they are fixed.

The inspections will be tracked for follow-up action on each of the respective forms. After the performance of the quarterly SHM inspections (if required), the inspection reports will be reviewed and action items will be followed up on. The SHM, or his designee, may conduct an unannounced inspection of the project.

7.1 RESPONSIBILITY FOR MINIMUM DAILY JOB SITE SAFETY AND HEALTH INSPECTION

Daily EHS inspections will be conducted by the UXOSO during this field effort to ensure safe work areas and compliance with the APP, OSHA (and Cal-OSHA) regulations, and EM 385-1-1 requirements.

7.2 PROOF OF INSPECTOR’S TRAINING/QUALIFICATIONS

The UXOSO must have the same minimum qualifications as a UXO Technician III. To perform the role of SSHO, the UXOSO must also have completed the 30-hour OSHA Construction Safety Training, and must have 5 years of continuous construction industry safety experience in supervising/managing general construction (managing safety programs or processes or conducting hazard analyses and developing controls). In addition, the UXOSO maintains competency through having taken 8 hours of documented formal, online, or self-study safety- and health-related coursework every year to meet the requirements of EM 385 1-1 Section 01.A.17 in the role of SSHO.

The CP designated for excavating and/or other areas of expertise that require an OSHA CP may be staff other than the SSHO, and is designated by the PM or SUXOS in AHAs. The designated CP will be responsible for any inspections performed during the period he/she is acting as CP for that task.
7.2.1 Documentation Procedures

The UXOSO will record any deficiencies in the on-site field logbook or in a daily safety report that is submitted along with the Contractor Production and Contractor Quality Control daily reports to the RPM, with a copy submitted daily to the SHM.

7.2.2 Deficiency Tracking System

Deficiencies will be logged as required in EM 385-1-1, Section 01.A.13d. The items noted during field audits will be communicated to the TtEC Corporate SHM, 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 within TtEC through training and electronic means as a method of continuous program improvement.

7.2.3 External Inspections

TtEC does not anticipate any external inspections from outside agencies will be conducted during this project.
8.0 MISHAP REPORTING AND INVESTIGATION

A mishap is any unplanned, undesired event that occurs during the course of work being performed. The term “mishap” includes accidents, incidents, and near misses. When a mishap occurs, the employees must notify their supervisor immediately. The supervisor will notify the UXOSO and SUXOS. The SUXOS will notify the PM, and the UXOSO will notify the SHM. If the mishap is an emergency, TtEC will notify emergency services and respond as discussed in the Emergency Plans. Recordable mishaps will be reported as soon as possible but not more than 24 hours afterward to the Contracting Officer/Contracting Officer’s Representative (COR) by the PM.

8.1 EXPOSURE DATA

The UXOSO will calculate exposure data on a weekly basis. Labor hours worked are obtained from hours charged to a project for payroll purposes. The UXOSO also will collect the number of subcontractor labor hours worked by reviewing daily project production reports and recording the hours on those reports. The UXOSO will forward the labor hours along with the Weekly Safety Report to the SHM, who will compile the monthly total (field staff only) and report that to the COR.

8.2 MISHAP REPORTS, INVESTIGATIONS, AND DOCUMENTATION

8.2.1 Immediate Reporting of Major Accidents

Immediate reporting of incidents is required within TtEC. In addition, if any accident has, or appears to have, any of the consequences listed below, TtEC management will immediately (as soon as possible, but not more than 2 hours of the event) report the accident to the RPM and the NAVFAC SW Safety Officer and will follow up with an official accident report.

Accidents to be immediately reported include:

- An injury or illness that:
  - Involves an exposure to a hazardous substance above the permissible exposure limit (PEL)
  - Meets the OSHA/Cal-OSHA recordable criteria
  - Results in permanent total or partial disability
  - Results in one or more worker hospitalizations
  - Results in a worker fatality
  - Involves three or more individuals becoming ill or having a medical condition that is suspected to be related to a site condition, or a hazardous or toxic agent on the site
- An injury or unexpected chemical exposure to a client or a member of the public
- Any material or weight-handling incident or near miss, including an overturned crane, collapsed boom, dropped load, or damage to crane or IRP Site 1
- Any property damage greater than $2,000
- A fire, explosion, or arc flash
- Safety-related events reported by an enforcing authority or client
- External regulatory inspections that result in findings or citations
- A spill or release resulting from TtEC activities
- A permit exceedance
- Any event that could result in adverse public media interest

In addition to the above, any mishap occurring in any of the following high hazard areas shall be immediately reported to the RPM and the NAVFAC SW Safety Officer. These mishaps shall be investigated in depth to identify all causes and to recommend hazard control measures. The RPM and the NAVFAC SW Safety Officer shall subsequently follow up with official reports as prescribed by regulation.

The RPM must also be notified immediately (within 2 hours) and provided follow-up investigative findings within 10 days of occurrences involving the following hazards:

a. Electrical – including arc flash, electrical shock, etc.
b. Uncontrolled release of hazardous energy (electrical and non-electrical)
c. Load-handling equipment or rigging
d. Fall from height (any level other than same surface)
e. Underwater diving

8.2.2 Process for Immediate Reporting to the Navy

The process for reporting mishaps to the Navy is described below:

1. The scene of any fatality, injury involving hospitalization, weight-handling incident, fire/explosion/flash, or property damage exceeding $2,000 will be secured from disturbance pending investigation and further instructions from the Navy and TtEC SHM.

2. TtEC will make a verbal report to the Navy RPM as soon as possible, or within 2 hours, with as much information as is available at that time.

3. Navy RPM will complete the Contractor Incident Reporting System (CIRS) for internal Navy notification.
4. Navy RPM will enter TtEC data into the CIRS module in Enterprise Safety Applications Management System (ESAMS) within 8 hours.

5. A hyperlink and password will be sent to the identified TtEC point of contact (PM, UXOSO, or SUXOS) with instructions for completing the CIRS data via ESAMS.

6. Additionally, regardless of the severity of the incident, a Contractor Significant Incident Report (CSIR) shall be completed and submitted to the Contracting Officer or designee on the same day as the event. A copy of the CSIR is included in Appendix E.

7. Navy RPM will review the CSIR for minimum notification content and resolve any issues or concerns

8.2.3 TtEC Accident Investigation, Reports, and Logs

Except for rescue and emergency measures, the mishap scene will not be disturbed until it has been released by the investigating official. After the oral reporting has been performed, as noted above, the SUXOS or UXOSO (as delegated) must complete a written event report form for the designated Tetra Tech corporate representative within 24 hours. This form can be either prepared manually using the form found in the Tetra Tech corporate procedure (TOTAL), or electronically using the corporate database. Within 72 hours, a completed investigation report must be submitted. The investigation report is part of the initial written report form. These forms can be completed by persons involved in the incident, but the investigation must be completed by a supervisor and/or the UXOSO. All reports will be reviewed by the PM and the SHM upon submission. Within the reporting system, corrective actions and persons responsible for those corrective actions are identified. The system requires follow-up to ensure completion of corrective actions. All recordable injuries, near-miss incidents, high-loss-potential incidents, property damage incidents, first aid cases, and environmental spills (greater than reportable quantity) will be entered into the Tetra Tech program incident safety database. This database summarizes the accident/incident history of the program from the start of the contract and on a year-to-date basis.

8.2.4 Additional Reporting Requirements

In addition to the reporting requirements listed above, the employer is required to report:

- Property damage exceeding $2,000
- Days-away injuries
- Days-away illnesses
- Restricted/transferred injuries
If a fatal injury, in-patient hospitalization, a single incident involving one or more persons, an amputation, or loss of an eye occurs, the following additional steps will be followed:

- The SHM will initiate contact with OSHA
- The work activities on the project must be suspended for 24 hours (for a fatality)
- Assistance will be provided to the SHM and OSHA, as directed

For certain incidents, the SHM will notify OSHA in accordance with the following reporting requirements:

- Work-related fatalities will be reported within 8 hours
- In-patient hospitalizations (as noted above), amputations, or loss of an eye will be reported within 24 hours
9.0 PLANS (PROGRAMS, PROCEDURES) REQUIRED IN EM 385-1-1, THE SAFETY MANUAL (AS APPLICABLE)

TtEC has established written requirements for complying with regulations and implementing TtEC policy to prevent accidents and injuries. This section describes how some of these programs are implemented specifically for this project.

9.1 FATIGUE MANAGEMENT PLAN

A Fatigue Management Plan (FMP) must be completed as part of the APP whenever work hours:

1. Exceed 10 hours per day for more than 4 consecutive days
2. Exceed 50 hours in a 7-day work week
3. Exceed 12 hours per day for more than 3 consecutive days
4. Exceed 58 hours per week for sedentary (including office) work

During this project, work hours are anticipated to be from 0700 to 1700 (7:00 AM to 5:00 PM) Monday through Thursday.

At the present time, an FMP is not required. Should work hours exceed the thresholds noted in items 1-4 above, TtEC will implement an FMP for affected workers containing the required elements of Section 01.A.20 in EM 385-1-1.

9.2 EMERGENCY PLANS

Emergencies involving physical hazards, including fires, are generally readily apparent visually. Injuries and medical emergencies, including potential exposure to hazardous materials, may not always be apparent. Tasks to be performed at the site, potential hazards associated with those tasks, and the recommended control methods are discussed in this APP and associated AHAs. Early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency and by following established procedures and programs related to MEC/MPPEH investigation and handling. The SUXOS and/or the UXOSO will be responsible for performing surveys of work areas prior to initiating site operations, and regularly while operations are being conducted. Survey findings are documented by the SUXOS and/or the UXOSO in the site health and safety logbook. The SUXOS and UXOSO will monitor available agency bulletins such as National Weather Service Red Flag Warnings and broadcasts as required when fire danger is high or when wildland fires are present in the vicinity so that measures can be taken to reduce the potential for fires and monitoring in the event evacuation of the site is warranted due to a nearby wildland fire. Site personnel are responsible for reporting situations they perceive as hazardous and correcting those hazards that are immediately correctable (e.g., removing tools.
or materials that may present a trip hazard) and reporting to their immediate supervisor any hazards that require further evaluation and mitigation.

The above actions will provide early recognition for potential emergency situations, and allow TtEC to instigate necessary control measures. However, if the SUXOS and the UXOSO determine that control measures are not sufficient to eliminate the hazard, TtEC will withdraw from the site until the hazard can be effectively managed or eliminated, and notify the appropriate response agencies whenever a hazard presents an emergency situation.

Emergency plans have been prepared to address employee safety in case of fire (including wildland fire)/unplanned explosion, injury or medical emergency, inclement weather and Red Flag Warnings, and spills of hazardous materials. These emergency plans will be reviewed with all affected employees and will be tested to ensure their effectiveness. The emergency plans also include information on communication, emergency equipment, first aid/CPR qualifications, and means of rescue.

In the event of an emergency during on-site work, the primary response action by on-site personnel will be to safely assemble and evacuate to an area unaffected by the emergency, notify the SUXOS and UXOSO, and render the appropriate level of response and support as specified in these plans.

Local emergency service providers capable of providing immediate response to site emergencies are available in the vicinity of former MCAS El Toro in the event a fire (including wildland fire) or unplanned explosion, injury, or medical emergency occurs; these agencies will be notified in the event of an emergency by calling 911 and communicating the nature of the emergency so that dispatch of appropriate responders can be determined and deployed. The PM, SHM, RPM, and the NAVFAC SW Safety Officer will be notified if these response agencies are contacted.

TtEC personnel will perform incipient emergency prevention activities, such as:

- Initial (e.g., non-structural) firefighting support and prevention (i.e., use of fire extinguishers on incipient stage fires)
- Initial spill control and containment measures and prevention
- Evacuation of personnel from emergency situations beyond the initial response level
- Initial medical support for injury/illness requiring only first aid-level support

TtEC personnel will not provide emergency response support beyond their on-site capabilities and their training.

9.2.1 Pre-Emergency Planning

Based on the nature of the planned activities, emergencies resulting from physical or chemical hazards, such as personnel exposures, fires (including wildland fires), or explosions, injuries, or
medical emergencies, could occur. To minimize or eliminate the potential for these emergency situations occurring, pre-emergency planning activities will include the following (which are the responsibility of the SUXOS and/or UXOSO with participation by subcontractor and craft personnel):

- Coordinating with the local emergency response personnel, including fire response agencies, and local hospitals prior to the commencement of work to ensure that TtEC emergency action activities, including rescue and escape capabilities, are compatible with existing emergency response procedures.
- Establishing and maintaining information and equipment at the project staging areas (support zones [SZs]) for easy access in the event of an emergency.
- Training of all workers regarding the requirements of these emergency plans and the location of emergency equipment, evacuation routes, and locations.
- Creating and maintaining documents on site that will be important in the event of an emergency situation, including:
  - An entry/exit log identifying personnel on site each day, including those working in the exclusion zone
  - Site layout and emergency evacuation routes (Figure 9-1)
  - Hospital and clinic route map with directions from site (Figure 9-2)
  - Emergency equipment list and locations (Table 9-1)
  - Emergency notification names and phone numbers (Table 9-2)
  - Completed (voluntary) medical data sheets (Appendix F) for on-site personnel
  - A chemical inventory of hazardous chemicals on site (Appendix G)
  - Corresponding SDSs (Appendix G)

At the beginning of the fieldwork, the EC will hold an emergency evacuation drill. The drill requires evacuation of the site to the designated evacuation area. The UXOSO and SUXOS will, after the drill, conduct a written debrief meeting with all participants. The UXOSO will prepare a short report with recommendations for improvement of the evacuation plan when necessary. Depending on the complexity of the job and critical tasks, more than one type of drill may be required to test emergency plans.

9.2.2 Personnel and Lines of Authority for Emergency Situations

The SUXOS will serve as the EC until emergency response personnel arrive on site and take command. If the SUXOS is not present or is involved in the emergency, the UXOSO is the alternate EC. If neither the SUXOS nor UXOSO is immediately present, the area or task supervisor will be the immediate EC and will take all necessary precautions and measures to initiate the
emergency response, including notification of emergency personnel and the SUXOS and UXOSO. In the event of an emergency, personnel will safely halt operations and evacuate to a safe area, and the EC will be in charge until emergency responders arrive and take command. The supervisor in charge will conduct a head count to confirm that all employees have been safety evacuated and are accounted for.

9.2.3 Emergency Signal, Assembly, and Evacuation Procedures

In the event of an emergency situation where TtEC is making the determination to evacuate the site, the EC (or a supervisor) will activate an air horn (or vehicle/equipment horn if available) to signal an evacuation. The emergency signal will be steady long beeps indicating the initiation of evacuation procedures.

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 and sudden extreme weather conditions, fire that is beyond incipient stages or unplanned explosion, evidence of acute personnel overexposure to a chemical, discovery of unanticipated waste materials that are unknown, and emergencies that could also occur due to activities or conditions not directly related to site work.

In an emergency, personnel in affected work zones will immediately and safely stop work and assemble near the SZ, or other safe area (upwind whenever possible), as identified by the SUXOS or UXOSO (or immediate supervisor of that operation) where accountability of personnel will be performed. Personnel will then proceed to the designated evacuation area. Primary and alternate emergency evacuation areas and routes are shown on Figure 9-1.

The location of assembly and evacuation areas and routes will be upwind of the site, as determined by the wind direction, whenever possible. The UXOSO will ensure that that diagrams showing these safe egress routes and locations of assembly areas and evacuation areas are kept current. All site personnel will be briefed regarding the assembly and evacuation locations and routes (including alternative locations for each work location) and the diagrams will be updated whenever this information changes.

Figure 9-2 shows the route to the nearest emergency hospital (Hoag Hospital, 16200 Sand Canyon Avenue, Irvine, CA 92618) that will be used if emergency medical services are required. This figure also includes directions to the clinic (Sand Canyon Urgent Care, 15775 Laguna Canyon Road #100, Irvine, CA 92618) for non-emergency care.

For efficient and safe site evacuation and assessment of the emergency situation, the EC will have the authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the project area once the emergency signal has been given and the order to evacuate is issued. Once the alarm has been sounded, the
EC must establish that access for emergency equipment is provided and that equipment that may cause combustion has been shut down. As soon as possible, and while the safety of the personnel is being confirmed, emergency agency notification will commence. The SUXOS or UXOSO will brief site personnel each day, or when the location of either the assembly or evacuation area is revised.

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

- Declare the evacuation via cellular telephones, hand signals, voice commands, line-of-site communication, or vehicle/air horns, as necessary.
- Use the following signal when communication via vehicle horn or air horn is necessary:
  - Steady long beeps will be used to indicate emergency situations
- Report to the designated evacuation area for accountability.
- Ensure that nobody is allowed back into the work area until the SUXOS, UXOSO, or PM has given the “all clear” for employees to return to the site.
- Describe the incident precipitating the evacuation to the SUXOS using all pertinent incident details.

9.2.4 Emergency Equipment

The emergency equipment listed in Table 9-1 will be strategically placed and maintained on site in accessible locations where active work is taking place. A description of the equipment and the circumstances under which it will be used are provided below:

- Fire extinguishers will be maintained on site and shall be immediately available for use in the event of an emergency. Site personnel will be trained in the use of the fire extinguisher as part of site-specific training.
- An industrial first aid kit meeting the requirements of OSHA and EM 385-1-1, Section 03.B.01, and a bloodborne pathogens kit will be readily available and visible at the work site. The location of each first aid kit will be clearly marked, and kits will be protected from the weather and properly maintained. The first aid kit must contain all the items listed in Table 3-1 of the EM 385-1-1 manual, and will include one pocket mouthpiece or CPR barrier and latex gloves. The first aid kit will be inspected weekly, and items will be replaced as they are used.
- An emergency eyewash station will be available at the work site and will be inspected weekly by the UXOSO to ensure that the station is functional, maintained in a clean condition, and that the water is changed at least weekly unless a preservative solution is used.
• Spill kits will be available in active work locations and fuel storage or refueling locations, and will be stocked with a sufficient amount of absorbent material for the type and quantity of hazardous material that could be spilled during the operation, including operating mobile construction equipment. Supplemental emergency spill response equipment may be stored in another location.

• An air horn will be available on site, unless vehicle/equipment horns are immediately available for use.

• A means of communication for notifying 911 emergency response will be provided within immediate reach (e.g., cellular telephone or land line or radio that can reach a dedicated person with access to a land line (remote locations).

• An emergency contact list with telephone numbers will be provided on site and will be updated as necessary.

• An emergency evacuation area location and routes map will be available on site and will be updated as necessary.

9.2.5 Posting of Emergency Telephone Numbers

The list of emergency telephone numbers provided in Table 9-2 will be maintained at the telephone communications points in the field office, and at any SZ.

9.2.6 Spill Emergency Plan

The following spill emergency procedures will be followed to prevent or minimize releases of hazardous or potentially hazardous materials:

• All containers of hazardous materials located on site will be labeled as to contents and associated hazards.

• Hazardous materials will only be brought to the site in the minimum quantities needed to perform the immediate task.

• A hazardous materials inventory as well as SDSs for hazardous materials used on site will be kept in a binder at the field office. The hazardous material inventory and SDS will be included in Appendix G of this APP, and will be updated as additional hazardous materials are identified and are brought on site for use on the project.

• All hazardous materials containers will be constructed with closeable lids that will be kept closed except when in direct use.

• Fuel containers will be metal, Underwriter’s Laboratory (UL) listed, and in good condition.

• Preventive maintenance will be performed on construction equipment and vehicles to minimize the possibility of hose and other equipment failure.
• Other maintenance (i.e., major maintenance or oil changes) will be performed off site at an equipment repair facility.

• Good housekeeping operations will be followed and hazardous materials will be stored in authorized storage areas.

• Absorbent materials (e.g., sorbent pads, sorbent socks, chemical protective gloves, and bags) will be staged in the SZ for responding to potential spills that could occur during heavy equipment and refueling tasks. Spill control equipment will include, at a minimum, absorbent pads, chemical protective gloves, and disposable bags, as well as tools such as shovels and brooms.

• Portable spill basins or secondary containment structures will be placed under refueling points during refueling or transfers of fuel.

• Refueling of heavy equipment will be performed using a fuel delivery vendor and vendor operator who is in constant supervision of that task. Overfill prevention during refueling will be verified visually by the operator.

• Hazardous materials handling operations will not be conducted when the weather could cause significant risk to the surrounding area if a spill should occur.

• Hazardous materials (e.g., fuel) will be transferred in well-ventilated areas as necessary.

• A spill kit containing sorbent materials, such as socks and sorbent booms, will be placed near fueling points.

In the event of a spill:

• The SUXOS will notify the PM.

• The PM will notify the RPM.

• The UXOSO will notify the SHM.

• The quantity of any reportable spill will be recorded internally and will be reported to the client, the RPM.

• TtEC will assist the client with any required notification to regulatory agencies if the spill is reportable to agencies.

• In no case will TtEC report a spill to a regulatory agency without first notifying the client and obtaining concurrence.

• An investigation and incident report will be prepared and corrective actions identified.

9.2.7 Fire Emergency Plan

Workers will not fight any fires other than small fires that have recently occurred and can be reasonably extinguished immediately (incipient-stage fires). There will be at least one fire extinguisher (refer to Table 9-1) at each active work location. Fire extinguishers will also be provided on each piece of mobile construction equipment and in the crew pickup trucks. The fire
extinguishers are intended to fight only incipient stage fires. In no case will workers attempt to fight any fire that cannot be reasonably extinguished within 30 seconds to 1 minute. Additional fire prevention measures, including measures that will be implemented to reduce the potential for wildland fires, especially during Red Flag Warnings, are included in Section 9.27.

If a fire breaks out on site, call (or designate someone) to call 911 before attempting to put out the fire (incipient stage only) and only if fighting the fire does not put anyone at further risk. Ensure a means of egress is available in the event that the fire cannot be extinguished.

To use the fire extinguisher, remember the word P.A.S.S. – pull the pin, aim the nozzle at the base of the fire, squeeze the lever, and sweep side to side at the base of the fire. Workers will be given fire extinguisher training during project orientation.

Fire extinguishers will be inspected by the UXOSO at the start of the project, and then on a monthly basis (at a minimum). Additionally, all 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. During project demobilization, all fire extinguishers and other hazardous material will be properly dispositioned for further use at other TtEC projects.

In the event of a fire or explosion, contact the appropriate emergency authorities by calling 911 as specified in Table 9-2 – Emergency Contact List. Any fire must also be reported to the appropriate client point of contact and the SHM. The person reporting the fire is required to provide the following information to responding emergency personnel:

- His/her name
- Location of the fire
- Number of injured persons and nature of injuries, if known
- Substance(s), chemical(s), or materials involved in the fire
- Size of the fire and available fuel (estimate)
- Extent of fire
- Rate that the fire is expanding (estimate)
- Time the fire started and the time the fire was extinguished
- Any other pertinent information

9.2.8 Medical Emergencies

In the event of a medical emergency, first aid and CPR assistance will be provided by CPR-/first aid-trained individuals. The injured party will be moved as minimally as possible if the scene remains safe for the injured or ill person and first aid responders or responding emergency
personnel. If it is safe to move the person without further injury or the location is compromised, the person will be moved to the nearest appropriate location for continued care. No person will enter an unsafe location, however, to rescue an injured worker if the scene poses a hazard that could injure or trap the would-be rescuer.

In the case of medical emergencies, should they occur on the project site, emergency responders, as determined by emergency dispatch personnel, typically will be relied on to stabilize patients and to provide transportation to the hospital. In the event of a medical emergency in which actual or suspected serious injury occurs, the following procedures will be followed:

- Survey the scene and evaluate whether the area is safe for entry.
- Render first aid and CPR as necessary.
- Obtain emergency medical services for ambulance transport to a local hospital by calling **911** from a cell phone or landline. This procedure will be followed even if there is no visible injury. Provide the following information to the emergency dispatch personnel:
  - Identify the location by address or nearest cross street, request medical assistance, and provide a name and telephone number.
  - Stay on the line with dispatch.
- Evacuate other personnel in the work area will be evacuated to a safe distance until the EC determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work will not commence again until the hazard control issues are resolved.
- Notify the PM and SHM. The PM and SHM will notify the RPM.

The nearest emergency hospital is:

Hoag Hospital  
16200 Sand Canyon Ave, Irvine, CA 92618  
(949) 764-4624

**Directions to Hoag Hospital Irvine are as follows:**

- Exit site from Magazine Road and turn right onto Irvine Blvd.
- From Irvine Blvd (0.41mi) turn left onto the ramp to CA-133S.
- Travel 3.23 mi on CA-133S merge onto I-405 via exit 8B.
- Turn take the Sand Cyn Ave exit.
- Travel .35 miles and turn right onto sand canyon avenue.
- The Hoag Hospital is on the right side of the road.
The nearest medical clinic for nonemergency medical needs is:

Sand Canyon Urgent Care  
15775 Laguna Canyon Road #100, Irvine, CA 92618  
(949) 417-0272

**Directions to Sand Canyon Urgent Care are as follows:**

- Exit site from Magazine Road and turn right onto Irvine Blvd.
- From Irvine Blvd (0.41mi) turn left onto the ramp to CA-133S.
- Travel 1.87 mi on CA-133S and take the Barranca exit.
- Turn right onto Barranca Pkwy and travel 0.13 mi
- Turn right onto Discovery travel 0.13 mi.
- The Sand Canyon Urgent Care is on the right side of the road.

The location of and directions to the hospital and clinic from the site are also included in Figure 9-2, and contact numbers for the hospital, clinic, and WorkCare are provided in Table 9-2. Prior to the start of work, the UXOSO will drive by the emergency hospital and clinic to ensure that they are accessible and available, and that the most efficient routes (primary and alternative) are identified during mobilization and accurately reflected in Figure 9-2.

**9.2.8.1 Decontamination during Medical Emergencies**

Based on the nature of the planned activities, the need for specific personal decontamination activities in an emergency medical situation is unlikely. However, if, during refueling, workers are saturated with fuel product, decontamination may be required. If decontamination becomes 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 with water, as necessary
- Contaminated clothing will be removed and disposed of
- First aid treatment will be rendered
- If decontamination is not feasible, as much information as is known will be provided to emergency responders regarding the potential contaminants.
9.2.8.2 First Aid

TtEC will ensure that a minimum of two people on site have current certifications in CPR, first aid, and bloodborne pathogens. Additional qualified persons will be listed on the bulletin board in the field office. Other than rendering basic CPR and first aid, these employees are not expected to perform emergency medical duties; however, they are authorized to perform emergency rescue or other duties up to the level of their training.

For first aid injuries that are not deemed an emergency situation, appropriate care following first aid may include stabilization and transportation to a nearby urgent care facility or occupational medicine clinic for evaluation. The UXOSO will evaluate the location of the nearest occupational medicine provider by contacting the clinic and determining if the clinic accepts TtEC worker’s compensation insurance (provided by AIG) during mobilization for these non-emergency injuries or illnesses. Subcontractors will be instructed to do the same as per their company’s corporate procedures. WorkCare will be contacted immediately following appropriate first responder patient care or when the patient is transferred to emergency responder personnel in order to help assist with patient and case management, and recommendations.

9.2.8.3 Medical Data Sheet

Each field team member, including subcontractors, will be asked to complete and submit a copy of the Medical Data Sheet (see Appendix F). This sheet is voluntary but encouraged, and will be provided to the UXOSO prior to workers 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 if the victim is unable to communicate. Any pertinent information regarding allergies to medications or other special conditions should be documented. This data sheet will be maintained confidential by the UXOSO and information shared only to the extent necessary to support medical care of the individual.

9.2.9 Inclement Weather

Although severe weather is unusual for the Irvine area, the UXOSO will monitor the weather when a storm is forecast for the area. If particularly ominous weather conditions are predicted such as lightning, wind, and excessive heat and/or wind that could present the potential for Red Flag Warnings and potential wildland fire danger, the UXOSO will monitor radio broadcasts or National Weather Service reports a minimum of 2 times per day, and more frequently if necessary, and management will evaluate the situation and take appropriate action to maintain worker safety, including travel to and from work, and to evaluate whether shutting down of the site or specific tasks will be required before the storm arrives. Information on hazards and fire prevention measures due to severe weather and Red Flag Warnings is contained in Section 9.27.
Nearby thunderstorms, if present, could have lightning associated with them. When a thunderstorm arises, the UXOSO will determine if lightning is within 10 miles of the site. Once lightning is seen, count the number of seconds until you hear the thunder. Divide number of seconds by 5 to get the distance the lightning is away from you. If lightning is 10 miles away or less, work should stop until 30 minutes after the last audible thunder or visible flash of lightning. A lightning meter may be used, as well, if available on site. If lightning is observed, all load-handling equipment work, work on elevated work platforms, scaffolding, and roofs, tree trimming, and other hazardous work will stop until no lightning activity is observed for a minimum of 30 minutes, and all outdoor workers will seek shelter in a fully enclosed vehicle cab or other fully enclosed structure, such as the field office.

The SUXOS or UXOSO SSHO will assess what work procedures can be safely performed when wind conditions exceed 20 miles per hour for any activities that can be affected by wind; lesser wind speeds may require consideration of work suspension depending on conditions. The SUXOS and UXOSO will also give consideration to fugitive dust emissions, the safety of equipment in high winds, and protection of workers from flying debris.

In preparation for an approaching storm, equipment stored outside will be secured, and all doors and windows associated with the equipment and offices will be closed. Tools and supplies will be stored in a designated secure location. Open excavations and current work tasks will be safely idled and secured as necessary.

9.2.10 Earthquake

If an earthquake occurs, workers in vehicles will stay in their vehicles. Workers will avoid standing next to excavations and structures. Workers on the ground may choose to lie on the ground until the quake subsides. After the earthquake, the UXOSO will monitor radio broadcasts or other emergency instructions and account for all crewmembers while awaiting further assessment of site safety before work continuation. Be aware that aftershocks are possible.

9.3 SITE SANITATION/HOUSEKEEPING PLAN

Sanitation facilities will be provided and maintained on site as required in Section 2 of EM 385-1-1. TtEC will provide portable toilet and hand washing (soap and water) facilities at the project worksite unless workers have access to other readily available toilet and/or handwashing facilities. These facilities will be ventilated and serviced on an as-needed basis, but, at a minimum, once per week. The facilities will be maintained in a sanitary condition, and located in an area accessible to work activities. Individual disposable paper towels will be available. The minimum number of toilet facilities will be provided, in accordance with Table 2-1 of EM 385-1-1 for sites other than construction sites, or Table 2-2 for construction sites.
Potable water will be available for washing hands and face, and for any drinking water provided to employees. During hot weather, cool drinking water will be provided. Drinking water will be from a local municipal water supply, or will be bottled water purchased from a store or other vendor whenever possible. Potable drinking water containers with lids will be marked “drinking water” and will not be used for any other purposes, with disposable cups provided for bottled water.

Any outlets or containers that dispense non-potable water will be labeled as “Caution – water unsafe for drinking, washing, or cooking.” There will be no cross-connection, open or potential, between a potable water system and system furnishing non-potable water.

Workers will discard all food debris and other detritus in a designated refuse container with closing lid on site that will be serviced regularly by a sanitation vendor. Used disposable PPE and other project wastes will be managed as detailed in the project waste management plan in a manner that does not allow for the spread of contamination by rain, wind, or spills/releases.

Good housekeeping procedures will be maintained throughout the duration of work, and regular cleaning will be performed to maintain safe and sanitary conditions in the workplace.

9.4 MEDICAL SUPPORT AGREEMENT

The project DFWs, activities, and tasks are all anticipated to have a “medium” RAC; therefore, the medical support agreement is not required to be in writing.

TT/EC and subcontractor crews will have working cellular telephones capable of communicating between teams and dialing 911 if required. Table 9-2 in the tables section of this APP includes the telephone numbers of the nearest hospital, urgent care clinic, and WorkCare Case Intervention for emergency medical support, along with project personnel emergency contact names and numbers. This table will be conspicuously posted, at a minimum, on the safety bulletin board, near the on-site project office, and/or in the SZ if an office is not present or nearby (e.g., as with mobile field crews).

Personnel at medical facilities who are expected to treat injured employees will be informed of the nature of the work to be performed and the injuries/illnesses prevalent on such jobsites by the UXOSO during or prior to mobilization, as required.

Figure 9-2, in the figures section of this APP, contains a highly visible map delineating the best route to the nearest emergency medical facility listed in Table 9-2. A copy of this map will be posted on the safety bulletin board and/or in the support zone if an office is not present or immediately available (e.g., as with mobile field crews).
The project site will have a first aid kit (one for every 25 or fewer employees) that complies with the criteria contained in American National Standards Institute Z308.1. In addition to the basic fill requirements, each kit will comply with Table 3-1 of EM 385-1-1.

A minimum of two first aid-/CPR-qualified persons will be on site for each work shift and will be listed on the AHAs. Names of all first aid-/CPR-qualified persons will be posted on the office bulletin board or support zone for field crews.

9.5 BLOODBORNE PATHOGEN PROGRAM

Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts, or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. However, under the principle of universal precautions, all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens. Two significant primary bloodborne pathogens are Hepatitis B and the human immunodeficiency virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS).

Potential bloodborne pathogen exposures include:

- Contact with contaminated medical equipment or medical waste or Sharps waste.
- Contact through medical emergency response operations such as administering first aid or CPR.

To reduce the risk of contracting a bloodborne pathogen, take the following precautions:

- Avoid contact with blood and other bodily fluids.
- Use protective equipment when giving first aid/CPR, such as disposable gloves and breathing barriers (which are provided in the first aid kits).
- Thoroughly wash your hands with soap and water immediately after giving care.

When cleaning up blood or other bodily fluids:

- Clean up the spill immediately or soon as possible after the spill occurs.
- Use disposable gloves and other PPE when cleaning spills.
- Wipe up the spill with paper towels or other absorbent materials.
- After the area has been wiped up, flood the area with a solution of one quarter cup of liquid chlorine bleach to 1 gallon of fresh water and allow it to stand for at least 20 minutes.
- Dispose of the contaminated material used to clean up the spill in a labeled biohazard container.
The UXOSO should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job. The UXOSO will notify the SHM. Site personnel will be given bloodborne pathogens training.

9.6 EXPOSURE CONTROL PLAN

Should an exposure occur, the SHM will direct post-exposure-related activities. The protocol shall include a plan to ensure immediate medical evaluation of exposed individual(s) per the current recommendations of the Centers for Disease Control and Prevention for HIV, Hepatitis B virus, and Hepatitis C virus.

Prior to the start of work outside the employee’s normal geographical area, TtEC will inform employees of parasitic, bacterial, viral and environmental diseases endemic to the geographical work location. This information and preventative measures and actions to take upon exposure from potential carriers of these diseases relevant to this project location (e.g., mouse or bird droppings, bites from mosquitos, ticks) are contained in Section 9.12.4 of this APP.

9.7 AUTOMATIC EXTERNAL DEFIBRILLATOR PROGRAM

Not applicable. An AED is not currently anticipated to be present on site.

9.8 SITE LAYOUT PLAN

TtEC will coordinate with the RPM for any required base access requirements. If Magazine Road is used for access, the Federal Bureau of Investigation may need to be contacted (through the RPM) and any additional security requirements that need to be followed for TtEC, subcontractors, and vendors, and will implement these requirements during fieldwork.

Access to the site will be coordinated with the RPM and strictly controlled with entry control points, as detailed in the ESS (TtEC 2015a). Personnel entering and exiting the contractor gate will lock the gate after each access/egress. Traffic control measures will be in place during mobilization of heavy equipment and support structures to the site. All site structures and vehicles 12 feet in height or greater will be equipped with high-visibility red flagging.

Temporary erosion controls and dust control measures will be established in construction areas and maintained throughout the project as required to minimize erosion and runoff and control dust generation. Following completion of fieldwork, the site will be restored to original or acceptable conditions. Temporary erosion controls will not be removed until final site stabilization has been achieved.

EZs will be established and enforced by the SUXOS during active MPPEH operations. An MPPEH holding area and material documented as safe area will also be established.
9.9 ACCESS/HAUL ROAD PLAN

Not applicable.

9.10 HEARING CONSERVATION PROGRAM

The UXOSO will evaluate the workplace for noise hazards initially, and then regularly during the course of work. The UXOSO will conduct noise monitoring whenever there is difficulty in communicating at distances greater than 2 feet, upon worker complaint of excessive noise, or whenever hazardous noise levels are suspected, including when new equipment is placed into service or into new areas.

The assessment of noise hazards will comply with the instrumentation requirements of Section 05.C.03 of EM 385-1-1, the American Conference of Governmental Industrial Hygienists threshold limit value continuous noise exposure standards outlined in Table 5-4 of EM 385-1-1, and the assessment/evaluation will be documented.

- For impact (impulse) noise, personnel exposures may not exceed 140 decibel (dBA) (unweighted) without the use of effective hearing protection devices.
- For continuous (steady-state) noise, personnel exposures may not exceed 85 dBA without the use of effective hearing protection devices.

During this project, noise hazards are known or expected during the following:

- Operation of some power tools
- Excavation equipment operation
- Screen plant operations

The UXOSO and SUXOS will consider and implement practical engineering or administrative controls when personnel are exposed to continuous (steady-state) sound pressure levels exceeding the levels stated above. Engineering controls may include lubrication, isolation, damping, baffles, or other methods suitable to the situation.

As an administrative control, the UXOSO and SUXOS will post noise-hazardous areas (areas where the noise values exceed the above thresholds) and the requirement for hearing protection in these areas. Equipment that is identified as noise hazardous will be labeled as a noise hazard.
requiring the use of hearing protection, and if the noise hazards of the equipment may affect adjacent workers, the workers will be notified of the noise values and offered hearing protection. If noise exposure to employees cannot be reduced to below the required standard, operating time limits may be imposed.

Hearing protection devices will be provided to affected employees for the attenuation of noise to acceptable levels (less than 85 dBA for continuous (steady-state) noise. Ear insert devices, including disposable, pre-formed, or custom-molded earplugs, will be fitted to the exposed individual by an individual trained in such fitting and able to recognize the difference between a good and poor fit. Workers who work in noise-hazardous environments more than 30 days per year on the job will undergo pre-employment and end-of-employment hearing testing.

9.11 RESPIRATORY PROTECTION PLAN

During all field activities, engineering controls, such as effective dust control, and good hygiene practices, such as hand washing, will be implemented, and proper PPE will be used as specified in this plan and the AHAs to minimize inhalation of respirable dusts and minimize the potential for contact with potential contaminants in soil and during use of very limited hazardous materials on this project.

Dust will be controlled through use of water mist or spray as required during removal tasks. Dust is not anticipated to be generated, as a full-time water truck will be on site and the screen plant will be equipped with dust suppression sprinklers. If dust controls are not effective, the UXOSO will notify the SHM because this situation presents a potential exposure issue for workers and the UXOSO will have workers who could be exposed to dusts wear full face air purifying respirators with P-100 cartridges. In addition, if the SHM believes exposure to naphthalene vapor could result in an exposure, the workers will be directed to wear full-face air-purifying respirators with P-100 and organic vapor (combination) cartridges.

Should unanticipated chemical contamination be discovered during excavation tasks (odor, stained or discolored soil, discovered buried containers, etc.), work will stop, and the PM and SHM, as well as the RPM and Adjacent Property point of contact (POC) (if needed) will be notified as this is a changed condition. This plan will be updated to include requirements for monitoring, chemical sampling and any upgrades to PPE and respiratory protection required.

As required, the UXOSO will implement TtEC’s Corporate Respiratory Protection Procedure, EHS 5-02, and a Respiratory Protection Plan. This plan will be updated as necessary by the UXOSO or SHM. All personnel who wear a respirator will work within the requirements of the Respiratory Protection Plan, under the direct supervision of the UXOSO.

All employees who wear a respirator will be trained. This training will occur initially, any time requirements change significantly due to process changes or changes in site-specific operations,
and at least annually. Training documentation will be maintained by the UXOSO and will be available upon request. Training topics will include the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
- Limitations and capabilities of the respirator.
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
- How to inspect, don, doff, use, and check the seals of the respirator.
- Procedures for maintenance (including cleaning) and storage of the respirator.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- The general requirements of the OSHA respirator standard at 29 CFR 1910.134.

Employees assigned to use respirators are required to inspect the equipment before and after each use; discard any defective equipment; clean and maintain the equipment according to manufacturers’ recommendations; and store their PPE in a clean, secure area (as directed by the UXOSO) on site each day. Specific PPE inspection, cleaning, and maintenance procedures vary according to the type of equipment being used. Prior to being assigned to their jobs, employees will be informed of these equipment-specific use and maintenance procedures.

A respirator cartridge change-out schedule will be developed by the UXOSO in consultation with the SHM, based on duration of exposures, relevant safety factors applied, and manufacturer guidelines. The UXOSO will maintain the change-out schedule for workers in consultation with the SHM and will document this schedule. An air-purifying respirator will not be used in atmospheres with less than 19.5% oxygen or an atmosphere that is immediately dangerous to life and health.

All employees who wear a respirator will undergo medical evaluation to ensure they are fit to wear the selected respirator. This medical evaluation includes a physical examination supervised by a board-certified occupational medicine physician. Copies of current medical evaluation and fitness to wear a respirator will be maintained onsite by the UXOSO and made available upon request.

All employees who wear a respirator will be qualitatively fit tested to ensure that the selected respirators achieve a proper face piece seal. Fit testing will be performed prior to initial use of the selected respirator, whenever respirator size, make, or model is changed, and at least annually thereafter. Records of fit testing will be maintained on site by the UXOSO and made available upon request.
9.12 HEALTH HAZARD CONTROL PLAN

The primary physical health hazards associated with this project are associated with the limited soil excavation of naphthalene-impacted soil, MPPEH operations, including the potential for unanticipated fires or explosions to occur; and heavy equipment operations, including use of excavator, loader, and screen plant. The physical hazards, if not properly controlled or if safe work practices are not followed, can lead to strains, sprains or breaks; punctures, lacerations, cuts, bruises or contusions; burns, struck-by or caught-in injuries; and/or ergonomic strains from repetition or improper task positioning.

TtEC will use fuel, such as diesel and/or gasoline, for equipment operation, spray paint for marking utilities, grease, and other petroleum products for equipment maintenance needs. Hazardous materials will be used in accordance with manufacturers’ use instructions, in well-ventilated areas, and with the proper PPE, as per the SDS, and in accordance with the Hazard Communication Standard.

Biological hazards, including bloodborne pathogens (e.g., if first aid or CPR is required), may be present on site. In addition, the potential exists for bites or stings by insects that can result in an allergic reaction or transmit potential bloodborne diseases.

Section 9.12.1 addresses chemical hazards and mitigation measures to reduce those hazards, including the monitoring strategy for this project, which is described in Section 9.12.1.1 below. Section 9.12.4 addresses biological hazards (e.g., animals, poisonous plants, insects, and insect transmitted bloodborne pathogens). Section 9.62 identifies and describes other physical and classic safety hazards, and mitigation measures to reduce those hazards, that have not been discussed elsewhere in this APP.

TtEC will create systems and procedures to prevent and control physical, chemical, and biological hazards that are identified through the risk/hazard analysis. The hierarchy of controls is engineering, administrative, work practices, and PPE. Use of such controls in conjunction with PPE will help reduce the hazard or exposure to the lowest practical level.

The basic formula for controlling workplace hazards, in order of preference, is:

- Eliminating the hazard from the method, material, or the facility.
- Abating the hazard by limiting exposure or controlling it at its source.
- Training personnel to be aware of the hazard and to follow safe work procedures to avoid it.
- Prescribing PPE for protecting employees against the hazard and ensuring they not only use the PPE, but know how to use it correctly.
9.12.1 Chemical Hazards, Controls, and Monitoring Strategy

Chemical hazards likely to be encountered during the project include hazards related to use of fuel, oil, and lubricants for the operation and routine maintenance of heavy equipment. The SDS and inventory will be on site and workers will be trained to the Hazard Communication Standard (see Section 6.6 of this APP).

In addition, some excavation work includes removal and handling of naphthalene-impacted soil. Naphthalene is anticipated to be present in soils at a maximum concentration of 128 milligrams per kilogram. Naphthalene (also known as tar camphor or white tar) is a colorless to brown solid (in pure form) with the odor of mothballs. The OSHA time-weighted average PEL is 10 parts per million (50 milligrams per cubic meter). Exposure routes are via inhalation, skin absorption, ingestion, and skin/eye contact.

Dust control plays a crucial role in prevention of potential exposures to naphthalene in soil through prevention of contact and ingestion/inhalation of contaminants adhering to dust particles in the air.

As stated in Section 9.11 above, should unanticipated chemical contamination be discovered during excavation tasks (odor, stained or discolored soil, discovered buried containers, etc.), work will stop and the PM and SHM, as well as the RPM and Adjacent Property POC (if needed) will be notified as this is a changed condition. In addition, should unanticipated chemical contamination be discovered during excavation tasks, this APP will be updated to include requirements for monitoring, chemical sampling, and any upgrades to PPE and respiratory protection required.

9.12.2 Site Control Measures

This section outlines the means by which TtEC will delineate work zones and use these work zones in conjunction with engineering controls (Section 9.12.1) and basic decontamination and hygiene procedures (Section 9.12.3) to prevent the potential spread of contaminants.

It is anticipated that for the planned work activities, a three-zone approach will be used during work at this site where there is any some anticipated potential for coming into contact with site contaminants (e.g., naphthalene-impacted soil). Where there is no known chemical contamination, a two-zone approach will include an EZ, as defined in the ESS and Work Plan (TtEC 2016) and an SZ, where the EZ is the controlled work zone around the active clearance/ MEC/MPPEH work areas in which special precautions are required to protect from MEC-related hazards and the SZ is for staging of safety equipment (e.g., fire extinguisher, first aid kit). Even with a two-zone approach, equipment and materials leaving a work area must still be inspected and any adhering soil and materials in tracks or on equipment buckets must be removed prior to their release from the work area.
When a potential exists for coming into contact with or spreading of site contaminants, a three-zone approach will be used. The three-zone approach will be comprised of an EZ, a contamination reduction zone (CRZ), and an SZ. The degree of control and the requirements for establishment and management of these zones will be at direction of the UXOSO based on site conditions, the potential for spreading of or contact with contaminants, and activities being performed.

Site control requires the establishment of a regulated area and designated site work zones appropriate to the work task. To minimize the transfer of potentially hazardous substances from the site (in areas where this is a concern, if such areas are identified) and to control access into potentially hazardous areas where work is being performed (the EZ), project personnel will:

- Schedule operations that use minimum numbers of personnel.
- Establish site work zones around each worksite location as appropriate and post signage.
- Implement appropriate decontamination procedures.
- Keep the client and other affected contractors informed of changing work zones.

9.12.2.1 Exclusion Zone

EZs will be formed in active work areas where tasks are being performed and entry by unauthorized or uninformed persons could be hazardous or require additional controls. Barricades or cones, along with caution tape, will delineate the EZ. The EZ for MEC-related operations is addressed in greater detail in the Work Plan (TtEC 2016).

For EZs that are set up to control chemical exposures or contamination, workers will place contaminated tools and equipment on plastic sheeting (when required) in the EZ to prevent contamination of the surrounding area as required until the tools are appropriately decontaminated and removed from use.

9.12.2.2 Contamination Reduction Zone

Adjacent to the EZ, the CRZ will serve as a buffer zone to prevent the spread of contamination beyond the work area. Workers will either wrap contaminated tools and equipment with plastic, or will decontaminate the equipment and themselves in this area before moving to the next work area. The appropriate level of decontamination will depend on the work task, whether the tools and/or personnel were in contact with the contaminated material, and whether any contaminated material adheres to the worker’s PPE or tools. The UXOSO will assist in recommending the proper levels of decontamination for work tasks.
9.12.2.3 Support Zone

The SZ will be arranged to consider accessibility, utility availability, and line of sight to work. This zone is where equipment, such as a fire extinguisher, first aid kit, spill kit, hand washing facility, and any other appropriate support, will be located.

9.12.3 Personal Hygiene and Decontamination

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

9.12.3.1 Responsibilities

The SUXOS is responsible for establishing and maintaining appropriate equipment and personnel decontamination areas and ensuring that subcontractors follow this plan. The UXOSO will assist the SUXOS in ensuring that adequate decontamination procedures for tasks are identified and followed to prevent contamination of individuals or the environment beyond the EZ.

9.12.3.2 Contamination Avoidance

Avoiding contamination is the first and best method for preventing the transfer of contamination. 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 and try to limit the need for excessive contact with contaminated media.
- Use the proper tools to safely conduct the job.
- Inspect tools and equipment used for subsurface activities for soil before tracking out of work area.

9.12.3.3 Decontamination

Decontamination for this project will involve physically removing contaminants from equipment and/or PPE. Decontamination, proper PPE donning and doffing procedures, and management of work zones will minimize the chance of cross-contamination from protective clothing to the wearer, equipment to personnel, and one area to another.

In general, decontamination will consist of:

- Removing residual materials from tools and equipment or personnel, regardless of their source, before taking breaks or engaging in hand-to-mouth activities.
• Employing a soap and water wash and rinse for hands, and, if required, face. Hygiene wipes may also be used but are not a substitute for hand washing with soap and water.
• Keeping break areas clean. No potentially contaminated PPE or equipment will be permitted in these locations or offices.
• Doffing of used and contaminated PPE properly, and storage of reusable PPE properly after decontamination and between uses.

9.12.3.4 Personnel Decontamination Guidance

It is anticipated that disposable PPE, such as gloves, boot covers, and coveralls, will be disposed of after use. Personnel decontamination will consist of a soap/water wash and rinse. This function will take place in an area adjacent to the site activities. A hand washing station will be available for workers to wash their hands before leaving the work area or taking breaks. Workers will be instructed to wash hands before going on breaks.

9.12.3.5 Equipment Decontamination Guidance

It is anticipated that heavy equipment, such as backhoe buckets, and portable hand tools, such as shovels, will be cleaned of adhering soil or mud (if present), along with any loose debris, prior to being moved out of the work area using brooms or wipes. Heavy equipment buckets, tires, and tracks are not anticipated to come into contact with significant volumes of contaminated soil and wet decontamination methods are not anticipated to be required for equipment at this time. Dry decontamination methods (scraping and brushing) will be used to remove soil.

The SUXOS will be responsible for evaluating equipment both arriving on site and leaving the site. The Equipment Inspection Checklist, included in Appendix D, will be used to document these inspections. Evaluation will consist of a visual inspection to ensure that visible contamination has been effectively removed.

9.12.4 Biological Hazards

Biological hazards may be encountered at Former MCAS El Toro in the form of biting or stinging insects, venomous snakes, rodent droppings, fungi that cause Valley Fever, and bloodborne pathogens (in the event that first aid/CPR is performed). Workers should anticipate the likelihood of encountering insects. Insect bites and 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 UXOSO will identify personnel with known allergic reactions to bites and stings at the pre-job safety orientation meeting. In addition, some insects can spread diseases.
 Personnel will not attempt to capture or feed any wild or semi-wild animals, such as cats or rats (if present), due to the possibility of a bite or parasitic infestation. Additionally, 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 such droppings. Detailed information regarding how to manage the potential biological hazards that may be present at the project site is provided in the following sections.

### 9.12.4.1 Insects

In the chaparral-covered areas of the site, insects, such as Africanized honey bees, wasps, hornets, and tarantulas, reside. Often in dry areas, bees are attracted to water in any form, including sweat, bottled water, and sodas. Bees have been known to enter cans and bottles and when a worker takes another sip from the container, the bee often stings the worker on the face, lips, or inside the mouth. Therefore, workers will use containers that can be closed when not in use. In sensitized individuals, effects, such as anaphylactic shock, can be more serious and can lead to severe reactions in the circulatory, respiratory, and central nervous system, and, in some cases, even death. The UXSO will identify personnel with a known reaction to bites and stings at the pre-job safety orientation meeting. 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 UXSO. Field personnel who may have insect allergies are strongly encouraged to provide this information to the UXSO prior to commencing work, and will be instructed to have their prescribed allergy medication on site (including an epinephrine pen if applicable). 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 long pants).
- Tuck pant leg into socks and wear long-sleeved shirts.
- Avoid placing bare hands in dark corners or under stored material.

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 a 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. Various spiders may be encountered at the site, and many spiders have the potential to bite.
Venomous spiders in the area include the black and brown widow spider, and tarantulas. Bite symptoms include localized pain, redness, burning and swelling at bite site; pain from the bite itself; abdominal pain; localized or generalized muscle cramps (e.g., stomach, shoulders and back); headache; rash and itching; and sweating. All suspected spider bites should be managed by washing the area with soap and water to prevent infection. Medical care should be sought immediately if any of the above symptoms develop.

9.12.4.2 West Nile Virus

West Nile virus (WNV) encephalitis is a mosquito-borne viral disease that can cause an inflammation of the brain. WNV is transmitted to people through the bite of a mosquito that has become infectious after feeding on a bird infected with the virus. Birds serve as the reservoir hosts of WNV, and the principal vector in the transmission from one bird to another is the mosquito.

Most infections produce no symptoms in people, or symptoms are mild or moderate. Approximately 80 percent of those infected with WNV will show no symptoms. About 20 percent of cases produce mild symptoms, including fever, headache, and body aches, often with skin rash and swollen lymph glands. Less than 1 percent of cases show more severe infections marked by headache, high fever, neck stiffness, muscle weakness, stupor, disorientation, convulsions, paralysis, coma, and, rarely, death. Persons age 50 years or older and immune-compromised individuals are at a higher risk of developing a more severe infection. Symptoms of WNV will generally last a few days, although even some healthy people report having the illness last for several weeks. The symptoms of severe disease (encephalitis or meningitis) may last several weeks, though neurological effects may be permanent.

Control measures to prevent contracting WNV include:

- Limit outdoor activities at dawn and dusk when mosquitoes are most active.
- Wear long-sleeved shirts and long pants.
- Spray DEET on your skin, and permethrin on clothing and work boots prior to starting work activities.

9.12.4.3 Hantavirus

The Hantavirus, which is sometimes transmitted by rodents found in the southwestern United States, causes respiratory distress, sometimes with fatal consequences. Similarly, rats transmit the arenavirus. Transmission of the Hantavirus or arenavirus occurs with exposure to rodent droppings. Good hygiene practices, such as washing hands and face prior to eating and drinking, will help to minimize the potential for exposure to the Hantavirus. While work is in progress, use of P-100 filter cartridges and work practices that minimize generation of dust and aerosols will help protect employees. Avoiding areas where there are concentrations of mouse droppings (Hantavirus) or rat droppings (Arenavirus) minimizes exposure to either virus. The virus can be
inhaled in the dust from areas where mice or rats have nested or left their droppings. Minimizing dust inhalation or avoiding these areas will lessen the risks of exposure. Any work in such areas should be performed only with full Level C protection, including, at a minimum, a P-100 air-purifying respirator. Thorough washing of hands and face after removing the PPE will further minimize the potential for exposure.

9.12.4.4 Snakes

Several species of snakes in California are known to be venomous. These snakes include various types of rattlesnakes. Several harmless snakes also may be present, and though not venomous, could also bite if cornered. If a snake is encountered, slowly and quietly back away from the snake and let it retreat. Avoid placing hands in dark spaces and under materials or debris. Do not attempt to move or kill a snake, as certain snakes are protected under state and federal laws. In the event of snakebite, wipe off the skin and notify the UXOSO immediately. If the snake is suspected of being one of the venomous varieties or if you do not know whether it is or is not:

- Seek immediate medical attention and safely try to document as much information about the snake as possible (color, markings, size, etc.) and record the time the bite occurred.
- Keep the affected area below heart level to reduce the flow of venom.
- Remove rings or constricting items as the bite area can swell.
- Give the person first aid and treat for possible shock.
- Apply a bandage, wrapped two to four inches above the bite to help slow the venom but not tight enough to cut off the flow of blood.

Do NOT apply cold compresses, apply a tourniquet, cut into the bite, attempt to suck out the venom, give the person any medications or anything by mouth but water, or raise the site of the bite above the level of the person’s heart. Await or transport the person to emergency medical care.

9.12.4.5 Valley Fever

The soils in the area of California in which former MCAS El Toro is located are known to contain various species of dimorphic fungi, most notably *Coccidioides immitis*, which can cause respiratory infection (i.e., coccidioidomycosis/Valley fever) in susceptible individuals. These infections arise when fungal spores residing in the soil are suspended in the air, such as during dust storms, and are inhaled. The spores deposit in the lungs and may mature into active mycelium after a period of 1 to 4 weeks. The resulting primary infection can be asymptomatic or illicit influenza-like symptoms. In certain cases, the infection can progress and disseminate throughout the body. If left untreated, such severe cases can be fatal. There is no immunization available for this infectious agent and an exact infectious dose is not known.
Limiting dust exposures, though, is a reasonable precaution to take particularly with individuals who have compromised immune systems. Dust suppression measures will be utilized during the duration of the project. These measures include using an on-site water truck to control the volume of airborne dust, using a screen plant sprinkler system, and covering soil stockpiles. For those site activities where significant dust exposures are likely, such as working on site during a severe dust storm, the workers will be required to wear disposable dust masks with a National Institute for Occupational Safety and Health N95 rating or better. They will also be required to wash their hands and face before leaving the site and to launder their work clothing each day.

9.12.4.6 Bloodborne Pathogens

Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts, or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. However, under the principle of universal precautions, all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens. Two primary bloodborne pathogens include Hepatitis B and HIV/AIDS.

Potential bloodborne pathogen exposures include:

- Contact with contaminated medical equipment, medical waste, or Sharps containers
- Medical emergency response operations, such as administering first aid or CPR

To reduce the risk of contracting a bloodborne pathogen, take the following precautions:

- Avoid contact with blood and other bodily fluids.
- Use protective equipment when giving first aid/CPR, such as disposable gloves and breathing barriers.
- Thoroughly wash your hands with soap and water immediately after giving care.

When cleaning up blood or other bodily fluids:

- Clean up the spill immediately or soon as possible after the spill occurs.
- Use disposable gloves and other PPE when cleaning spills.
- Wipe up the spill with paper towels or other absorbent materials.
- After the area has been wiped up, flood the area with a solution of one quarter cup of liquid chlorine bleach to 1 gallon of fresh water and allow it to stand for at least 20 minutes.
- Dispose of the contaminated material used to clean up the spill in a labeled biohazard container.
The UXOSO should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job. Site personnel will be given bloodborne pathogens training.

9.12.4.7 Poisonous Plants

Poison ivy or oak may be present in the El Toro TCRA work area. The SSHO will evaluate work areas prior to conducting vegetation removal tasks, and will review TtEC’s corporate procedure HSG2-08, Poison Ivy, Oak, and Sumac Contamination Control, with vegetation removal personnel prior to starting the vegetation removal task. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison ivy has white berries and both poison ivy and poison oak have red or yellow foliage in the fall of the year.

Contact with poisonous ivy or oak may lead to a skin rash in susceptible individuals. A rash results from a toxin found in the sap; it is extruded from the leaves and contained in the stems and roots. The rash is characterized by reddened, itchy, blistering skin requiring first aid treatment. In the event of contact with one of these plants, immediately wash skin thoroughly with Dawn soap and cool water, Technu or Zanfel, taking care not to touch the face or other body parts.

Avoidance of plant/sap contact is the only effective means of preventing poisoning. A person experiencing symptoms of poisoning should remove contaminated clothing, and wash the exposed areas thoroughly with Dawn soap and cool water, taking care not to touch face or other body parts. Technu or Zanfel can be used to wash the affected area, and calamine or other poison ivy lotion can be used if the rash is mild. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity. Employees will be trained in the identification of these species and will be advised to wear protective clothing such as gloves and long-sleeved shirts when working conditions permit. Employees should also consider applying barrier lotions (e.g., Ivy Block) to skin that has the potential to contact these species. Alcohol wipes, Dawn liquid soap, or Technu can be used to decontaminate skin, and clothing should be changed after contact to prevent exposure to poison ivy. Gloves should be worn when removing and decontaminating clothing potentially exposed to poison ivy.

9.13 HAZARD COMMUNICATION PROGRAM

Specific hazardous materials or chemicals that will be brought onto the project site are anticipated to consist primarily of gasoline, diesel fuel for use in fueling and operation of equipment, and elastomeric compounds. When any material or chemical is brought onto the site, a SDS must be provided to the UXOSO, and those who use the material must become familiarized with the hazards, and the precautions to take.
A preliminary Hazardous Materials Inventory is included in Appendix G. An SDS will be added, and the inventory will be updated when specific product information is available from the actual material used and manufacturer/supplier data. This inventory, and the associated SDSs, will be updated whenever additional hazardous materials are introduced to the site. This includes all hazardous materials brought on site by subcontractors for their operations.

The UXOSO will file the SDSs in a notebook that will be available in the field office. The UXOSO will review the SDSs with the workers, and this training will be documented on the daily safety meeting form. All workers will have general HAZCOM training that explains how the program is managed at the site and that specifically requires them to notify the UXOSO when any new material is brought onto the site. All containers will be labeled and will specify the content and hazards of the material in the container.

9.14 PROCESS SAFETY MANAGEMENT PROGRAM

Not applicable.

9.15 LEAD COMPLIANCE PLAN

Not applicable.

9.16 ASBESTOS ABATEMENT PLAN

Not applicable.

9.17 RADIATION SAFETY PROGRAM

Not applicable.

9.18 ABRASIVE BLASTING PROCEDURES

Not applicable.

9.19 HEAT STRESS MONITORING PLAN

A potential exists for heat stress-related injuries to occur during the performance of work at IRP Site 1 from exposure to ambient temperatures, effects of radiant loading, level of work activity, and level of PPE worn during work tasks, and other factors that can add significant heat stress to otherwise routine tasks. TtEC Procedure EHS 4-06, Temperature Extremes, will be followed during work activities.
Heat stress-related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. These problems are described in greater detail below.

- Heat rash occurs because sweat is not evaporating, causing irritation and vesicular inflammation. Standing erect and immobile in the heat allows blood to pool in the lower extremities. As a result, blood does not return to the heart to be pumped back to the brain and fainting may occur.
- Heat cramps are painful spasms of the muscles due to excessive water and salt loss from profuse sweating.
- Similarly, heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. Heat exhaustion is characterized by clammy and moist skin, nausea, dizziness, headaches, and low blood pressure.
- Heat stroke is characterized by dry skin due to lack of sweating, dry mouth, mental confusion, and convulsions.

A person exhibiting signs of heat stress should be removed from the work area and moved to a shaded/cool area immediately. The injured person should be soaked with water and fanned to promote evaporation. Medical attention must be obtained immediately. **EARLY RECOGNITION AND PROMPT TREATMENT OF HEAT STRESS SYMPTOMS, INCLUDING HEAT STROKE, ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.** Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illnesses. To avoid heat stress, the following steps, as necessary, will be implemented:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Encourage workers to use sunscreen with a sun protection factor of 30 or greater when a potential for sunburn exists, and encourage the use of hats, long-sleeved shirts, sunglasses (tinted safety glasses), and other protective attire.
- Perform work during cooler hours of the day, if possible, or at night if adequate lighting can be provided.
- Acclimate workers to heat using a regimen of increasing exposure on each day of work.
- Perform physiological monitoring as follows:
  - If a worker is required to wear semi-impermeable or impermeable clothing, then physiological monitoring shall include:
a. Heart rate monitoring with a standard of a sustained heart rate in excess of 180 beats per minute (bpm) minus the age of the worker in years, recovery heart rate at one minute after a peak work effort is greater than 120 bpm, or

b. Core body temperature monitoring with a standard of greater than 100.4 degrees Fahrenheit (°F) (38.0 degrees Celsius [°C]) for unacclimatized workers, and 101.3°F (38.5°C) for acclimated workers.

c. Workers exceeding the above standards are required to have work/rest regimens and fluid replacement schedules.

- If a worker is wearing permeable clothing:
  a. Environmental monitoring or physiological monitoring shall be conducted and work/rest regimens established.
  b. Monitoring shall be conducted when the temperature exceeds 75°F (24°C) and 55% humidity.
  c. Figure 6-1 in EM 385-1-1 – the approximate wet bulb globe temperature (WBGT) chart – should be used to approximate the WBGT.
  d. If Figure 6-1 is used, direct radiant sun exposure, air velocity, temperature, humidity, and adjustment factors for various work clothing should be taken into consideration.

- Provide shelter (air conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Use a buddy system so workers can help monitor each other and alert other workers to changes and symptoms of heat stress.
- Maintain worker’s body fluids at normal levels. This is necessary to ensure the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, e.g., 8 fluid ounces (0.23 liter) of water must be ingested for approximately every 8 ounces (0.23 kilogram) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat.
- Provide potable drinking water to employees.
- When heavy sweating occurs, encourage the worker to drink more. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
The following strategies may be useful:

- Maintain water temperature at 50 to 60 °F (10 to 16.6 °C).
- Provide small disposable cups that hold about 4 ounces (0.1 liter).
- Have workers drink 16 ounces (0.5 liter) of fluid, preferably water or dilute drinks, before beginning work.
- Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
- Train workers to recognize the symptoms of heat-related illnesses.
- Rotate personnel and alternate job functions.
- Provide cooling vests as necessary when impermeable clothing is worn.
- Avoid intake of alcoholic and caffeinated beverages.
- Work in early morning hours

Early symptoms of heat stress related problems may include:

- Decline in task performance
- Lack of coordination
- Decline in alertness
- Unsteady walk
- Excessive fatigue
- Muscle cramps
- Dizziness

In summary, proper training and preventive measures will aid in averting loss of worker productivity and serious illness from heat stress. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illnesses. To avoid heat stress, maintain worker’s body fluids and electrolytes at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. If a worker experiences heat stress, medical attention will be sought. Workers who have more than one heat-related episode within a month will require a doctor’s written release prior to returning to a potential heat stress environment.

**9.20 COLD STRESS MONITORING PLAN**

Not applicable.
9.21 INDOOR AIR QUALITY MANAGEMENT

The designated smoking area will be at least 25 feet from any building entrance, and local ordinances will be reviewed to determine if more stringent requirements apply. Use of tobacco (cigarettes and cigars or pipes) and smokeless (vapor) devices are prohibited in TtEC and DoD vehicles and work buildings.

9.22 MOLD REMEDIATION PLAN

Not applicable.

9.23 CHROMIUM (VI) EXPOSURE EVALUATION

Not applicable.

9.24 CRYSTALLINE SILICA EVALUATION

Not applicable.

9.25 LIGHTING PLAN FOR NIGHT OPERATIONS

Not applicable.

9.26 TRAFFIC CONTROL PLAN

Not applicable.

9.27 FIRE PREVENTION PLAN

Fire prevention and protection measures require pre-planning. Fire extinguisher types, capacities, and locations are shown in Table 9-1. The UXOSO will inspect fire extinguishers monthly, and servicing will be performed by a qualified service provider on an annual basis.

At Site 1, wildfire danger can be considered high and fire prevention measures are essential to minimizing the potential for starting a fire due to TtEC operations which could spread to vegetation and become a wildfire.

The UXOSO and SUXOS will monitor the National Weather Service for any issued Red Flag Warnings in the area on a daily basis and local broadcasts for any additional considerations or warnings related to fire danger. The California Fire Weather website for Red Flag Warnings and Fire Weather Watch conditions operated by the National Oceanic and Atmospheric Administration can be found at http://www.wrh.noaa.gov/firewx/cafw/index.php. Information about the current wildfires burning in California can be obtained from Cal Fire at http://www.fire.ca.gov/ or National Fire News at http://www.nifc.gov/fireInfo/nfn.htm.
Employees will use safe work practices, including proper storage of flammable and combustible liquids, control of ignition sources, including sparks, and follow the rules described below:

- Smoking is permitted only in a specifically designated area approved by the SUXOS and UXOSO that is free of combustible materials, including vegetation. All cigarettes must be extinguished by placement into a receptacle that contains water when the person is done smoking.
- Refueling will be performed only in a designated area that is free of dry surface vegetation. The area must have spill control materials available nearby and a 60-B:C fire extinguisher present.
- Equipment must be refueled with the equipment turned off (except under special circumstances as required by an operator’s manual). Allow the equipment to cool down prior to refueling.
- TtEC will not park vehicles or drive over dry vegetation or grass. If trailers are used, TtEC will ensure that trailer chains do not drag on the ground where they could spark on the ground surface (e.g., concrete, rocks, etc.).
- Grass or vegetation will not be trimmed (if required) using gasoline powered equipment on a red flag warning day and these activities will not be performed during hours when it is hot and/or windy and the work will be done before 10 AM.
- When portable gasoline powered equipment is used onsite, it will be equipped with a spark arrester.
- Gasoline powered equipment and vehicles will be properly maintained. The exhaust system, spark arresters will be maintained in proper working order and free of carbon buildup and the engine will be free of oil and dust. TtEC will use the recommended grade of fuel.
- No refueling operations will be performed unattended.
- Latching on fueling hoses is prohibited. Smoking is prohibited in any area where refueling is performed.
- Compressed gas cylinders, if present, will be secured only in an upright position. Flammable gas cylinders will be stored separately from oxygen gas cylinders. Flammable cylinder storage areas will be posted as “FLAMMABLE, NO SMOKING.”
- All sources of ignition shall be prohibited within 50 feet of operations where a potential fire hazard is present, including refueling areas. The area shall be conspicuously and legibly posted “NO SMOKING, MATCHES, or OPEN FLAME.”
- Flammable liquids will be stored in an approved storage cabinet in UL-listed metal containers or National Fire Protection Association-rated fuel tank, hoses, and nozzles that are in good condition and not leaking.
• Fuel tanks will have a means of preventing overfilling (visual or other indicator of fuel level). Fuel tanks will not be overfilled to allow for expansion.

• Non-sparking and explosion-proof equipment and tools will be used whenever the potential for ignition of flammable or explosive gases, vapors, or liquids exists.

• Good housekeeping will be maintained such that debris and materials do not accumulate in work areas and pose a fire hazard.

• Self-closing, UL-labeled or metal containers will be used to collect waste that is saturated with flammable or combustible liquids (e.g., oily rags).

All handling of MEC/MPPEH, including treatment of MEC/MPPEH using donor explosives, and screening of soil in the screening plant will be performed in accordance with the standard operating procedures and safe work practices outlined in the Work Plan, TtEC UXO corporate procedures, and the ESS. During this work, TtEC will carefully evaluate the potential for severe weather including lightning (including dry lightning), wind (speed and direction), and consider any Red Flag Warnings related to conducting operations where explosives are used or fuel powered equipment is being used. Areas where explosive operations are conducted and where the screening plant is placed will be free of dead or dry surface vegetation. In addition, the area around the perimeter where explosive operations will be conducted will be sufficiently wetted using a water truck or water buffalo immediately prior to the detonation. The water buffalo or water truck will be positioned in the SZ as a supplement to the staged fire extinguishers in the event the detonation causes any incipient stage fires or smoldering material.

Prior to starting any MEC/MPPEH treatment operations, TtEC will review the AHA and the team will conduct an on-site safety meeting to include a discussion of predicted weather patterns, escape routes, and safety zones with potential wildland fire hazards in mind. TtEC will also notify local fire response agencies and ensure they are advised about the explosive operations that will be conducted and the location of the operations. If a Red Flag Warning is in effect, TtEC will carefully evaluate whether the treatment operations can be safely conducted relative to the weather conditions and wildland fire potential and will suspend operations as appropriate until the danger has decreased.

Hot work may be required (for instance, if grinding, cutting, or welding is performed); no hot work will be permitted until it is determined that the area is gas free and that there are no flammable or combustible materials stored within 50 feet of the work area. In addition, no hot work will be conducted if a Red Flag Warning is in effect. The TtEC Hot Work Procedure, EHS 6-05, and the associated required permit system will be implemented if any work is considered to be hot work, including dedicated fire watch.
9.28 WILD LAND FIRE MANAGEMENT PLAN

Not applicable. Fire prevention, including measures TtEC will take to minimize the potential for wildland fires due to TtEC operations, is addressed in Section 9.27.

9.29 ARC FLASH HAZARD ANALYSIS

Not applicable.

9.30 ASSURED EQUIPMENT GROUNDING CONTROL PROGRAM

This program is only required if electrical equipment is used that is not connected to a fully grounded permanent building electrical system. When required, the assured equipment grounding control program (AEGCP) shall consist of written procedures for equipment inspections, tests, test schedules, and results. Following these procedures will ensure that the equipment grounding conductor for all cord sets or receptacles that are not connected to a part of the permanent wiring of the building or structure, and equipment connected by cord and plug, are installed and maintained to protect employees on construction sites. The AEGCP must be in compliance with OSHA, the National Electrical Safety Code, and National Electrical Code (NEC) requirements. TtEC EHS 3-10 “Electrical Safety – Assured Equipment Grounding” will be implemented to satisfy these requirements.

9.31 HAZARDOUS ENERGY CONTROL PROGRAM AND PROCEDURES

TtEC Procedure EHS 6-04, Lockout/Tagout, establishes the Control of Hazardous Energy Program. This program applies to all TtEC operations, except as follows:

- Work on cord- and plug-connected electrical equipment where the plug is under the control of the employee performing the work
- Hot tap operations
- Work involving minor changes and adjustments to equipment during routine operations (such as small tooling adjustments)

Details on the methods used to control hazardous energy for a defined task or specific piece of equipment (e.g., trommel repair or maintenance) must be documented in the AHA for that task. The UXOSO will ensure appropriate lockout/tagout procedures are evaluated and included within an AHA if hazardous energy sources are present and maintenance or servicing is required where workers could be exposed to hazardous energy. The specific procedures required will be based on the manufacturer’s instructions. A copy of the equipment user’s manual will be available on site and referenced for this evaluation. The approved AHA will be reviewed with workers prior to performing the task so that workers understand the need for lockout/tagout as it relates to the use of this equipment and how it is to be implemented. Energy may be present in the form of electrical,
pneumatic, hydraulic, and kinetic forms and the specific lockout/tagout means and methods must be suitable to the hazard presented by the equipment and the activities that will be performed.

When subcontractors are on site, TtEC and the subcontractor must fully coordinate all hazardous energy control activities throughout the planning and implementation of work, including the AHA process. If TtEC and any subcontractors work will be at a government-controlled or government-operated facility, TtEC and the subcontractor will coordinate acceptance of any hazardous energy control activities with the client, including submittal of the AHA for approval.

9.32 STANDARD PRE-LIFT PLAN – LOAD-HANDLING EQUIPMENT

Not applicable.

9.33 CRITICAL LIFT PLAN – LOAD-HANDLING EQUIPMENT

Not applicable.

9.34 NAVAL ARCHITECTURAL ANALYSIS – LOAD-HANDLING EQUIPMENT (FLOATING)

Not applicable.

9.35 FLOATING PLANT INSPECTION AND CERTIFICATION

Not applicable.

9.36 SEVERE WEATHER PLAN FOR MARINE ACTIVITIES

Not applicable.

9.37 EMERGENCY PLAN FOR MARINE ACTIVITIES

Not applicable.

9.38 MAN OVERBOARD/ABANDON SHIP PROCEDURES

Not applicable.

9.39 FLOAT PLAN FOR LAUNCHES, MOTORBOATS, AND SKIFFS

Not applicable.
9.40 FALL PROTECTION AND PREVENTION PLAN

Workers will not climb onto the top of a work trailer or any other platform or slope edge that does not have proper guard rails and exposes them to a potential fall of 6 feet or more without adequate fall protection. The UXOSO will evaluate whether any fall hazards are present at the site and ensure appropriate guards are in place to prevent worker exposure to falls during work tasks.

If workers could be exposed to fall hazards of 6 feet or greater, either a standard guardrail system (as per Section 21 of EM 385 1-1) will be put into place where workers could be exposed to a fall, or workers will wear appropriate fall protection. If fall protection is required for any work task (currently not anticipated to be required), the fall protection CP (to be listed in AHA should the need arise) will develop, submit, and implement on site a site-specific Fall Protection and Prevention Plan in accordance with Section 21.D of EM 385 1-1, which will be added to this APP by field change request. This plan shall include, in detail, the specific practices, equipment, and methods used to protect workers from falling to lower levels. The plan will be updated as conditions change and at least every 6 months. Fall protection requirements and CP designation will also be incorporated into the task AHA.

9.41 DEMOLITION/RENOVATION PLAN (TO INCLUDE ENGINEERING SURVEY)

Not applicable.

9.42 ROPE ACCESS WORK PLAN

Not applicable.

9.43 EXCAVATION/TRENCHING PLAN

A limited excavation to a depth of 10 feet bg is planned for the removal of naphthalene-impacted soil, however, trenching is not anticipated at this time. Because excavations are greater than 5 feet in depth, both a formal excavation plan and AHA are required. It is not anticipated that any workers will need to enter the excavation to perform the removal and/or sampling of soil following removal. The need for shoring of the excavation has not been identified.

To ensure utilities are not impacted by excavation, utility locates will be performed in advance of intrusive work. Excavation/dig permits will be obtained from the Base (as applicable) prior to initiating intrusive activities, including excavation. Private utility locating will be provided by a subcontracted utility locator. Dig Safe 811 public utility locating requests will be made by TtEC.

Excavations and trenching will be performed using a medium- or large-sized excavator. All excavation work will be conducted in accordance with OSHA excavation regulations, as described in 29 CFR 1926.651, Section 25 of EM 385-1-1, and TtEC corporate procedure EHS 6-03, Excavation and Trenching.
Excavation safety will be addressed in task-specific AHAs and as outlined below.

- Overhead power lines or other overhead hazards that the excavator bucket or boom could contact or come within 15 feet of (or a greater distance for higher voltages), will be disconnected through contact with the utility provider. The UXOSO will verify power disconnects. Trucks and bins transporting soil must also consider proximity to overhead utility lines so that truck bed and boom of loader/excavator does not get within minimum distances.

- Air lances/knives, shovels, or other non-intrusive methods may be used to dig an excavation to ensure underlying utilities are not damaged if such utilities are present. Utility lines that traverse an excavation will be shielded and/or supported, as necessary.

- Inspections will be performed by the CP daily on all excavations and adjacent areas. The checklist provided in corporate procedure EHS 6-03 or equivalent will be used to document inspections.

- The excavation will be barricaded or backfilled for worker protection as well as public protection when unattended (e.g., chain-link fence surrounding excavation) as required in EM 385-1-1, Section 25.

- Spoil piles will be placed a minimum of 2 feet (3 feet whenever possible) away from the excavation sidewalls.

- Berms and spotters will be provided at excavation perimeters to prevent trucks from backing too close to the excavation edge (generally 3 feet away from edge) when trucks are loaded with soil or when dumping clean fill for use in backfilling.

- If workers come within 6 feet of a vertical excavation sidewall or edge that is 6 feet deep or more, barricades (fence, standard barricade system, etc.) will be provided 6 feet from the excavation edge.

- If the excavation exceeds 5 feet in depth, and personnel will be required to enter an excavation that cannot be safely sloped, this plan will be updated to include any shoring or benching requirements designed by a QP, as well as a means of access and egress and a rescue plan.

9.43.1 Identification, Duties, and Training of the Competent Person

The CP for excavation will be designated as such by the PM in the AHAs prepared for excavation. The person assigned as CP will have the ability to recognize hazards associated with conducting excavations, and will be fully authorized to take immediate corrective actions to ensure the safety of personnel and property.

CPs will have an adequate combination of experience and training to classify soil types and select protective systems, including safe sloping and benching for soil types, as outlined in 29 CFR
1926.652. Training and experience pertaining to qualification as a CP will be documented and will include the following:

- General safety practices related to working in or near open excavations
- Inspection requirements and techniques
- Classification of soils in accordance with 29 CFR 1926.652
- Uses, limitations, and specifications of protective systems in accordance with 29 CFR 1926.652

Duties of the CP will include the following:

- Provide site personnel with training on site-specific excavation requirements as outlined in this plan, the AHA, and the excavation design documents.
- Be present on site daily. The CP will complete the checklists and reports as required in EHS Procedure 6-3.
- Ensure that, in addition to the initial utility locate on the site maps, a physical locate survey is performed and the site is marked out in accordance with Procedure EHS 3-15, Underground Utilities.
- Repeat inspections after each rain event, and often enough to detect conditions that may increase the hazards

9.44 FIRE PREVENTION AND PROTECTION PLAN FOR UNDERGROUND CONSTRUCTION

Not applicable.

9.45 COMPRESSED AIR WORK PLAN FOR UNDERGROUND CONSTRUCTION

Not applicable.

9.46 ERECTION AND REMOVAL PLAN FOR FORMWORK AND SHORING

Not applicable.

9.47 PRECAST CONCRETE PLAN

Not applicable.

9.48 LIFT-SLAB PLANS

Not applicable.
9.49 MASONRY BRACING PLAN
Not applicable.

9.50 STEEL ERECTION PLAN
Not applicable.

9.51 EXPLOSIVES SAFETY SITE PLAN
The Work Plan contains MEC-/MPPEH-related procedures and precautions, including standard operating procedures (SOPs) for handling and disposal of MEC/MPPEH. In addition, an ESS has been prepared separately from the Work Plan and will be followed for all MEC-related work.

9.52 BLASTING PLAN
The Work Plan contains MEC-/MPPEH-related procedures and precautions, including SOPs for treatment and disposal of MEC/MPPEH using donor explosives. In addition, an ESS has been prepared separately from the Work Plan and will be followed for all MEC related work.

9.53 DIVE OPERATIONS PLAN
Not applicable.

9.54 SAFE PRACTICES MANUAL FOR DIVING ACTIVITIES
Not applicable.

9.55 EMERGENCY MANAGEMENT PLAN FOR DIVING
Not applicable.

9.56 TREE FELLING AND MAINTENANCE PROGRAM
Not applicable.

9.57 AIRCRAFT/AIRFIELD CONSTRUCTION SAFETY AND PHASING PLAN
Not applicable.

9.58 AIRCRAFT/AIRFIELD SAFETY PLAN COMPLIANCE DOCUMENT
Not applicable.
9.59 SITE SAFETY AND HEALTH PLAN FOR HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

An SSHP is included as Attachment 1 to this APP. Many elements identified in EM 385-1-1 for working with hazardous, toxic, and radioactive waste are already included in this APP. In such cases, the SSHP refers the reader to the appropriate section of the APP where the information is contained so that information is not duplicated.

9.60 CONFINED SPACE ENTRY PROCEDURES

Not applicable. At the present time, no confined space entry is authorized by this plan.

9.61 CONFINED SPACE PROGRAM

Not applicable. The SSHO will evaluate the site for any potential confined spaces and ensure they are appropriately marked with warning signs and that personnel are informed/trained to recognize these locations and know that entry into these spaces is prohibited unless the requirements of the TtEC Confined Space Program and the confined space entry procedures are fully developed and implemented for confined space entry, and are approved by the SHM.

9.62 OTHER HAZARDS AND CLASSIC SAFETY REQUIREMENTS AND PRECAUTIONS

Physical hazards not otherwise specifically addressed in the above sections are covered in the following sections.

9.62.1 Motor Vehicles and Heavy Equipment

The project will require the use of heavy equipment, including excavator, dump truck, and screen plant. In addition, support trucks or other trucks may be used to haul rolloff bins, or deliver equipment and supplies to the site. This equipment poses unique and immediate hazards that, if uncontrolled, can result in severe injury or fatality. Injuries can result from malfunctioning equipment, improper operation of equipment, or personnel placing themselves in operator “blind spots,” between pieces of equipment, or between equipment and immovable objects.

Personnel will receive initial and regular reminders that it is their responsibility to remain out of the operating areas of any moving heavy equipment to avoid being injured. In addition, the following precautions will be taken to help prevent injuries and accidents:

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horns, and other safety devices will be checked at the beginning of each work day.
• A piece of paper or cardboard will be employed to check for high-pressure leaks in this area that could result in hydraulic fluids being injected into the skin. Using bare hands for this inspection is prohibited.

• Large equipment will not be operated in reverse unless equipped with a reverse signal alarm, audible above the surrounding noise level, and backup warning lights, or unless the vehicle is reversed only when an observer (spotter) signals that it is safe to do so.

• Motor vehicle cabs will be kept free of all non-essential items, and all loose items, including equipment and/or samples, will be secured.

• The parking brake, for vehicles so equipped, will be set before shutting off and dismounting a vehicle.

• Wearing of seat belts is mandatory at all times when the vehicle is in operation.

• During periods of rain, fog, or other adverse weather conditions, the use of headlights is mandatory.

• All posted traffic signs and directions from flagmen (if used) or spotters will be observed.

• Personnel will be prohibited from placing themselves between operating equipment and immovable objects.

• Personnel will wear Class 2 high-visibility vests to increase visual recognition whenever working within 15 feet of an established traffic pattern/route or working near heavy equipment.

• Efforts will be directed to minimize the number of personnel within an area where equipment is being operated.

Heavy equipment operators have a limited field of vision and may not be aware that someone is near the equipment being operated. Therefore, although heavy equipment is required to be equipped with warning devices such as backup alarms, and the operator is required to operate with caution, it is incumbent on personnel in the area to maintain sufficient distances from the equipment. For example, a sufficient distance is beyond the reach of an excavator turning a full 360 degrees with its bucket and boom fully extended. It is also incumbent on personnel in the area to ensure that they have made eye contact with the operator prior to moving within the reach of the excavator or other mechanical equipment. The operator must cease operations and rest the bucket (or other extension) on the ground before personnel approach. Caution will be exercised at all times. It will be emphasized that personnel should NEVER place themselves between operating heavy equipment and immovable objects due to the potential for crushing injuries and death. Furthermore, it is required that the operator obtain a spotter for all backing operations.

Heavy equipment will be controlled using the following measures:

• Ensuring that only appropriately qualified/experienced personnel are permitted to operate the devices.
• Performing initial and periodic inspections of heavy equipment to provide safe operation; inspections will be documented using the Equipment Inspection Checklist (Appendix D).

• Keeping heavy equipment operations areas clear and otherwise adequate to allow for the safe movement of the equipment without endangering personnel or property.

• Implementing appropriate vehicle maintenance and decontamination operations.

Safe and proper practices will be followed at all times, or vehicle operating privileges will be suspended or revoked at the discretion of the UXOSO. The UXOSO will be responsible for ensuring that these requirements are implemented on site.

TtEC personnel will follow locally established traffic rules and the traffic plan provided in the Work Plan. Coordination with other contractor or client operations personnel will be conducted as required to ensure traffic safety and the delineation of controlled work zones. Personnel operating site vehicles will yield to pedestrians, when present. Personnel working in areas subject to vehicular traffic or operating construction equipment will wear Class 2 high-visibility safety vests. Temporary fences will be used to delineate controlled work zones to keep unauthorized personnel out of the work area and to secure the area during non-work hours (Figure 9-1). Personnel will not direct traffic unless they have received training in compliance with OSHA regulations and EM 385-1-1 Section 04.B.12.

9.62.2 Electrical Hazards

In order to prevent accidents caused by electric shock, the UXOSO will inspect any electrical connections on a daily basis. The UXOSO will shut down and lock out any equipment that is found to have frayed or loose connections until a qualified electrician is contacted and repairs are made. The equipment will be de-energized and tested before any electrical work is done. The equipment will be properly grounded prior to and during work. In addition, ground fault circuit interrupters (GFCIs) will be installed for each circuit between the power source and tool for outdoor use. In the event that generators are used to supply 110-volt power, these generators will contain GFCIs. Larger generators, or equipment not connected to permanent building electrical systems will have GFCIs, or assured grounding to protect workers.

The requirements for electrical safety are described below:

• Electrical wiring and equipment will be listed by a nationally recognized testing laboratory (NRTL). The usual recognized testing laboratories are UL, the Canadian Standards Association, and Factory Mutual.

• Live parts of wiring and equipment will be guarded to protect persons or objects from harm. uninsulated live wires must be placed at various heights and distances from the ground and from buildings, depending on the voltage carried by those lines (consult the SHM if uninsulated live wires are anticipated).
• A qualified electrician will perform the work on electrical power supplies and lines. No live electrical work will be performed unless a permit is obtained from the MCAS Yuma POC as specified in EM 385-1-1 Section 11.A.02(c), and the SHM has approved the procedure. Compliance with Section 11 is required. Live electrical work requires arc flash protection.

• Flexible cords (extension cords) will contain the number of conductors required for service, plus a ground wire. Cords will be rated for hard usage (S, SE, SEO, SO, SOO, ST, STO, STOO). Flexible cords are not allowed to be passed through doors or windows, or to be placed on the ground where they would be subjected to being run over by vehicles. If flexible cords must be passed through walls, the cords will be protected by bushings or fittings.

• Flexible cords must be inspected on each day of use. No splicing or fraying is allowed.

• Flexible cords will not be secured with staples, hung from nails, or suspended by bare wire (plastic tie straps, commonly used today, are acceptable).

• Extension cords will not be plugged into other extension cords. Extension cords will not be plugged into power strips.

• Portable lamps must have bulbs protected by a substantial guard and attached to the lamp holder handle.

• The circuit breaker panels and electrical transformers and supply equipment must be labeled as to the voltage contained therein.

• The circuit breaker panels must be labeled as to what each breaker controls.

• The breaker panels and electrical panels must have a cover protecting any live exposed wires.

• A clearance of at least a 36 inches must be maintained on three sides of the circuit breaker boxes, transformers, and electrical supply equipment so as to provide ready access to the equipment in the event of an emergency.

• Circuit breaker boxes that are locked, or kept in locked rooms, must have a key readily available in the event of an emergency.

9.62.3 Portable Generators

Portable generators, if used, must meet the requirements for grounding as specified in National Fire Protection Association 70 of the NEC. NEC 250-6 includes certain exemptions for the grounding of portable and vehicle-mounted generators. Refer to EM 385-1-1, Section 11, for additional details. Portable generators will be operated in open air only, where there is sufficient ventilation to prevent accumulation of exhaust gases, including carbon monoxide.
### 9.62.4 Overhead Electrical Hazards

Overhead power lines (if present) may present a hazard to equipment and personnel if inadvertent contact is made. To prevent equipment contact with power lines and to prevent arcing, adequate clearance must be maintained. TTEC requires a minimum clearance of 15 feet. If adequate clearance cannot be maintained, electrical disconnects may be required to secure against a contact hazard. The voltage of overhead lines must be ascertained in order to determine if more than 15 feet clearance is required. The SUXOS or UXOSO will evaluate the work site to determine if there are any overhead power lines present in any location where activities are being conducted, including in laydown areas and travel routes, and, if present, will take actions to ensure clearance is maintained.

### 9.62.5 Underground Utilities

A high-loss-potential hazard includes ground-disturbing activities with the associated potential for contact with underground utilities. When conducting intrusive activities, such as excavation, the opportunity to encounter fire, explosion, or electrocution hazards exists from inadvertent contact with underground utilities. Therefore, the locations of underground utilities will be verified prior to performing any intrusive activities and precautions will include: white lining the area; having utilities identified using a private locating service, National One Call (811); and performing a geophysical survey to clear utilities in the area of the intrusive operations.

### 9.62.6 Slips, Trips, and Falls

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

- Uneven terrain due to debris or depressions
- Workplace clutter
- Wet or slippery surfaces
- Open excavations

Hazards of this nature and the potential consequences of injury from a slip, trip, or fall are more likely when personnel are maneuvering and carrying equipment on these work sites or are busy with tasks and not paying attention to surroundings.

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
- Applying traction grit such as sand over slippery surfaces
- Maintaining good housekeeping practices
- Using barricades or other appropriate warnings to demarcate hazard areas
- Selecting and using proper portable ladders (as required)
- Selecting and using proper fall protection equipment (as required)

The UXOSO 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 M – Fall Protection; Subpart P – Excavations, and Subpart X – Stairways and Ladders. Requisite strength, heights and widths, and fall protection will be evaluated as required for the work tasks. Also refer to EM 385-1-1 for additional instruction regarding avoiding slips, trips, and falls.

9.62.7 Head Injuries

At a minimum, workers will don hard hats if a potential overhead hazard is present, or when working around heavy equipment. This will prevent minor injuries caused by bumping one’s head while working at the project site.

9.62.8 Falling Objects

No personnel will work under equipment or suspended loads at any time. Also, the supervisor will verify that a sufficiently wide area is clear of personnel while the equipment is in operation.

9.62.9 Heavy or Awkward Lifting

Hazards associated with heavy or awkward lifting are more frequent 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 (TtEC prohibits lifting more than 50 pounds without assistance).
- Use proper lifting techniques.
- Plan your lifts: place heavy items on shelves between the waist and chest and lighter items on higher shelves. Also, 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; 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 not confident that you can complete the lift without hurting yourself, either use a lifting aid (such as a dolly or mechanical hoist), or request assistance 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 slightly and avoid turning and twisting at the waist 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.

• Include sufficient breaks to guard against fatigue and injury during periods of high-frequency lifts or extended-duration lifts.

Another important activity is to assess the area available to maneuver the lift. Rearrange the area, remove clutter, and minimize the necessity of twisting and turning.

The activities described below should be employed when evaluating the area in which the lifting will occur and the effort required to complete the lifting task:

• Evaluate the area of the lift
  - Investigate 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.

• Take into account your overall physical condition
  - Report previous injuries on your Medical Data Sheet (Appendix F) or inform supervisor of limitations.
  - 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.

9.62.10 Portable Power Hand Tools

Any portable power tools (e.g., saws, drills, pressure washers) used in the work area must have appropriate guarding, interlocks, or controls to ensure safe operation. Machinery and equipment must be inspected for defects in the guarding, electrical safety, and operation before each use. The following specific precautions regarding power hand tools will be used to help prevent injuries and accidents:

• Never remove, make inoperative, or reduce the effectiveness of any equipment or machine guard.
• Never override any safety interlock or attempt to operate any piece of equipment or machinery without guards or other required safety devices in place and fully functional.

• Never operate any piece of equipment or machinery when it is functioning improperly or at any time when operation would constitute a hazard. Malfunctioning equipment must be repaired immediately or removed from the premises.

• Do not use electrically powered tools near flammable materials or within an explosive atmosphere, unless they are of the explosion-proof type meeting the NEC requirements for explosive areas. Employees operating the equipment should be aware of sparks and/or metal fragments when using this equipment.

• Never operate electrical power equipment without proper grounding. All electrical cords and cables, including extension cords, must include a third-wire ground.

• Ensure that all electrical power tools are listed by an NRTL and marked to indicate that they have double insulation if they are not internally grounded.

• Do not use electrical tools in wet or damp areas.

• Use tools only for their intended purpose (e.g., do not use a wrench to hammer an object). Defective tools (e.g., with mushroomed heads or split or defective handles) are to be taken out of service until they can be repaired or replaced.

• Do not use conductive (i.e., metal) tools around energized electrical sources; test the insulation provided.

• Select the correct size and type of wrench for each job. Do not extend wrench handles with a pipe or “cheater” bar.

• Repair mushroomed punch, drift, and chisel heads or take the tool out of service and replace it. Metal particles may break off and fly into the face or eyes of nearby workers when mushroomed heads are struck.

• Wear eye protection at all times when using hand tools (powered or manual).

• Inspect all hand tools and power tools prior to use. TtEC employs inspection checklists and colored stickers and/or tape, as previously described, to indicate that equipment has been inspected and is ready for use.
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10.0  RISK MANAGEMENT PROCESSES

Risk management is a process that includes the identification, assessment, and prioritization of risks, followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events to an acceptable level. TtEC utilizes the AHA as the risk management tool for this process. Seed AHAs for the each DFW, task, or activity known at this point in time are provided in Appendix A. Additional AHAs may or may not be required during the course of the fieldwork.

The AHA defines the work sequence, anticipated hazards, conditions, equipment, materials, personnel and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. Before beginning each work activity/DFW, TtEC will review/update the initial seed AHA, which includes a RAC for that activity. Work will not begin on the activity until the initial AHA that addresses the activity-specific hazards has been accepted by the RPM and NAVFAC SW Safety Officer.

AHAs are living documents and are intended to be updated (by the workers, with SUXOS and UXOSO assistance) as needed. The AHAs will be reviewed and modified as necessary to address changing site conditions, operations, or change of CPs or QPs. If the initial RAC increases due to a change made to the AHA by the workers, the AHA shall be resubmitted to the RPM and NAVFAC SW Safety Officer for acceptance prior to work proceeding. Changes to or updates of an AHA that do not increase the RAC are not required to be resubmitted for acceptance by the RPM and NAVFAC SW Safety Officer.
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11.0 REFERENCES


———. 2008b. 6055.09-STD, Ammunition and Explosives Safety Standards.


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TABLES
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### TABLE 3-1

**COMPARISON OF TTEC AND 2014 BLS DATA FOR NAICS CODE 562910 (TRIR AND DA/RT RATES)**

<table>
<thead>
<tr>
<th>NAICS 562910 Remediation Services</th>
<th>TTEC 2013</th>
<th>TTEC 2014</th>
<th>TTEC 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIR</td>
<td>1.8</td>
<td>0.59</td>
<td>0.91</td>
</tr>
<tr>
<td>DA/RT</td>
<td>1.0</td>
<td>0.59</td>
<td>0.30</td>
</tr>
</tbody>
</table>

**Notes:**
- 673,413 hours in 2015
- Additional BLS comparison information
- 0.5 DA BLS 2014
- 0.5 RT BLS 2014

**Abbreviations and Acronyms:**
- DA – Days Away
- NAICS – North American Industry Classification System
- RT – Restricted Duty/Transfer Rate
- TTEC – Tetra Tech EC, Inc.
- TRIR – Total Recordable Incident Rate
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<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial first aid kit with bloodborne pathogens kit</td>
<td>SZ for active work locations</td>
</tr>
<tr>
<td>Fire extinguisher, one 10-A-60:BC</td>
<td>SZ for active work locations</td>
</tr>
<tr>
<td>Fire extinguisher, one 1A-10:BC</td>
<td>Site vehicles and heavy equipment</td>
</tr>
<tr>
<td>Fire extinguisher, one 60:BC</td>
<td>Refueling areas</td>
</tr>
<tr>
<td>Water truck or water buffalo</td>
<td>SZ for MEC/MPPEH treatment operations</td>
</tr>
<tr>
<td>Portable eye wash (15-minute/0 to 4 gallons per minute)</td>
<td>SZ for active work locations</td>
</tr>
<tr>
<td>Air horn (if not equipped with vehicle horn)</td>
<td>SZ for active work locations</td>
</tr>
<tr>
<td>Spill kit (appropriately stocked with sorbent pads, gloves, and bags)</td>
<td>SZ for active work locations and refueling areas</td>
</tr>
<tr>
<td>Cellular telephones (with signal booster if required)</td>
<td>Minimum of SUXOS, UXOSO, each field supervisor (others as required for safety and communication purposes)</td>
</tr>
</tbody>
</table>

**Abbreviations and Acronyms:**
- MCAS – Marine Corps Air Station
- MEC – munitions and explosives of concern
- MPPEH – material potentially presenting an explosive hazard
- SUXOS – Senior Unexploded Ordnance Supervisor
- SZ – Support Zone
- UXOSO – Unexploded Ordnance Safety Officer
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### TABLE 9-2

**EMERGENCY CONTACT LIST**

<table>
<thead>
<tr>
<th>Service</th>
<th>Address</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulance/Fire/Police</td>
<td></td>
<td>911</td>
</tr>
<tr>
<td>Hospital</td>
<td>Hoag Hospital Irvine 16200 Sand Canyon Avenue</td>
<td>911 (949) 764-4624</td>
</tr>
<tr>
<td></td>
<td>Irvine, CA 92618</td>
<td></td>
</tr>
<tr>
<td>Clinic</td>
<td>San Canyon Urgent Care 15755 Laguna Canyon Road #100</td>
<td>(949) 417-0272</td>
</tr>
<tr>
<td></td>
<td>Irvine, CA 92618</td>
<td></td>
</tr>
<tr>
<td>WorkCare</td>
<td></td>
<td>1-800-455-6155</td>
</tr>
<tr>
<td>Case Intervention</td>
<td></td>
<td>1-888-449-7787</td>
</tr>
<tr>
<td>Poison Control</td>
<td></td>
<td>1-800-222-1222</td>
</tr>
<tr>
<td>Navy Remedial Project Manager</td>
<td>Richard Pribyl</td>
<td>(619) 524-5261</td>
</tr>
<tr>
<td>TtEC PM, Ian Roberts</td>
<td></td>
<td>(303) 980-3529 (office)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(303) 243-4583 (cellular)</td>
</tr>
<tr>
<td>TtEC SHM, Roger Margotto, CIH</td>
<td></td>
<td>(619) 471-3503 (office)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(619) 988-0520 (cellular)</td>
</tr>
<tr>
<td>TtEC/ERRG SUXOS, Dave Williams</td>
<td></td>
<td>(928) 261-9184 (cell)</td>
</tr>
<tr>
<td>TtEC UXOSO, Keith Rivera</td>
<td></td>
<td>(480) 217-1672</td>
</tr>
</tbody>
</table>

**Abbreviations and Acronyms:**
- CIH – Certified Industrial Hygienist
- ERRG – Engineering/Remediation Resources Group, Inc.
- MCAS – Marine Corps Air Station
- NAVFAC SW – Naval Facilities Engineering Command Southwest
- PM – Project Manager
- SHM – Safety and Health Manager
- SUXOS – Senior Unexploded Ordnance Supervisor
- TBD – to be determined
- TtEC – Tetra Tech EC, Inc.
- UXOSO – Unexploded Ordnance Safety Officer
FIGURES
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FIGURE 4-1
ORGANIZATIONAL CHART

FORMER MARINE CORPS AIR STATION
EL TORO, CALIFORNIA
Accident Prevention Plan: IRP Site 1
MCAS EL TORO IRP SITE 1
106-45490011
199-JD41844
EL TORO, CALIFORNIA
12/22/2016

Figure 9-1

SITE LAYOUT AND EMERGENCY EVACUATION ROUTE

Legend
- Emergency Assembly Area
- Emergency Evacuation Route
- Approximate location of Naphthalene-Impacted Soil

IRP Site 1:
- IRP Site 1
- EOD Training Range

Adjacent Property:
- Area A
- Area B
- Area C
- Agua Chinon Wash Retarding Basin
- Former MCAS El Toro
- Base Boundary
- EOD Training Range
- Perimeter Fence
- EOD Training Range Boundaries

Scale: 1" = 500 Feet
NAD 1983 StatePlane California VI Feet
FIPS 0406 Feet

1) Imagery from the USDA National Agriculture Imagery Program (NAIP), 1-m resolution, 2014, via the ArcGIS Image Server.

ACRONYMS:
EOD = Explosive Ordnance Disposal
IRP = Installation Restoration Program
MCAS = Marine Corps Air Station

Notes:
1 INCH = 500 FEET (SCALE AT 17" X 11")

Approximate location of Naphthalene-Impacted Soil

1) Image from the USDA National Agriculture Image Program (NAIP) 1 m resolution, 2014, via the ArcGIS Image Server.
Legend

Medical Emergency Route:
- To Hoag Hospital Irvine (Primary destination)
- To Sand Canyon Urgent Care (Alternative destination)
- Emergency Assembly Area
- Emergency Evacuation Route
- Former MCAS El Toro Base Boundary
- IRP Site 1

Medical Facilities:
1) Hoag Hospital Irvine, 16200 Sand Canyon Avenue, Irvine, CA 92618
2) Sand Canyon Urgent Care, 15775 Laguna Canyon Road, #100, Irvine, CA 92618

NOTES:
IRP = Installation Restoration Program
MCAS = Marine Corps Air Station

1 inch = 3,000 feet (scale at 17" x 11")

NAD 1983 STATEPLANE CALIFORNIA VI
FIPS 0406 FEET

106-45490011
12/22/2016
12/22/2016
12/22/2016
12/22/2016
APPENDIX A

PRELIMINARY “SEED” ACTIVITY HAZARD ANALYSES
Activity Hazard Analysis (AHA) #1

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

<table>
<thead>
<tr>
<th>Job/Task: Mobilization/Site Set-up/Demobilization</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: IRP Site 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former MCAS El Toro, California</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract Number: N62473-12-D-2006, CTO 0011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date Prepared: March 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared by (Name/Title): Arthur Gunter, PG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewed by (Name/Title): Roger Margotto, CIH, CSP, CHMM, SHM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes: (Field Notes, Review Comments, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP. TtEC Corporate Safety Programs, and EM 385-1-1 will also be available on site for review of specific materials and mitigation measures. DON PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾-length shirt sleeve), hearing protection (as required), work gloves worn when indicated, Class 2 high-visibility safety vest. Other PPE as specified below. Welding conducted to attach armor to field equipment will be done in accordance with AHA #8 Hotwork. Project UXOSO/SSHO – to be determined First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Risk Assessment Code (RAC) Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent</td>
<td>Likely</td>
</tr>
<tr>
<td>Catastrophic</td>
<td>E</td>
</tr>
<tr>
<td>Critical</td>
<td>E</td>
</tr>
<tr>
<td>Marginal</td>
<td>H</td>
</tr>
<tr>
<td>Negligible</td>
<td>M</td>
</tr>
</tbody>
</table>

### Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).

- “Probability” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.
- “Severity” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.

### RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.
<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set up/demobilize work areas, including exclusion zones</td>
<td>Potential exposure to existing hazards in area.</td>
<td>Set up staging area in location authorized by the base. Make sure that support areas are located outside of exclusion zones.</td>
<td>M</td>
</tr>
<tr>
<td>Note: it is not anticipated that a work trailer will be established; however a Conex may be staged and used as an office and storage location for equipment.</td>
<td>Bringing chemicals to base may result in exposure to workers and to other site personnel.</td>
<td>Identify chemical hazards and complete training regarding the safe handling of chemicals brought onto the site, for example, gasoline and diesel fuel (refer to SDSs). The UXOSO will maintain copies of all SDSs at the site.</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Noise from the site setup activities could cause hearing loss to workers.</td>
<td>Ensure that workers wear hearing protection when sound levels exceed 84 dBA continuously. Usually this will only involve workers working in unenclosed cabs of heavy equipment, or ground workers working near heavy equipment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vehicle operations or unloading tasks could result in injury to personnel or others on site.</td>
<td>Ensure that workers operating company vehicles have a valid state-issued driver’s license. Any CDL trucks and trailers will be operated by CDL-qualified drivers. Operate at safe speeds, and obey local traffic speeds and rules in the APP. Wear seat belt at all times when vehicle is in operation. Use parking brake when parked. Use chocks when parked on inclines. Use dedicated spotter and standard hand signals for backing operations, and follow the Traffic Plan in the Work Plan. Wear Class 2 high-visibility vest when working around vehicles in operation. SUXOS will coordinate with RPM to identify travel and traffic patterns and to delineate work and staging areas.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slip, trip, and fall hazards could be present.</td>
<td>Visually inspect work areas and barricade or eliminate slip, trip, and fall hazards if feasible. Keep work areas neat and orderly. Always place supplies in areas away from normal foot traffic, and equipment and tools in a safe location that does not present a trip hazard to workers. Maintain proper illumination in all work areas. Workers should not stand or walk on equipment or supplies. Load/unload on even terrain only.</td>
<td></td>
</tr>
<tr>
<td>Construction equipment used during mobilization and staging could strike overhead power lines if present.</td>
<td>Observe the travel path, staging, and other locations where mobile equipment with booms will be operated for overhead lines. The UXOSO or SUXOS will establish the clearance distances that are required, and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider. The voltage of overhead lines must be known in order to ascertain if more than 15 feet minimum clearance is required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sharp objects could cause cuts or puncture injuries to workers.</td>
<td>Wear cut-resistant work gloves when handling sharp edges, items with pinch points, materials, etc. Whenever practical, blunt sharp edges. Use cutting tools with retractable blades. Always cut away from the body.</td>
<td></td>
</tr>
</tbody>
</table>
## AHA #1 – Job/Task: Mobilization/Site Set-up/Demobilization

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set up/demobilize work areas, including exclusion zones (continued)</td>
<td>Eye injuries could occur from exposure to dust or debris, from being struck by objects.</td>
<td>Wear safety glasses with side shields at all times when working on site. If something enters the eye, do not rub the eye. Utilize the portable eyewash for flushing of eye to try to remove object. Use the eyewash for the full 15 minutes, regardless of whether you feel that the object has been removed. Notify supervisor if object still irritates or stays in the eye, seek medical attention as soon as possible. A follow-up eye exam is recommended any time an object gets into an eye since it is necessary to ensure that the object does not remain, even if it cannot be felt. To keep dust down, travel at slower speeds on unpaved roads and laydown areas. If required, a water mist will be used to control dust.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fall hazards (falls from heights of 6 feet or greater) could exist while working in elevated areas.</td>
<td>Ensure that workers do not climb upon any equipment, shipping containers, buildings, trailers, etc. where there is exposure to a fall of 6 feet or greater (no proper guarding and rails in place) without a means of fall protection designed by a CP. At the present time, there is no fall protection plan in place to cover this task and there is no identified need for such activity. A site-specific Fall Protection Plan would need to be developed and implemented by a CP prior to undertaking activities involving a fall hazard. The UXOSO must identify site fall hazards and ensure appropriate controls are in place.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers could experience strains from manually moving materials and equipment.</td>
<td>Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting, and getting help when moving bulky/heavy materials and equipment. Encourage the use of lifting equipment and use of a hand truck whenever possible. Employees will not lift more than 50 pounds alone. Encourage a steady, sustainable work pace.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers could be exposed to extreme temperatures and sunburn.</td>
<td>Monitor for heat stress in accordance with EHS 4-06, Temperature Extremes. Provide fluids and rest breaks during warm weather and while wearing impermeable protective clothing. Provide sunscreen lotion with an SPF of 15 or greater.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers could experience eye hazards.</td>
<td>Ensure that safety glasses are worn as the minimum required eye protection for all work areas. Use dust control methods, as necessary. Place a portable emergency eye wash at each work area. Flush objects from eyes; do not rub.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of communication in widely dispersed areas could lead to a delayed response in an emergency.</td>
<td>Ensure that each work team has a telephone, or access to a telephone, for emergency communication. A work team may substitute a 2-way radio for a phone if the other person has a 2-way radio and access to a phone. If more than one team at a time is working, ensure that there is communication between the work teams and project management. Use the buddy system. Coordinate communications with base officials. (Airfield operations usually require control of communication devices in the area.)</td>
<td></td>
</tr>
<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>1.  Set up/demobilize work areas, including exclusion zones</td>
<td>Workers could be struck by, or pinned against, heavy equipment. Workers</td>
<td>Wear Class 2 high-visibility reflective vests when exposed to vehicular traffic. Make eye contact</td>
<td>M</td>
</tr>
<tr>
<td>(continued)</td>
<td>could be struck by nearby traffic.</td>
<td>with operators before approaching equipment. Understand and review posted hand signals. Use traffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>barricades, signs, flags, and backup spotters during field activities.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Handling sharp objects or using hand tools or knives could cause cuts,</td>
<td>Wear leather work gloves when handling materials that may be sharp or have sharp edges, and when</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>punctures, or scrapes.</td>
<td>using hand and power tools. Be familiar with the proper use and limitations of hand tools.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>have a minimum of 2 persons who are first aid- and CPR-trained on site. Never carry a knife in a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>pocket. Ensure knives have retractable blades. When using knives, cut away from the body.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biological hazards, such as insects, ticks, and spiders, could cause</td>
<td>Use DEET insect repellant as necessary. Exercise caution in locations where snakes, spiders, or</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>disease. Venomous snakes or scorpions could bite/sting workers.</td>
<td>scorpions could be present. Workers with allergies to stings will inform the UXOSO, complete the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>medical data sheet, and carry their own prescription medication as applicable. First aid and medical</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>attention will be given as required. During mobilization, survey the site for potential nests in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the ground, trees, or debris. Report any bee, wasp, hornet, or yellow jacket nests to the SUXOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and UXOSO so that an exterminator can be called in to remove or exterminate the nest properly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Let other workers know the location of the nest so it is not disturbed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers could encounter and be injured by MPPEH.</td>
<td>Follow approved procedures in the work plans and Procedure UXO-3, -5, -6, and -7 from the CRL at</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>all times. Properly qualified UXO personnel will provide MEC avoidance guidance. Non-UXO personnel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>will adhere to the instructions provided by the UXO personnel at all times. Work areas will be</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>scanned with magnetometers by qualified UXO personnel prior to non-UXO personnel entering the area.</td>
<td></td>
</tr>
</tbody>
</table>
### AHA #1 – Job/Task: Mobilization/Site Set-up/Demobilization

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site vehicles</td>
<td>Drivers must have current state-issued driver’s license. Only trained and authorized personnel will operate off-road vehicles.</td>
<td>Receipt inspection by Equipment Supervisor. Daily vehicle inspection by drivers.</td>
</tr>
<tr>
<td>Heavy equipment</td>
<td>Only trained equipment operators will operate heavy equipment; only licensed personnel will operate vehicles. Qualified operators will be identified for each assignment. Operators manual must be available on site.</td>
<td>Daily inspection, and inspections prior to each use. Use the form provided in the APP.</td>
</tr>
<tr>
<td>Hand and power tools</td>
<td>Workers must be trained in that use of hand and power tools by the UXOSO or designee and have reviewed operator’s manual. The operator’s manual must be available on site. Ensure that the proper hand tool is used for the task.</td>
<td>Daily inspection by users/operators. Check function of GFCI. All power tools must be listed by an NRTL.</td>
</tr>
<tr>
<td>Fire extinguishers</td>
<td>Fire extinguisher training, including use/limitations. At least monthly by UXOSO or designee.</td>
<td>Weekly inspection of first aid kits. Kits must contain items required in EM 385-1-1 and Cal-OSHA 8 CCR 5812. Weekly inspection of eyewashes. Potable water changed weekly unless preservative solution is used. Fire extinguishers must be inspected monthly.</td>
</tr>
<tr>
<td>First aid kits and other emergency equipment, including portable eyewash station</td>
<td>Personnel require training to use emergency equipment and first aid kits. These personnel must be familiar with this plan, the inspection criteria for the equipment, and how the equipment is used. The UXOSO will provide direction on the use of the equipment.</td>
<td>Weekly inspection of first aid kits. Kits must contain items required in EM 385-1-1 and Cal-OSHA 8 CCR 5812. Weekly inspection of eyewashes. Potable water changed weekly unless preservative solution is used. Fire extinguishers must be inspected monthly.</td>
</tr>
<tr>
<td>PPE: long pants, protective boots, safety glasses, hard hat, work gloves, and hearing protection</td>
<td>Training in the use and care of PPE, as provided in the OSHA HAZWOPER 40-hour course and 8-hour refresher.</td>
<td>Inspect all items prior to each use.</td>
</tr>
</tbody>
</table>

**Abbreviations and Acronyms:**

- AHA – activity hazard analysis
- APP – Accident Prevention Plan
- Cal-OSHA – California Occupational Safety and Health Administration
- CCR – California Code of Regulations
- CDL – commercial driver’s license
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CP – Competent Person
- CPR – cardiopulmonary resuscitation
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- dBA – decibels, A-scale
- DEET – N, N-diethyl-meta-toluamide
- DON – U.S. Department of the DON
- EHS – environmental health and safety
- EM – Engineer Manual
- GFCI – ground fault circuit interrupter
- HAZWOPER – Hazardous Waste Operations and Emergency Response
- MEC – munitions and explosives of concern
- MCAS – Marine Corps Air Station
- NRTL – nationally recognized testing laboratory
- OSHA – U.S. Occupational Safety and Health Administration
- PG – Professional Geologist
- POC – point of contact
- PPE – personal protective equipment
- RAC – Risk Assessment Code
- RPM – Remedial Project Manager
- SDS – Safety Data Sheet
- SHM – Safety and Health Manager
- SOP – Standard Operating Procedure
- SPF – sun protection factor
- SSNO – Site Safety and Health Officer
- SUXOS – Senior Unexploded Ordnance Supervisor
- TIEC – Tetra Tech EC, Inc.
- UXO – unexploded ordnance
- UXOSO – Unexploded Ordnance Safety Officer
AHA Signature Sheet

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>TITLE</th>
<th>DATE</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
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</table>
Activity Hazard Analysis (AHA) #2

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

<table>
<thead>
<tr>
<th>Job/Task: Surface Clearance</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: IRP Site 1</td>
<td>Risk Assessment Code (RAC) Matrix</td>
<td></td>
</tr>
<tr>
<td>Former MCAS El Toro, California</td>
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<tr>
<td>Contract Number: N62473-12-D-2006, CTO 0011</td>
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<tr>
<td>Date Prepared: March 2016</td>
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<tr>
<td>Prepared by (Name/Title): Arthur Gunter, PG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewed by (Name/Title): Roger Margotto, CIH, CSP, CHMM, SHM</td>
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</tr>
<tr>
<td>Notes: (Field Notes, Review Comments, etc.)</td>
<td>Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).</td>
<td></td>
</tr>
<tr>
<td>1. In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP/SSHP. EM 385-1-1 will also be available on site or electronically for review of specific materials and mitigation measures.</td>
<td>“Probability” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.</td>
<td>RAC Chart</td>
</tr>
<tr>
<td>2. PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾-length shirt sleeve), hearing protection (as required), work gloves worn when indicated, and Class 2 high-visibility safety vest. UXO personnel may wear nonconductive footwear with protective toe cap/composite toe footwear. Boots must be at least ankle high and have a steel or composite shank and nonslip sole. They must be constructed of leather or other chemically resistive material; suede and cloth are not acceptable.</td>
<td>“Severity” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.</td>
<td>E = Extremely High Risk</td>
</tr>
<tr>
<td>Project UXOSO/SSHO – to be determined</td>
<td></td>
<td>H = High Risk</td>
</tr>
<tr>
<td>First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined</td>
<td>Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.</td>
<td>M = Moderate Risk</td>
</tr>
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<td>L = Low Risk</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
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<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>1. Brief all site personnel on EZ establishment and procedures</td>
<td>Site personnel not aware of EZ boundary locations could encounter MPPEH or MEC.</td>
<td>Show EZ boundaries on a site map. Orient workers as to locations of EZ boundaries. Review Work Plan and Explosives Safety Submission.</td>
</tr>
<tr>
<td>2. Remove nonessential personnel from within the EZ boundaries</td>
<td>Nonessential workers could come into contact with or be affected by MPPEH or MEC.</td>
<td>Evacuate all nonessential personnel from area before any surface clearance operations. Monitor the EZ while work is underway so work can be discontinued if any unauthorized personnel enter.</td>
</tr>
<tr>
<td>3. Perform surface clearance</td>
<td>Slips, trips, and falls from various agents are potential hazards.</td>
<td>Visually inspect work areas and mark, barricade, or eliminate slip, trip, and fall hazards. Only work on walking/working surfaces that have the strength and integrity to support employees safely. Establish good footing. Wear safety-toed boots with soles that have good traction (see Note 2 on page 1 above).</td>
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<td></td>
<td>Failure to properly survey site could cause exposure to MEC hazards.</td>
<td>Ensure that the sweep transects overlap to guarantee 100 percent coverage.</td>
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<td></td>
<td>Failure to observe and prepare for encounter with insects, rodents, or snakes could cause injury to worker.</td>
<td>Observe for insects, rodents, and snakes. Use a “tapping” stick, if necessary, in any brush area to flush out or expose snakes before walking in brushy areas. Wear snake chaps (gaiters). Use insect repellant as necessary. Observe for any possible bird habitation and other flora and fauna of biological significance. Note locations and identify them for future reference by the remediation team. Avoid placing hands in concealed areas. Wear protective gloves. Use tools wherever possible to dislodge objects first before placing hands low to ground to move objects. Use DEET insect repellent as necessary. Exercise caution in locations where snakes, spiders, or scorpions could be present. Workers with allergies to stings will inform the UXOSO, complete the medical data sheet, and carry their own prescription medication as applicable. First aid and medical attention will be provided as required. During mobilization, survey the site for potential nests in ground, trees, or debris. Report any bee, wasp, hornet, or yellow jacket nests to the SUXOS and UXOSO so that an exterminator can be called in to remove or exterminate the nest properly. Let other workers know the location of the nest so it is not disturbed.</td>
</tr>
<tr>
<td></td>
<td>Workers not wearing the required PPE could be injured.</td>
<td>Wear safety-toed boots with slip resistant soles, a hard hat, and safety glasses (see Note 2 on page 1, above).</td>
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<tr>
<td></td>
<td>Workers could be struck by, or pinned against, mobile construction equipment. Workers could be struck by nearby traffic.</td>
<td>Wear Class 2 high-visibility reflective vests when exposed to vehicle traffic. Make eye contact with operators before approaching equipment. Understand and review posted hand signals. Use traffic barricades, signs, flags, and backup spotters during field activities.</td>
</tr>
</tbody>
</table>
## AHA #2 – Job/Task: Surface Clearance

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Perform surface clearance (continued)</td>
<td>Workers could be injured by high winds and flying debris or significant dust in the air.</td>
<td>Ensure that all debris/materials are secured. Shut down operations when wind speed is &gt; 30 mph sustained (or lesser depending on real-time hazard assessment. Monitor the local weather report daily, and as necessary, for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies.</td>
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<td>Workers could be exposed to extreme temperatures and sunburn.</td>
<td>Monitor for heat stress in accordance with EHS Procedure 4-06, Temperature Extremes. Provide fluids and rest breaks during warm weather and while wearing impermeable protective clothing. Wear broad-spectrum sunscreen lotion with an SPF of 15 or greater.</td>
<td>L</td>
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<td>Lack of communication in widely dispersed areas could lead to a delayed response in an emergency.</td>
<td>Ensure that each work team has a cellular telephone, or access to a telephone, for emergency communication. A work team may substitute a 2-way radio for a cellular phone if the other radio party has access to a phone. If more than one team at a time is working, ensure that there is communication between the work teams and project management. Use the buddy system.</td>
<td>M</td>
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<tr>
<td>4. Inspect debris</td>
<td>Sharp metal or other debris may cause cuts or lacerations.</td>
<td>Keep eyes on material being investigated at all times. Use slow, deliberate movements. Wear leather gloves.</td>
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<td>Movement of heavy debris or frequent bending over to pick up debris may cause back strain.</td>
<td>Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting, and getting help when moving bulky/heavy materials and equipment. Encourage the use of lifting equipment and use of a hand-truck whenever possible. Employees will not lift more than 50 pounds alone. Encourage a steady, sustainable work pace. Take breaks and rotate the work to avoid repetitive stress to the back.</td>
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<td>Contacting MPPEH or MEC materials may result in injury.</td>
<td>Evacuate all nonessential personnel from area before any inspecting debris. Monitor the EZ while work is underway so it can be ceased if any unauthorized personnel enter.</td>
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<td>Debris may contain hazardous materials or containers of unidentified product.</td>
<td>Avoid contact with materials. Wear PPE as specified in SSHP. Do not open containers if unanticipated waste is found. Report the items to the SUXOS. SUXOS will report the items to the PM and DON RPM. Update plan to ensure it addresses any safe handling or removal of the material.</td>
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<td>Handling of any discovered MPPEH or MEC and metallic debris could result in unplanned explosion or fire causing injury to UXO personnel.</td>
<td>Follow approved procedures in the Work Plan and Procedures UXO-03, -05, -06, and -07 from the CRL for management of MEC and donor explosives at all times. Do not handle MEC that has not been positively identified and determined safe to move. MEC found will be blown in place using donor explosives following procedures in the Work Plan and ESS.</td>
<td>M</td>
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</table>
# AHA #2 – Job/Task: Surface Clearance

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
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</thead>
<tbody>
<tr>
<td>1. Site vehicles</td>
<td>Drivers must have current state-issued driver’s license. Only trained and authorized personnel will operate site vehicles.</td>
<td>Receipt inspection by Equipment Supervisor. Daily vehicle inspection by drivers.</td>
</tr>
<tr>
<td>2. Magnetometers</td>
<td>Only qualified UXO Technicians trained on care and use of magnetometers will use this equipment. Ensure user manual is available on site.</td>
<td>Receipt inspection by UXO Technician. Daily inspection by UXO Technician. Successful completion of geophysical prove-out demonstration and daily function checks per the SOPs.</td>
</tr>
<tr>
<td>3. Hand tools (e.g., shovels)</td>
<td>Training in use of hand tools will be provided by the SSHO or designee and review of operating manual. Use the proper hand tool for the task.</td>
<td>Daily inspection by users/operators.</td>
</tr>
<tr>
<td>4. Industrial hygiene monitoring equipment</td>
<td>UXOSO must be familiar with use/limitations of the monitoring equipment, calibration procedures, and industrial hygiene strategy. Ensure user manual is available on site.</td>
<td>Calibration and function checks prior to use.</td>
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<td>(e.g., WBGT)</td>
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<td>5. First aid kits and other emergency equipment</td>
<td>Emergency equipment/first aid kits must be used only by personnel familiar with this plan. The SSHO will provide training regarding the use and inspection criteria associated with the equipment, and what the equipment is used for.</td>
<td>Weekly inspection of first aid kits. Kits must contain items required in EM 385-1-1 and Cal-OSHA 8 CCR 5812. Weekly inspection of eyewashes. Potable water changed weekly unless preservative solution is used. Fire extinguishers must be inspected monthly.</td>
</tr>
</tbody>
</table>

**Abbreviations and Acronyms:**

- AHA – Activity Hazard Analysis
- APP – Accident Prevention Plan
- Cal-OSHA – California Occupational Safety and Health Administration
- CCR – California Code of Regulations
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CPR – cardiopulmonary resuscitation
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- CTO – Contract Task Order
- DEET - N, N-diethyl-meta-toluamide
- EHS – environmental health and safety
- EM – Engineer Manual
- EZ – exclusion zone
- IRP – Installation Restoration Program
- MEC – munitions and explosives of concern
- mph – miles per hour
- MPPEH – material potentially presenting an explosive hazard
- OSHA – Occupational Safety and Health Administration
- PG – Professional Geologist
- PM – Project Manager
- PPE – personal protective equipment
- RAC – Risk Assessment Code
- RPM – Remedial Project Manager
- SHM – (Program) Safety and Health Manager
- SOP – standard operating procedure
- SPF – sun protection factor
- SS – Site Supervisor
- SSHO – Site Safety and Health Officer
- SSHP – Site Safety and Health Plan
- UXO – unexploded ordnance
- UXOSO – UXO Safety Officer
- WBGT – wet bulb globe temperature

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AHA 2 Surface Clearance

Final Accident Prevention Plan
Installation Restoration Program Site 1
Former MCAS El Toro, California
DCN: UMAC-2006-0011-0012
CTO No. 0011
**AHA Signature Sheet**

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

<table>
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Activity Hazard Analysis (AHA) # 3

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

Job/Task: Soil Excavation (including MEC-impacted soil to 18 inches and naphthalene-impacted soil to 10 feet)

<table>
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<tr>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
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<tr>
<th>Risk Assessment Code (RAC) Matrix</th>
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<td><strong>Severity</strong></td>
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<td>Catastrophic</td>
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<tr>
<td>Critical</td>
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<tr>
<td>Marginal</td>
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<td>Negligible</td>
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Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.

Notes: (Field Notes, Review Comments, etc.)

This AHA describes preparation of the area where waste and debris that is collected will be placed. In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP. TtEC Corporate Safety Programs and EM 385-1-1 will also be available on site for review of specific materials and mitigation measures. PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, standard work uniform (long pants, ¾-length shirt sleeve), hearing protection (as required), work gloves worn when indicated, Class 2 high-visibility safety vest, and other PPE as specified below.

Project UXOSO/SSHO – to be determined

First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined

Excavation CP – to be determined
## AHA #3 – Job/Task: Soil Excavation

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
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</thead>
<tbody>
<tr>
<td><strong>1.</strong></td>
<td>Survey the site Slips, trips, and falls could occur from the presence of debris, uneven surfaces, etc.</td>
<td>Visually inspect work areas and pre-existing slip, trip, and mark, barricade, or eliminate fall hazards. Ensure that work areas are kept neat and in an orderly state.</td>
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<td>Contact with underground utilities could result in injuries.</td>
<td>Perform utility locate prior to performing excavations, and obtain a facility dig permit. Implement TiEC Corporate Procedure EHS 3-15, Underground Utilities, to ensure all water, power, sewer, storm drain, communications, and gas lines have been located and marked. Request utility clearance tickets through 811, and coordinate with the MCAS El Toro for utility clearance verifications where needed. Mark and geophysically verify utilities.</td>
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</tr>
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<td><strong>2.</strong></td>
<td>Excavate soil using a shielded excavator. (MEC-impacted soil will be removed to depth of 18 inches; naphthalene-impacted soil will be removed to a depth of 10 feet.)</td>
<td>Workers could be struck by or pinned against heavy equipment. Wear Class 2 high-visibility safety vests when exposed to vehicular traffic. Avoid equipment swing areas. Make eye contact with operators before approaching equipment. Understand and review posted hand signals. Ensure that workers are always in sight of the operators. Use trained spotters. Establish and follow the Traffic Plan. All heavy equipment on this project will be equipped with rollover protection systems and backup alarms. Stay clear of moving equipment, unless necessary. If working near equipment, workers must be in sight of the operator. Inspect all equipment daily, before use, to ensure that proper maintenance is being performed. Make eye contact with operator; heavy equipment has right-of-way. Workers will not work under any equipment or loads.</td>
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<td>Strains could occur from use of tools, such as shovels.</td>
<td>Maintain steady pace when using tools, and take adequate rest periods. If possible, rotate tasks among the workers. Use appropriate tools for the task and maintain tools in good condition.</td>
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<td>For areas where MEC/MPPEH may be present, unanticipated explosions could occur.</td>
<td>Cab of excavator will be equipped with proper shielding to protect the operator as specified in the ESS and Work Plan. Other personnel will remain away from active work location as specified in the Work Plan procedures and ESS, and in accordance with the direction of the SUXOS. Follow approved procedures in the work plans at all times and Procedure UXO-3, -5, -6, and -7 from the CRL. Properly qualified UXO personnel will provide MEC avoidance guidance. Non-UXO personnel will adhere to instructions of the UXO personnel at all times. Work areas will be scanned with magnetometers by qualified UXO personnel prior to non-UXO personnel entrance.</td>
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<td>Noise from operating heavy equipment could damage hearing.</td>
<td>Ensure that hearing protection is worn when sound levels exceed 84 dBA continuously.</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
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<tr>
<td>2. Excavate soil (continued)</td>
<td>Falls into excavations could cause injury to workers and cave ins/engulfment hazards</td>
<td>Ensure that Excavation CP will be on site to verify excavation safety prior to entry and to inspect excavations daily. Inspections will be documented by the CP. Ensure that workers do not enter any excavation that is deeper than 4 feet. Ensure that excavation of naphthalene-impacted soil and sampling of soil is safely performed (use bucket to collect samples). Ensure that sloping is conducted safely, as required, at the direct of the excavation CP. If exposure to a fall of 6 feet or more is possible along excavation leading edges and Class II barricades are not provided, workers who are exposed will wear appropriate fall protection and a fall protection and prevention plan will be developed by a CP. Open excavations that are unattended will be properly barricaded to protect workers and/or the public. Trucks will be provided, with log stops at least 3 feet away from the excavation edge if trucks are being loaded near the excavation. Spotters will be used to backup trucks.</td>
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<td></td>
<td>Potential for contact with naphthalene-contaminated soil or munitions constituents (if present in soil) could cause dermal exposure to or spread of contamination into other areas.</td>
<td>Avoid contact with contamination whenever possible. Do not unnecessarily walk in or on contaminated soils or handle contaminated soils. When handling or walking on contaminated soil (e.g., if required), wear PVC boots or Kennard™ overboots that can be decontaminated, as well as nitrile gloves for hands and Kleengard or Tyvek™ coveralls to protect worker clothing. Perform decontamination and doff contaminated clothing in the CRZ in accordance with the APP requirements. Manage soiled PPE in accordance with the Waste Management Plan. Wash hands when leaving the CRZ, and before eating, drinking, or smoking. Do not wear contaminated clothing or boots outside of the CRZ.</td>
<td>M</td>
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<td></td>
<td>Fugitive dust could be generated and could contain naphthalene (in naphthalene impacted soil area) and munitions constituents or fungi spores which could be inhaled or ingested or cause eye irritation, Valley Fever (fungi spores).</td>
<td>Ensure that the operator of the excavator and trucks keeps the cab closed (if possible) and stages upwind if possible during excavation. Ensure that workers outside EZ or essential workers in EZ will position upwind of dust-generation activities when possible, and will wear safety glasses. Ensure that a water mist is applied (remotely) as required to keep dust levels down during excavation and soil-handling tasks. Ensure that respiratory protection (full-face APR with P-100 and organic vapor cartridge) is worn during excavation tasks if dust levels cannot be effectively controlled and workers could be exposed to inhalation or ingestion of site contaminants in dust, or as vapors. Respiratory protection will be assigned at the direction of the UXOSO and SHM based on action levels in the APP.</td>
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<td></td>
<td>Truckers and ground workers could be struck by load or equipment as it is loaded.</td>
<td>Prohibit truck drivers from standing near trucks or excavators as they are being loaded. Prohibit truck drivers from sitting in the cab of trucks as they are being loaded, unless the truck is equipped with a cab protector (FOPS).</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
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<tr>
<td>2. Excavate soil (continued)</td>
<td>Dirt and other materials can be accumulated on roads used for transport of material.</td>
<td>Brush off trucks before they enter a paved road. Tarp truck or load truck in such a manner to prevent dirt and dust from getting onto paved roads. Ensure that debris will not come off truck as the material is transported.</td>
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## AHA #3– Job/Task: Soil Excavation

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heavy equipment (excavators, loaders, dozers, backhoes), dump trucks</td>
<td>Only qualified persons may operate equipment. Operator’s manual must be reviewed and be available on site. Only DMV-licensed personnel will operate trucks. Equipment operations manual must be available on site.</td>
<td>Daily inspection and before use by operator. Use inspection checklists.</td>
</tr>
<tr>
<td>2. Hand and power tools</td>
<td>Training in use of hand and power tools by the UXOSO or designee and review of operating manual are required. Use proper hand tool for the task. Operations manual for tools must be available on site.</td>
<td>Daily inspection by users/operators. Power tools must be listed by a NRTL.</td>
</tr>
<tr>
<td>3. Fire extinguishers</td>
<td>Fire extinguisher training, including use/limitations, is required.</td>
<td>Inspection at least monthly by UXOSO or designee.</td>
</tr>
<tr>
<td>4. First aid kits and other emergency equipment</td>
<td>Emergency equipment/first aid kits must be used by personnel familiar with this plan; training on the use and inspection criteria of the equipment, and what the equipment is used for must be provided by or under the direction of the SSHO.</td>
<td>Initial inspection at start of project, and at least weekly thereafter or after use for restocking (29 CFR 1926.50(d)(2)). First aid kits must be filled per EM 385-1-1 Table 3-1. Inspect eye wash station weekly (by UXOSO). Potable water changed weekly unless a preservative solution is used.</td>
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</tbody>
</table>

### Abbreviations and Acronyms:

- **AHA** – Activity Hazard Analysis
- **APP** – Accident Prevention Plan
- **APR** – air-purifying respirator
- **Cal-OSHA** – California Occupational Safety and Health Administration
- **CCR** – California Code of Regulations
- **CFR** – Code of Federal Regulations
- **CHMM** – Certified Hazardous Materials Manager
- **CIH** – Certified Industrial Hygienist
- **CP** – Competent Person
- **CPR** – cardiopulmonary resuscitation
- **CRL** – Corporate Reference Library
- **CRZ** – contamination reduction zone
- **CSP** – Certified Safety Professional
- **CTO** – Contract Task Order
- **dBA** – decibels
- **DMV** – Department of Motor Vehicles
- **DON** – Department of the Navy
- **EHS** – Environmental Health and Safety
- **EM** – Engineer Manual
- **ESS** – Explosives Safety Submission
- **EZ** – exclusion zone
- **FOPS** – falling object protective system
- **IRP** – Installation Restoration Program
- **MCAS** – Marine Corps Air Station
- **MEC** – munitions and explosives of concern
- **MPPEH** – material potentially presenting an explosive hazard
- **NRTL** – Nationally Recognized Testing Laboratory
- **PG** – Professional Geologist
- **PPE** – personal protective equipment
- **PVC** – polyvinyl chloride
- **RAC** – risk assessment code
- **SHM** – Safety and Health Manager
- **SSHO** – Site Safety and Health Officer
- **TtEC** – Tetra Tech EC, Inc.
- **UXO** – unexploded ordnance
- **UXOSO** – Unexploded Ordnance Safety Officer
### AHA Signature Sheet

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

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<tr>
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Activity Hazard Analysis (AHA) #4

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

Job/Task: Mechanical Screening and Stockpiling of Excavated Soils

Overall Risk Assessment Code (RAC) (Use highest code) M

Risk Assessment Code (RAC) Matrix

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<tr>
<th>Severity</th>
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<td>Negligible</td>
<td>M</td>
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</table>

Notes: (Field Notes, Review Comments, etc.)
In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP and SSHP. TtEC Corporate Safety Programs and EM 385-1-1 will also be available on site for review of specific materials and mitigation measures.

PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾-length shirt sleeve), hearing protection (as required), work gloves worn when indicated, Class 2 high-visibility safety vest, other PPE as specified below.

Project UXOSO/SSHO – to be determined
First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined
### AHA #4 – Job/Task: Mechanical Screening and Stockpile of Excavated Soils

<table>
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<tr>
<th>Job Steps</th>
<th>Hazards</th>
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<tr>
<td>1. Service screen plant</td>
<td>Fueling equipment could cause a fire hazard.</td>
<td>Ensure that the screen plant is turned off when fueling. Only UL-listed and NFPA-approved metal fuel cans will be used. Fuel cans will be equipped with a self-closing pouring spout. Fuel caps will be secured prior to restarting machinery. Fuel cans will be removed from the area prior to starting the screen plant. At a minimum, 60-BC fire extinguishers will be readily available. Smoking and open flames will not be permitted within 25 feet of fueling areas.</td>
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<td>Workers could be subjected to hazardous energy when servicing screening plant where any part of body is placed into or positioned under or within any mechanical or energized parts</td>
<td>Ensure that if any servicing is required, the proper lockout/tagout procedures are identified and included in this AHA per the manufacturer’s instructions, and that the control of hazardous energy program described in EHS 6-04 is implemented. Ensure operations manual is on site and reviewed by operators. Do not insert any body parts or remove any guards unless properly isolated.</td>
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<tr>
<td></td>
<td>Workers could encounter chemical exposure during fueling.</td>
<td>Ensure that if any servicing is required, the proper lockout/tagout procedures are identified and included in this AHA per the manufacturer’s instructions, and that the control of hazardous energy program described in EHS 6-04 is implemented. Ensure operations manual is on site and reviewed by operators. Do not insert any body parts or remove any guards unless properly isolated.</td>
<td>M</td>
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<tr>
<td></td>
<td>Fuels/oils could spill during fueling/oiling.</td>
<td>Ensure that protective clothing (nitrile gloves and safety glasses) is worn during fueling and oiling activities. Exposed skin areas will be rinsed with water immediately if contact with hazardous materials occurs. A portable eye wash station and first aid kit will be readily available. Review fuel Safety Data Sheet. Position upwind when refueling to minimize exposure to vapors. Ensure that fuel/oil caps are secured on equipment and containers after use. Secondary containment will be placed under refueling areas. Spills will be cleaned up immediately. Spills and absorbent materials will be readily available adjacent to fueling/oiling areas.</td>
<td>M</td>
</tr>
<tr>
<td>2. Start up screen plant</td>
<td>Workers could be struck by construction equipment when working in vicinity.</td>
<td>Wear a Class 2 high-visibility traffic vest and ensure operator can see you at all times when working in proximity to construction equipment. Do not enter swing radius.</td>
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### AHA #4 – Job/Task: Mechanical Screening and Stockpile of Excavated Soils

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<td>2. Start up screen plant (continued)</td>
<td>Improper startup of plant could cause injury.</td>
<td>Before initial plant startup, the plant will be inspected by the operator and UXOSO. The screen plant will be free of obstructions prior to start up. Employees will follow the manufacturer’s recommended startup/operating procedures prior to commencing work. As required in EM 385-1-1, Section 17, all conveyors must have an emergency stop along the entire length of the conveyor (17.A.03). Also, the conveyor systems must be equipped with a time-delay audible and a visual warning signal that will be sounded immediately before starting the conveyor. Personnel will be clear of the screen plant exhaust and conveyors prior to the equipment being started. Ensure all guards are secure and in place prior to starting. NO guards will be removed unless proper lockout procedures are implemented. Personnel will know the location of the “kill switch” (emergency stop button, in addition to the emergency stop device along the entire length of the conveyor). Position the conveyors and screen plant machine in a downwind location to minimize dust exposure. Ensure legs for vibrating grid are positioned correctly and safety pins are in place. No workers will enter screen plant for maintenance unless lockout/tagout measures are employed and all raised components are mechanically braced.</td>
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<tr>
<td>3. Load screen with soil</td>
<td>Workers may be struck by material throwback.</td>
<td>Material will be added using front-end loader or other heavy equipment only. All conveyors will have guards protecting workers from all moving parts. The operator who loads the material will have a remote control device on hand, if available. Employees will never place hands, arms, feet, legs, or any other body part on the feed table or within the limits of the in-feed hopper when the screen plant is in operation. All employees working around the conveyors and screen plant machine will not wear loose clothing. No jewelry or long hair is allowed when working around moving/rotating parts. Push sticks will be used if necessary to move stuck material. ANSI-approved safety glasses and face shields will be worn to protect workers from projectiles thrown back from the chute. All workers will stay clear of the conveyor chutes. The work area will be secured to prevent unauthorized personnel from entering during operation. Material to be placed in screen plant should be moistened to reduce the volume of dust produced. Use water trucks or misters to mist materials on a regular basis.</td>
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## AHA #4 – Job/Task: Mechanical Screening and Stockpile of Excavated Soils

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<tr>
<td>4. Operate screen plant</td>
<td>Noise exposure could cause loss of hearing.</td>
<td>Hearing protection is required when sound levels exceed 84 dBA continuously. Workers working in unenclosed cabs of heavy equipment and ground workers working near heavy equipment or working near the screening system will wear hearing protection.</td>
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<td>Falling from heights when working on top of equipment could result in injury.</td>
<td>Workers should not stand on top of equipment, except on those locations where designed platform/guardrails are in place.</td>
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<td></td>
<td>Exposure to flying debris could result in injury.</td>
<td>Unit may cause debris to be expelled out of the top at high force. Avoid working too close to unit and do not position hands or face directly over the screening area. Wear hard hat and safety glasses with plastic face shield.</td>
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</tr>
<tr>
<td>5. Stockpile output soil and debris</td>
<td>Workers could get in the way of debris as it comes out the chute of the conveyor system, resulting in injury.</td>
<td>Workers should never stand under output chute, whether the unit is operating or not.</td>
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<td>Stockpiled material could create a slip or fall hazard.</td>
<td>Site workers should avoid climbing on stockpiles except when necessary for sampling or for covering piles with plastic. Stockpiles should be limited to 250 cubic yards each and will not have a slope of 1:1 or greater.</td>
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<tr>
<td>6. Collect MDAS and fragments, and place into drums after inspection and verification by SUXOS</td>
<td>Collected material will be heavy and could injure a worker who tries to lift the container.</td>
<td>Recovered MPPEH and related fragments will be collected and placed in 55-gallon drums for removal. Workers should never lift a container that weighs more than 50 pounds. Use a mechanical device, such as a drum dolly, to move collected materials. Perform stretch/flex exercises prior to work shift.</td>
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<tr>
<td>7. Evaluate pile for MEC/MPPEH</td>
<td>MEC and MPPEH can be found in screening pile, and could explode.</td>
<td>MEC found will be blown in place using donor explosives following procedures in the Work Plan and ESS. UXO technicians will screen all debris to ensure MPPEH is appropriately handled following SOPs in the Work Plan and ESS.</td>
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<tr>
<td>8. Perform screen plant maintenance</td>
<td>Accidental startup of screen could cause injury.</td>
<td>Screen plant will be equipped with a locking device on the ignition system or lockout/tagout procedures will be followed to prevent unauthorized startup of equipment. Lockout/tagout procedures, as outlined in EHS 6-04, will be followed to prevent accidental startup of machines. All personnel will be given proper instruction on lockout/tagout procedures. All machinery will be shut down and locked out/tagged out prior to maintenance. Additionally, the screen plant must come to a complete stop after shutdown prior to commencing maintenance operations.</td>
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### AHA #4 – Job/Task: Mechanical Screening and Stockpile of Excavated Soils

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<tr>
<td>9. Use pneumatic finishing system</td>
<td>Use of compressed air could cause injury.</td>
<td>MPPEH and metal fragments will be separated from the lighter soil, debris, and other like-size materials using a pneumatic finishing system. All site workers will remain clear of pneumatic finisher except those operating the equipment. Workers will wear face shields in addition to safety glasses and other required PPE.</td>
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<td>10. Screen and handle MPPEH and debris</td>
<td>Potential exposure to lead or munitions constituents (inhalation/ingestion/dermal from handling MPPEH or from soil and dust generated during screening) could cause injuries.</td>
<td>Wear leather work gloves with a nitrile inner glove. Ensure dust control methods are used in the area at all times dust is being generated. The plant is equipped with a dust control system and mister. If dust levels are not well controlled, workers will wear respirators with P-100 cartridges at direction of UXOSO. Wash hands before eating, smoking, or using the latrine.</td>
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<tr>
<td>11. Stockpile soils</td>
<td>Dust hazard could be created.</td>
<td>Cover soil stockpiles when not in use. Follow proper dust control using water mist as necessary when dusts are generated and stockpiles are open.</td>
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## AHA #4 – Job/Task: Mechanical Screening and Stockpile of Excavated Soils

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
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<tbody>
<tr>
<td>1. Dual-stage vibratory screening system</td>
<td>Specific training on the use of a screen plant is required. Operator’s manual must be reviewed and located on site. Vibratory screening plant will be operated by trained and qualified MT2 personnel only.</td>
<td>Daily, before use. Check emergency stop device each day of operation.</td>
</tr>
<tr>
<td>2. Heavy equipment</td>
<td>Operator must be qualified to operate heavy equipment. Statement of qualification must be in employee’s training record. Operator will review the operating instructions, and the operator’s manual must be on the equipment.</td>
<td>Inspect each day of use as required by manufacturer. Document on daily inspection form.</td>
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<tr>
<td>3. Hand tools</td>
<td>Specific training for hand tools must be provided.</td>
<td>Inspect before each use. Discard defective tools.</td>
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<tr>
<td>4. First aid kits and other emergency equipment, including portable eyewash station</td>
<td>Personnel require training to use emergency equipment and first aid kits. These personnel must be familiar with this plan, the inspection criteria for the equipment, and how the equipment is used. The UXOSO will provide direction on the use of the equipment.</td>
<td>First aid kits must be inspected weekly, as required by OSHA. Fire extinguishers must be inspected monthly. Eyewash stations must be inspected weekly. Potable water must be changed weekly unless a preservative solution is used.</td>
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<tr>
<td>5. PPE: long pants, protective boots, safety glasses, hard hat, work gloves, hearing protection, dust masks</td>
<td>Training will be provided on the use and care of PPE, as described in the OSHA HAZWOPER 40-hour course and 8-hour refresher.</td>
<td>Inspect all items prior to each use.</td>
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**Abbreviations and Acronyms:**

- AHA – Activity Hazard Analysis
- ANSI – American National Standards Institute
- APP – Accident Prevention Plan
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CSP – Certified Safety Professional
- CTO – Contract Task Order
- dBA – decibels
- DON – Department of the Navy
- EM – Engineer Manual
- ESS – Explosives Safety Submission
- HAZWOPER – Hazardous Waste Operations and Emergency Response
- IRP – Installation Restoration Program
- MCAS – Marine Corps Air Station
- MEC – munitions and explosives of concern
- MDAS – material documented as safe
- MPPEH - material potentially presenting an explosive hazard
- MSDS – Material Safety Data Sheet
- NFPA – National Fire Protection Association
- OSHA – Occupational Safety and Health Administration
- PG – Professional Geologist
- POC – point of contact
- PPE – personal protective equipment
- RAC – Risk Assessment Code
- SHM – Safety and Health Manager
- SOP – standard operating procedure
- SS – Site Supervisor
- SSHO – Site Safety and Health Officer
- SSHP – Site Safety and Health Plan
- TtEC – Tetra Tech EC, Inc.
- UL – Underwriter’s Laboratory
- UXO – unexploded ordnance
- UXOSO – unexploded ordnance safety officer
AHA Signature Sheet

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

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**Activity Hazard Analysis (AHA) #5**

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

<table>
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<tr>
<th>Job/Task: Digital Geophysical Mapping</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
<th>M</th>
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<tbody>
<tr>
<td>Project Location: IRP Site 1</td>
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<td>Former MCAS El Toro, California</td>
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<tr>
<td>Contract Number: N62473-12-D-2006, CTO 0011</td>
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<tr>
<td>Date Prepared: March 2016</td>
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<tr>
<td>Prepared by (Name/Title): Arthur Gunter, PG</td>
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<tr>
<td>Reviewed by (Name/Title): Roger Margotto, CIH, CSP, CHMM, SHM</td>
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<tr>
<td>Notes: (Field Notes, Review Comments, etc.)</td>
<td>Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (See above)</td>
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<tr>
<td>1. In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved SSHP. EM 385-1-1 will also be available on site or electronically for review of specific materials and mitigation measures. PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾ length shirt sleeve), hearing protection (as required), work gloves worn when indicated, Class 2 high-visibility safety vest, and other PPE as specified below. Project UXOSO/SSHO – to be determined First aid-/CPR-qualified: SXUSOS – David Williams UXOSO/SSHO – to be determined</td>
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**Risk Assessment Code (RAC) Matrix**

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- **E** = Extremely High Risk
- **H** = High Risk
- **M** = Moderate Risk
- **L** = Low Risk

**Step 1:** Review each “Hazard” with identified safety “Controls” and determine RAC (See above)

- “**Probability**” is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.
- “**Severity**” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.

**Step 2:** Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on AHA. Annotate the overall highest RAC at the top of AHA.

---

**Overall Risk Assessment Code (RAC) (Use highest code): M**

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<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install IVS; survey background using DGM system</td>
<td>Potential MEC/MPPEH in the area could cause injury to workers.</td>
<td>Carefully inspect the area before scanning. If MEC/MPPEH is found, follow approved procedures in the Work Plan at all times, and Procedure UXO-03, -05, -06, and -07 from the CRL for management of MEC and donor explosives. Do not handle MEC that has not been positively identified and determined safe to move. MEC found will be blown in place using donor explosives and following procedures and SOPs included in the Work Plan and ESS.</td>
<td>M</td>
</tr>
<tr>
<td>2. Install IVS; paint surrogate items</td>
<td>Use of spray paint to mark seeds and anomalies could expose employees to paint fumes, or to the paint itself.</td>
<td>Follow manufacturers’ instructions on the use of paint. Review the appropriate SDS. Never point paint toward another person. Stay upwind when spraying.</td>
<td>L</td>
</tr>
<tr>
<td>3. Use shovel to place “seeds” as specified in Work Plan (greatest depth approximately 2 feet)</td>
<td>Use of shovel could cause strain to workers.</td>
<td>Maintain a steady work pace. When shoveling, use the pivot and turn technique. Avoid twisting at waist. Inspect shovel to ensure it is not damaged before use.</td>
<td>M</td>
</tr>
<tr>
<td>4. Collect DGM data using DGM system; record data from IVS</td>
<td>Improper handling of instruments could cause strain to workers.</td>
<td>Carry instruments as required by the manufacturer of the instrument. Use straps when provided, and adjust for comfort. Use care when walking so that there are no sudden jerks or missteps that can cause the worker to strain or to lose control of the instrument. Obtain assistance from other workers if several instruments must be carried.</td>
<td>L</td>
</tr>
<tr>
<td>5. Scan all surface grids using Geonics EM-61-MK 2</td>
<td>Failure to properly survey site could cause exposure to MEC hazards.</td>
<td>Ensure that the sweep transects overlap to guarantee 100% coverage.</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Slips, trips, and falls from various agents could cause injuries to workers.</td>
<td>Visually inspect work areas and mark, barricade, or eliminate slip, trip, and fall hazards. Establish good footing. Wear work boots with soles that have good traction. Work carefully in steep slope areas. Consider use of clamp-on shoe spikes when walking on slopes. Do not climb slopes greater than 45°.</td>
<td>M</td>
</tr>
<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
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<tr>
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</tr>
<tr>
<td>5. Scan all surface grids using Geonics EM-61-MK 2 (continued)</td>
<td>Failure to observe and prepare for encounter with insects, rodents, or snakes could cause injury to worker.</td>
<td>Observe for insects, rodents, and snakes. Use a “tapping” stick if necessary in any brush area to flush out or expose snakes before walking in brushy areas. Use insect repellant as necessary. Observe for any possible bird habitation and other flora and fauna of biological significance. Note locations and identify for future reference by the remediation team. Avoid placing hands in concealed areas. Wear protective gloves. Use tools wherever possible to dislodge objects first, before placing hands low to ground to move objects. Use DEET insect repellant as necessary. Exercise caution in locations where snakes, spiders, or scorpions could be present. Workers with allergies to stings will let the UXOSO know using the medical data sheet and will carry their own prescription medication, as applicable. Provide first aid and medical attention as required. Survey the site for potential nests on ground, or in trees, or debris during mobilization. Report any bee, wasp, hornet, or yellow jacket nests to the SUXOS and UXOSO so that an exterminator can be called in to remove or exterminate the nest properly. Let other workers know the location of the nest so it is not disturbed. Workers not wearing the required PPE could be injured. Ensure that all workers wear composite toe boots with slip resistant sole, hard hat, and safety glasses. Workers performing MEC clearance may wear regular work boots while performing the surveys as steel-toed boots interfere with the instrumentation. Workers will wear Class 2 high-visibility safety vests when working in areas with vehicular traffic. Workers could be exposed to extreme temperatures and sunburn. Monitor for heat or cold stress in accordance with EHS Procedure 4-06, Temperature Extremes. Provide fluids and rest breaks during warm weather, and while wearing impermeable protective clothing, if used. Wear broad spectrum sunscreen rated SPF 15 or higher. Workers could experience eye hazards from debris and dust when walking through the area. Ensure that workers wear safety glasses as the minimum required eye protection for all work areas. Provide a portable emergency eye wash at each work area. Flush objects from eyes; do not rub. Lack of communication in widely dispersed areas could lead to a delayed response in an emergency. Ensure that each work team has a telephone, or access to a telephone, for emergency communication. A work team may substitute a 2-way radio for a phone, if the other radio party has access to a phone. If more than one team at a time is working, ensure that there is communication between the work teams and project management. Use the buddy system.</td>
<td>M</td>
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</tbody>
</table>
### AHA #5 – Job/Task: Digital Geophysical Mapping

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Scan all surface grids using Geonics EM-61-MK 2 (continued)</td>
<td>Workers could be struck by lightning.</td>
<td>Follow the 30-second rule (time between lightning strike and thunder) for shutdown of operations, or as determined by the SSHO. Immediately suspend operations when lightning is in the immediate vicinity, and seek shelter in a building (preferred) or vehicle. Monitor the local weather report daily and as necessary for any severe weather warnings. Wait 30 minutes after the last lightning strike before resuming work. Don’t use or be in contact with metal fixtures or telephone lines when inside structures.</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Workers could be injured by high winds</td>
<td>Ensure that all debris/materials are secured. Shut down operations when wind speed is &gt; 30 mph sustained, or lower based on a real-time hazard assessment. Monitor the local weather report daily and as necessary for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies (safe refuge areas, emergency assembly areas).</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Contact with MEC/MPPEH materials could cause injury.</td>
<td>Evacuate all nonessential personnel from area before inspecting any debris. Monitor the EZ while work is underway so it can be discontinued if any unauthorized personnel enter. Only UXO qualified workers will inspect or handle any MEC/MPPEH.</td>
<td>M</td>
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<tr>
<td></td>
<td>Handling of any discovered MEC/MPPEH and metallic debris could cause injury.</td>
<td>Follow approved procedures in the Work Plan at all times and Procedure UXO-03, -05, -06, and -07 from the CRL for management of MEC and donor explosives. Do not handle MEC that has not been positively identified and determined to be safe to move. MEC found will be blown in place using donor explosives following procedures in the Work Plan and ESS.</td>
<td>M</td>
</tr>
</tbody>
</table>

### AHA #5 – Job/Task: Digital Geophysical Mapping

<table>
<thead>
<tr>
<th>Equipment to Be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vehicles</td>
<td>Drivers must have current state-issued driver’s license.</td>
<td>Inspection daily and before use. Use equipment safety checklist.</td>
</tr>
<tr>
<td>2. Hand tools</td>
<td>Specific training for hand tools will be provided.</td>
<td>Inspection before each use. Discard defective tools.</td>
</tr>
</tbody>
</table>
### AHA #5 – Job/Task: Digital Geophysical Mapping

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<tbody>
<tr>
<td><strong>3. Minimum PPE:</strong></td>
<td>PPE training will be provided 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 UXOS through initial training documentation, and reviewed prior to permitting personnel to participate in site activities, and will be confirmed through observing worker activities.</td>
<td>PPE inspection performed by the SUXOS/UXOSO. Ongoing (prior to each use) inspections are the responsibility of PPE users.</td>
</tr>
</tbody>
</table>
| Steel-toed boots, hard hats, and safety impact eye protection, work gloves, work clothes.  
Optional items: Hearing protection at UXOSO discretion, Class 2 high-visibility vests when near active traffic areas.  
For UXO and Geophysics Technicians – Steel-toed or composite 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.  
UXO and Geophysical Mapping personnel – If steel-toed footwear cannot be worn because of interferences with UXO detection devices, wear safety impact footwear with non-metallic toe protection (provided that the footwear meets ASTM 2412 and 2413). | | |
| **4. Geonics EM 61-MK2** | Only qualified UXO Technicians trained on care and use of instruments may operate such instruments. | Receipt inspection by UXO Technician. Daily inspection by UXO Technician. Workers must successfully complete IVS demonstration. |
| Only qualified UXO Technicians trained on care and use of instruments may operate such instruments.  
Receipt inspection by UXO Technician.  
Daily inspection by UXO Technician.  
Workers must successfully complete IVS demonstration. | | |
| **5. First aid kits and other emergency equipment** | Emergency equipment/first aid kits must only be used by personnel familiar with this plan; equipment use and inspection criteria, and information regarding what the equipment is used for will be provided by or under direction of the SSHO. | Weekly inspection of first aid kits. Kits must contain items required by EM 385-1-1 and Cal OSHA 8 CCR 5812. Weekly inspection of eyewashes. Potable water changed weekly unless preservative solution is used. Fire extinguishers must be inspected monthly. |
| Emergency equipment/first aid kits must only be used by personnel familiar with this plan; equipment use and inspection criteria, and information regarding what the equipment is used for will be provided by or under direction of the SSHO.  
Weekly inspection of first aid kits.  
Kits must contain items required by EM 385-1-1 and Cal OSHA 8 CCR 5812. Weekly inspection of eyewashes. Potable water changed weekly unless preservative solution is used. Fire extinguishers must be inspected monthly. | | |

**Abbreviations and Acronyms:**

- AHA – Activity Hazard Analysis
- APP – Accident Prevention Plan
- ASTM – ASTM International
- Cal-OSHA – California Occupational Safety and Health Administration
- CCR – California Code of Regulations
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- CTO – Contract Task Order
- DEET – N, N-diethyl-meta-toluamide
- DGM – digital geophysical mapping
- DON – Department of the Navy
- EHS – Environmental Health and Safety
- EM – Engineer Manual
- ESS – Explosive Safety Submission
- EZ – exclusion zone
- HAZWOPER - Hazardous Waste Operations and Emergency Response
- IRP – Installation Restoration Program
- IVS – instrument verification strip
- MEC – Munitions and Explosives of Concern
- mph – miles per hour
- MPPEH – Material Potentially Presenting an Explosive Hazard
- PG – Professional Geologist
- PPE – personal protective equipment
- RAC – Remedial Action Contract
- SDS – Safety Data Sheet
- SHM – Safety and Health Manager
- SOP – standard operating procedure
- SPF – sun protection factor
- SSHO – Site Safety and Health Officer
- SSHP – Site Safety and Health Plan
- SUXOS – Senior Unexploded Ordnance Supervisor
- UXO – Unexploded Ordnance
- UXOSO – Unexploded Ordnance Safety Officer

AHA 5 Digital Geophysical Mapping

Final Accident Prevention Plan
Installation Restoration Program Site 1
Former MCAS El Toro, California
DCN: UMAC-2006-0011-0012
CTO No. 0011
AHA Signature Sheet
I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>TITLE</th>
<th>DATE</th>
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<tbody>
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<td>10.</td>
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</table>
Activity Hazard Analysis (AHA) #6

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

Job/Task: MEC and MPPEH Investigation and Removal (Intrusive Investigation)

Overall Risk Assessment Code (RAC) (Use highest code) | H
---|---

Risk Assessment Code (RAC) Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Probability</th>
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<tbody>
<tr>
<td></td>
<td>Frequent</td>
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<tr>
<td>Catastrophic</td>
<td>E</td>
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<td>Critical</td>
<td>E</td>
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<td>Marginal</td>
<td>H</td>
</tr>
<tr>
<td>Negligible</td>
<td>M</td>
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</table>

Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).

“Probability” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.

“Severity” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.

Notes: (Field Notes, Review Comments, etc.)

In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP/SSHP. EM 385-1-1 will also be available on site or electronically for review of specific materials and mitigation measures.

PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾ length sleeve shirt), hearing protection (as required), work gloves worn when indicated, a Class 2 high-visibility safety vest, and other PPE as specified below.

Project UXOS/SSHO – to be determined
First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOS/SSHO – to be determined
<table>
<thead>
<tr>
<th>Job Steps</th>
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<th>Controls</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Remove nonessential personnel from within the EZ boundaries</td>
<td>Nonessential workers could come into contact with or be affected by MEC.</td>
<td>Evacuate all nonessential personnel from area before any intrusive investigation activities are performed. Monitor the EZ while work is underway so it can be discontinued if any unauthorized personnel enter. Evacuation drill shall be conduct prior to start of work.</td>
<td>M</td>
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<tr>
<td>2. Verify adequate MEC surface clearance was conducted</td>
<td>Workers could be injured by contacting MEC materials.</td>
<td>Ensure that the sweep transects overlap to guarantee 100 percent coverage (this is the responsibility of the Senior UXO Supervisor).</td>
<td>M</td>
</tr>
<tr>
<td>3. Relocate previously identified TOI</td>
<td>Location of TOI could be incorrect. Workers could come into contact with or be affected by MEC. Workers could be struck by, or pinned against, heavy equipment. Workers could be struck by vehicles in nearby traffic. Biological hazards, such as snakes, insects, ticks, or spiders, could cause poisoning, disease.</td>
<td>Ensure that this activity is performed by a UXO-qualified person only. Verify and validate location of TOI. Ensure that the Senior UXO Supervisor is present. Plan travel routes that have been re-cleared by UXO Technicians. Under no circumstances will personnel work alone. Use remote sensing equipment to detect UXO. Mark and avoid positive targets. Wear Class 2 high-visibility reflective vests when in the vicinity of vehicular traffic. Make eye contact with operators before approaching equipment. Understand and review posted hand signals. Use traffic barricades, signs, flags, and backup spotters during field activities. Look carefully for snakes before stepping into any area or before placing hands near the ground. Watch for snakes when disturbing rubble or debris and wear snake chaps. Use DEET insect repellant as necessary. Exercise caution in locations where snakes, spiders, or scorpions could be present. Workers with allergies to stings will let the UXOSO know using the medical data sheet and will carry their own prescription medication as applicable. Provide first aid and medical attention as required. Survey the site for potential nests on the ground, or in trees, or debris during mobilization. Report any bee, wasp, hornet, or yellow jacket nests to the SUXOS and UXOSO so that an exterminator can be called in to remove or exterminate the nest properly. Let other workers know the location of the nest so it is not disturbed.</td>
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### AHA #6 – Job/Task: MEC and MPPEH Investigation and Removal (Intrusive Investigation)

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</tr>
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<tbody>
<tr>
<td>3. Relocate previously identified TOI (continued)</td>
<td>Workers could be struck by lightning.</td>
<td>Follow the 30-second rule (time between lightning strike and thunder) for shutdown of operations, or as determined by the SSHO. Immediately suspend operations when lightning is in the immediate vicinity and seek shelter in a building (preferred) or vehicle. Monitor the local weather report daily and as necessary for any severe weather warnings. Wait 30 minutes after the last lightning strike before resuming work. Don’t use or be in contact with metal fixtures or telephone lines when inside structures.</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Workers could be injured by debris or materials falling during high winds.</td>
<td>Ensure that all debris/materials are secured. Shut down operations when wind speed is &gt; 30 mph sustained, or lower based on a real-time hazard assessment. Monitor the local weather report daily and as necessary for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies.</td>
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<tr>
<td></td>
<td>Lack of communication in widely dispersed areas could lead to a delayed response in an emergency.</td>
<td>Ensure that each work team has a telephone, or access to a telephone, for emergency communication. A work team may substitute a 2-way radio for a phone, if the other radio party has access to a phone. If more than one team at a time is working, ensure that there is communication between the work teams and project management. Use the buddy system.</td>
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<tr>
<td></td>
<td>Workers could be exposed to extreme temperatures and sunburn.</td>
<td>Monitor for heat stress in accordance with EHS Procedure 4-06, Temperature Extremes. Provide fluids and rest breaks during warm weather and while wearing impermeable protective clothing. Use broad-spectrum sunscreen lotion with a minimum SPF of 15.</td>
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</tr>
<tr>
<td>4. Conduct intrusive investigation</td>
<td>Hand excavation could cause injury to workers.</td>
<td>Use probes prior to use of hand tools. Intrusive work will be performed by UXO-qualified personnel only. Don leather work gloves prior to performing task. Ensure the Senior UXO Supervisor is present. Work will be performed by a UXO-qualified person only. Under no circumstances will personnel work alone. Keep all spark- and flame-producing materials away from energetic materials. Do not handle ammunition and explosives roughly or carelessly. Extra care should be taken, because, in most cases, the hazards of the ammunition and/or explosives increase with age, deterioration, or damage.</td>
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<td>Handling MEC could cause unplanned detonation.</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
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<tr>
<td>4. Conduct intrusive investigation (continued).</td>
<td>Excavation hazards, such as airborne dust, could be present.</td>
<td>Excavation is not to exceed 1.5 feet in depth. Spoil banks and equipment must be at least 3 feet away from the excavation (EHS Procedure 6-03). Review excavation AHA, in addition to this AHA, with the work crew. Maintain eye contact with operators. Personnel must wear Class 2 high-visibility clothing. Avoid climbing on stockpiles. Cover all stockpiles if left overnight. Barricade all open excavations, as required in the Work Plan. Handle soil carefully to avoid dust generation. Use water truck, and misters, to minimize airborne dust at all times.</td>
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<tr>
<td></td>
<td>Workers could be struck by, or pinned against, heavy equipment.</td>
<td>Wear reflective warning vests when exposed to vehicular traffic. Avoid equipment swing areas. Make eye contact with operators before approaching equipment. Understand and review posted hand signals. Workers must always be in visual sight of the operators. Use trained spotters.</td>
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<td></td>
<td>TOI could become unstable or otherwise dangerous due to its condition. For areas where MEC/MPPEH may be present, an unanticipated explosion could occur.</td>
<td>Work will be performed by a UXO-qualified person only. Immediately evacuate to safe zones when notified to do so.</td>
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<td></td>
<td>Noise from operating heavy equipment could damage hearing.</td>
<td>Cab of excavator will be equipped with proper shielding to protect the operator, as specified in the ESS and Work Plan. Personnel not directly involved will remain away from active work location, as specified in the work plan procedures and ESS under SUXOS direction. Follow approved procedures in the work plans at all times and Procedure UXO-3, -5, -6, and -7 from the CRL. Properly qualified UXO personnel will provide MEC avoidance guidance. Non-UXO personnel will adhere to instructions provided by UXO personnel at all times. All MEC will be treated on site by qualified UXO technicians using donor explosives in accordance with SOPs in the Work Plan and the ESS.</td>
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<td>Hearing protection is required when sound levels exceed 84 dBA continuously.</td>
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</tbody>
</table>
## AHA #6 – Job/Task: MEC and MPPEH Investigation and Removal (Intrusive Investigation)

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<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
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</thead>
<tbody>
<tr>
<td>1. Site vehicles</td>
<td>Drivers must have current state-issued driver’s license. Only trained and authorized personnel will operate off-road vehicles.</td>
<td>Receipt inspection by Equipment Supervisor. Daily vehicle inspection by drivers.</td>
</tr>
<tr>
<td>2. Magnetometers</td>
<td>Only qualified UXO Technicians trained in care and use of magnetometers will operate such equipment.</td>
<td>Receipt inspection by UXO Technician. Daily inspection by UXO Technician. Workers must successfully complete instrument verification demonstration.</td>
</tr>
<tr>
<td>3. Hand tools</td>
<td>Training in use of hand tools will be provided by the SSHO or designee, and workers will review operating manual. Use proper hand tool for the task.</td>
<td>Daily inspection by users/operators.</td>
</tr>
<tr>
<td>4. Heavy equipment, such as excavator</td>
<td>Only trained equipment operators will operate heavy equipment.</td>
<td>Inspect all equipment before each use. Document inspection on provided form. Operator’s manual must be present on the site.</td>
</tr>
<tr>
<td>5. Industrial hygiene monitoring equipment (e.g., WBGT)</td>
<td>Personnel must be familiar with use/limitations of the monitoring equipment, calibration procedures, and industrial hygiene strategy.</td>
<td>Calibration and function checks before use.</td>
</tr>
<tr>
<td>6. First aid kits and other emergency equipment</td>
<td>Emergency equipment/first aid kits must only be used by personnel familiar with this plan; equipment use and inspection criteria, and information regarding what the equipment is used for will be provided by or under direction of the SSHO.</td>
<td>Inspect initially and at least weekly thereafter or after use for restocking (29 CFR 1926.50(d)(2)). First aid kits must be filled per EM 385-1-1 Table 3-1. Inspect eye wash station weekly (performed by UXOSO). Potable water changed weekly unless a preservative solution is used.</td>
</tr>
</tbody>
</table>

### Abbreviations and Acronyms:

- AHA – Activity Hazard Analysis
- APP – Accident Prevention Plan
- CFR – Code of Federal Regulations
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- CTO – Contract Task Order
- dBA – decibels, A-scale
- DEET – N,N-diethyl-meta-toluamide
- DON – Department of the Navy
- EHS – environmental health and safety
- EM – Engineer Manual
- ESS – Explosives Safety Submission
- EZ – exclusion zone
- IRP – Installation Restoration Program
- MEC – Marine Corps Air Station
- MEC – munitions and explosives of concern
- mph – miles per hour
- MPPEH – material potentially presenting an explosive hazard
- PG – Professional Geologist
- PPE – personal protective equipment
- RAC – Risk Assessment Code
- SPF – skin protection factor
- SHM – Safety and Health Manager
- SOP – standard operating procedure
- SS – Site Supervisor
- SSHO – Site Safety and Health Officer
- SSHP – Site Safety and Health Plan
- SUXOS – Site UXO Supervisor
- TOI – target of interest
- UXO – unexploded ordnance
- UXOSO – Unexploded Ordnance Safety Officer
- WBG – wet bulb globe temperature
AHA Signature Sheet
I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

<table>
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<tr>
<th>NAME</th>
<th>SIGNATURE</th>
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Activity Hazard Analysis (AHA) #7

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

Job/Task: Soil Sampling

<table>
<thead>
<tr>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
<th>M</th>
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</table>

Risk Assessment Code (RAC) Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Probability</th>
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<tbody>
<tr>
<td>Frequent</td>
<td>Likely</td>
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<tr>
<td>Catastrophic</td>
<td>E</td>
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<tr>
<td>Critical</td>
<td>E</td>
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<tr>
<td>Marginal</td>
<td>H</td>
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<tr>
<td>Negligible</td>
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</table>

Notes: (Field Notes, Review Comments, etc.)
In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP/SSHP. TECC Corporate Safety Programs and EM 385-1-1 will also be available on site for review of specific materials and mitigation measures.

Scope: This AHA covers pre-excavation and post-excavation soil sampling. Soil samples will be collected from a maximum depth of 3 feet bgs using hand augers and scoops for samples collected from stockpiles, and using an excavator bucket for samples collected from the excavation bottom and sidewalls.

PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾ length shirt sleeve), hearing protection (as required), work gloves worn when indicated, a Class 2 high-visibility safety vest, and other PPE, as specified below.

Project UXOSO/SSHO – to be determined
First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined.

Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).

“Probability” is the likelihood to cause an incident, near miss, or accident and identified as Frequent, Likely, Occasional, Seldom, or Unlikely.

“Severity” is the outcome/degree if an incident, near miss, or accident did occur and identified as Catastrophic, Critical, Marginal, or Negligible.

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on AHA. Annotate the overall highest RAC at the top of AHA.
### AHA #7 – Job/Task: Soil Sampling

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
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</thead>
<tbody>
<tr>
<td>1. Assess site safety</td>
<td>Slip, trip, and fall hazards could cause injury to workers. Vehicle traffic patterns could present a potential hazard to workers.</td>
<td>Visually inspect work areas for slip, trip, and fall hazards; hazards will be marked, barricaded, or eliminated, as necessary. Maintain good housekeeping in the work area. Perform work only during daylight hours. Ensure no equipment is operating or traveling near field workers while soil samples are being collected.</td>
<td>M</td>
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<tr>
<td>2. Collect soil samples</td>
<td>Workers could be struck by vehicles in traffic area. Chemical exposure to MC or naphthalene in contaminated soils being sampled, or dusts, if generated, could cause harm to workers. Workers could suffer strains from the improper use of tools, such as shovels and hand augers. Improper zone control could expose workers to chemical hazards.</td>
<td>Ensure that the person collecting soil samples wears a hardhat and Class 2 high-visibility, reflective safety vest, in addition to steel-toed boots, safety glasses, and nitrile gloves. If walking on soil stockpiles, the sampler will wear Kleengard overboots or PVC boots that can be decontaminated. Equipment operators must be aware of the presence of workers on the ground, because they may be hard to see while they are sampling. It is best that two people work as a team, with one worker always standing upright while the other worker is sampling. Ensure that workers on the ground remain visible to the operator, and obtain permission to enter the area prior to getting within the swing radius of the equipment. Wear nitrile gloves during sampling. Remove PPE properly and wash hands upon completion of sampling. If walking on soil stockpiles, the sampler will wear Kleengard overboots or PVC boots that can be decontaminated. Ensure positive dust control activities are conducted at all times when handling soil, if dusts are generated. Ensure hands are washed after sampling, and doff PPE in the CRZ. Inspect all tools for damage before use. Do not use damaged tools. Mark and tag them as “out of service.” Maintain a steady pace and follow the rest periods given on the job. Use appropriate tools for the task, and maintain tools in good condition. Wear leather work gloves when using hand augers. Establish work zones in each work area by using barricades or cones. Remove PPE and decontaminate within the CRZ.</td>
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<tr>
<td>3. Handle soil samples</td>
<td>Exposure to sample preservation chemicals (if used) could cause harm to workers.</td>
<td>Review SDSs for sample preservation chemicals. Wear nitrile gloves when handling preservation chemicals that could be methanol or acid based.</td>
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</table>
### AHA #7 – Job/Task: Soil Sampling

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
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<tbody>
<tr>
<td>1. Hand tools</td>
<td>Specific training for hand tools.</td>
<td>Inspect before each use. Discard defective tools.</td>
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<tr>
<td>2. PPE, nitrile gloves, Kleengard overboots</td>
<td>Specific training for workers collecting field soil samples.</td>
<td>Inspect PPE and nitrile gloves prior to being used by samplers when collecting soil samples. Gloves will be changed between each sampling location.</td>
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<tr>
<td>3. First aid kits and other emergency equipment</td>
<td>Emergency equipment/first aid kits must only be used by personnel familiar with this plan; equipment use and inspection criteria, and information regarding what the equipment is used for will be provided by or under the direction of the SSHO.</td>
<td>Inspect initially and at least weekly thereafter, or after use for restocking (29 CFR 1926.50(d)(2)). First aid kits must be stocked per EM 385-1-1 Table 3-1. Eye wash station should be inspected weekly by UXOSO. Potable water should be changed weekly unless a preservative solution is used.</td>
</tr>
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</table>

**Abbreviations and Acronyms:**

- AHA – Activity Hazard Analysis
- APP – Accident Prevention Plan
- bgs – below ground surface
- CFR – Code of Federal Regulations
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CPR – cardiopulmonary resuscitation
- CRZ – contamination reduction zone
- CSP – Certified Safety Professional
- CTO – Contract Task Order
- DON – Department of the Navy
- EM – Engineer Manual
- MC – munitions constituents
- MCAS – Marine Corps Air Station
- IRP – Installation Restoration Program
- PG – Professional Geologist
- PPE – personal protective equipment
- PVC – polyvinyl chloride
- RAC – Risk Assessment Code
- SDS – Safety Data Sheet
- SHM – Safety and Health Manager
- SS – Site Supervisor
- SSHO – Site Safety and Health Officer
- SHSP – Site Safety and Health Plan
- SUXOS – Site UXO Supervisor
- TTEC – Tetra Tech EC, Inc.
- UXOSO – Unexploded Ordnance Safety Officer
**AHA Signature Sheet**

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

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Activity Hazard Analysis (AHA) #8

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of field work by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

<table>
<thead>
<tr>
<th>Job/Task: Hot Work (Affix shielding to cab of excavator)</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
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</thead>
<tbody>
<tr>
<td>Project Location: IRP Site 1</td>
<td>Risk Assessment Code (RAC) Matrix</td>
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<tr>
<td>Former MCAS El Toro, California</td>
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<tr>
<td>Contract Number: N62473-12-D-2006, CTO 0011</td>
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<td>Date Prepared: March 2016</td>
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<tr>
<td>Prepared by (Name/Title): Arthur Gunter, PG</td>
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<tr>
<td>Reviewed by (Name/Title): Roger Margotto, CIH, CSP, CHMM, SHM</td>
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</table>

Notes: (Field Notes, Review Comments, etc.)
In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved APP/SSHP. TtEC Corporate Safety Programs and EM 385-1-1 will also be available on site for review of specific materials and mitigation measures.

PPE for this AHA will consist of a hard hat (when overhead safety hazards exist), safety-toed boots, safety glasses with side shields, a standard work uniform (long pants, ¾-length shirt sleeve), hearing protection (as required), work gloves worn when indicated, Class 2 high-visibility safety vest, and other PPE as specified below.

Project UXOSO/SSHO – to be determined
First aid-/CPR-qualified personnel: SUXOS – David Williams; UXOSO/SSHO – to be determined

---

Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (see above).

“Probability” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.

“Severity” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.

RAC Chart

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<tr>
<th>RAC</th>
<th>Probability</th>
<th>Severity</th>
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<tbody>
<tr>
<td>E</td>
<td>Extremely High Risk</td>
<td>Catastrophic</td>
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<tr>
<td>H</td>
<td>High Risk</td>
<td>Critical</td>
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<tr>
<td>M</td>
<td>Moderate Risk</td>
<td>Marginal</td>
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<tr>
<td>L</td>
<td>Low Risk</td>
<td>Negligible</td>
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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.
<table>
<thead>
<tr>
<th>Job Steps</th>
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<th>RAC</th>
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<tbody>
<tr>
<td>1. Inspect acetylene torch and lines; use a qualified and trained welder/torch operator</td>
<td>Defective switches, meters, hoses, cables and valves could cause injury to workers.</td>
<td>Follow manufacturer’s operating manual for inspections. All electrical equipment must meet UL or CSA listings. Documentation of training or certification of welder/torch cutter must be on file. Torch lines will be completely flexible, capable of handling the maximum current, and in good repair. Welding supply cables will not be placed in areas of vehicular or pedestrian traffic, or near power supply cables, or other high tension wires. Valves will be accessible for shutdown when the leads are unattended.</td>
<td>M</td>
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<tr>
<td>2. Inspect compressed gas cylinders</td>
<td>Potential fire or explosion hazards could result in exposure of workers to chemical hazards.</td>
<td>No smoking or other spark- or heat-producing activities will occur in vicinity of compressed gas cylinders. Replace cylinders by first shutting valves and securing valve stem with protective shroud. Avoid breathing fumes. When storing cylinders, uncouple them from welding system, place caps on cylinders and secure upright and segregated from each other (e.g., oxygen away from acetylene or propane).</td>
<td>M</td>
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<tr>
<td>3. Inspect area where torch cutting will be performed; set up protective barriers; obtain hot work permit</td>
<td>Flammable and combustible materials near workers could cause injuries to workers.</td>
<td>Remove or cover all flammable or combustible materials within the area. Ensure barriers are positioned to restrict exposure of other workers and nearby people to the welding arc.</td>
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<tr>
<td>4. Remove all combustibles and flammables within 50 feet of welding</td>
<td>Lifting of materials and equipment could cause back or muscular injury to workers. Trip hazards in area could cause injuries to workers.</td>
<td>Use safe lifting techniques. Do not lift any item greater than 50 pounds, remove trip hazards, and any hazards in area where electrical leads could snag. Mark hazards that cannot be removed.</td>
<td>M</td>
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<tr>
<td>5. Place 60-BC fire extinguisher 25 feet from work area along egress path</td>
<td>Lack of fire suppression in area could cause fire to be uncontrolled and result in injuries to workers.</td>
<td>Validate that fire extinguisher has been inspected. Ensure a fire watch is designated in accordance with the permit.</td>
<td>M</td>
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<tr>
<td>6. Perform torch cutting following accepted practices</td>
<td>Failure to follow torch cutting procedures and manufacturer’s requirements could cause damage to property or injury to workers.</td>
<td>Ensure that only qualified or certified welders perform welding or torch cutting. Follow manufacturer’s requirements and operating instructions. Do not torch or saw cut painted surfaces until paint has been analyzed for heavy metals. Avoid contact with hot slag and torch flame. Have water source and burn kit available. Wear eye/face protection as well as fire retardant coveralls and welding chaps/gloves/jacket as specified in TtEC hot work procedures. Inhalation of metal fumes could cause injuries to workers.</td>
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<td>Have UXOSO/SSHO and SHM evaluate fume exposures. Wear respiratory protection to control fume exposures, as necessary, based on SHM hazard.</td>
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### AHA # 8 Hot Work

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<th>Job Steps</th>
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<tr>
<td>7. Clean surface to be cut</td>
<td>Sparking and incidental fires could result from debris, labels, or other materials on or within the vessel being dismantled, and cause injuries to workers.</td>
<td>Ensure that surface to be cut is free of labels or other surface debris that can ignite.</td>
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<td>8. Don PPE consisting of leather or other suitable flame resistant apron or clothing, gloves, and welding helmet with shade #12-14 or darker</td>
<td>Improper PPE could cause workers to be exposed to heat, sparks, fire, electrocution. Ultraviolet light from welding could damage eyesight of welder. Welder could be exposed to toxic fumes from welding.</td>
<td>Inspect and wear specified PPE. Review SDS for shielded electrode. Wear respiratory protection for welding fumes (EM 385-1-1. 10.B.04.c.). Supplied air may be required. In this case, the SHM should be contacted and this AHA updated accordingly.</td>
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<tr>
<td>9. Complete cutting, turn off gas at torch and at source cylinders; transport manageable metal pieces to bins</td>
<td>Failure to disconnect properly could expose workers to flammable and explosive hazards. Lifting of cut metal pieces could cause muscular strain or injury to workers.</td>
<td>Check and double check that torch fuel source has been properly turned off. Use safe lifting techniques and use care as piece may still be hot. Wear leather work gloves when handling metal pieces.</td>
<td>M</td>
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<tr>
<td>10. Return lines and supplies to storage</td>
<td>Trip hazards when handling lines could cause injuries to workers.</td>
<td>Follow good housekeeping procedures. Store hoses in a manner that avoids damage, such as cutting, exposure to chemicals, or kinks.</td>
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<td>11. Inspect area for fire and stay in area for 30 minutes after work is completed to ensure there is no potential for fire</td>
<td>Failure to inspect could cause an uncontrolled fire to spread beyond work area, injuring workers.</td>
<td>Ensure workers communicate with other workers so that they can be notified if a fire starts. Ensure fire watch is assigned as per the hot work permit.</td>
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<tr>
<td>Equipment to be Used</td>
<td>Training Requirements</td>
<td>Inspection Requirements</td>
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<tr>
<td>1. Equipment – torch cutting equipment, electrodes, generator</td>
<td>Specific training for use of welding unit will be provided, or documentation of such training provided. Qualified or certified welder must be used. Ensure manufacturer’s operation manual is on site.</td>
<td>Inspect equipment before each use, following manufacturers’ requirements. Document inspection on an inspection form or in a logbook.</td>
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<tr>
<td>2. Power tools, hand tools</td>
<td>Specific training for power tools and hand tools will be provided.</td>
<td>Inspect hand tools before each use, following manufacturers’ requirements. Discard or tag out of service any tools that are damaged. Do not use power tools that have frayed cords or exposed wiring. All power tools must have a grounding plug or be double insulated. The UXOSO will inspect cords and electrical connections daily. All power tools must be listed by a nationally recognized testing laboratory.</td>
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<td>3. Vehicles - pickup trucks</td>
<td>Only licensed personnel will operate vehicles.</td>
<td>Inspect daily and before each use. Use the equipment safety checklist found in the SSHP or from the operator’s manuals.</td>
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<tr>
<td>4. First aid kits and other emergency equipment</td>
<td>Emergency equipment/first aid kits must be used by personnel familiar with this plan; equipment use and inspection criteria, and information regarding what the equipment is used for will be provided by or under the direction of the SSHO.</td>
<td>Initially and at least weekly thereafter, or after use for restocking (29 CFR 1926.50[d][2]). First-aid kits must be filled per EM 385-1-1-1 Table 3-1. Inspect eye wash station weekly (to be performed by UXOSO). Change potable water weekly unless a preservative solution is used.</td>
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<tr>
<td>5. PPE: long pants, protective boots, safety glasses, hard hat, work gloves, hearing protection, and welding/torch cutting equipment</td>
<td>Training will be provided in the use and care of PPE, as provided in OSHA HAZWOPER 40-hour course and 8-hour refresher. Training will be provided regarding the proper use of welding and hot cutting PPE for welders/torch operators.</td>
<td>Inspect all items prior to each use.</td>
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**Abbreviations and Acronyms:**

| AHA – Activity Hazard Analysis | EM – Engineer Manual | SDS – Safety Data Sheet |
| APP – Accident Prevention Plan | HAZWOPER – Hazardous Waste Operations and Emergency Response | SHM – Safety and Health Manager |
| CFR – Code of Federal Regulations | IRP – Installation Restoration Program | SSOH – Site Safety and Health Officer |
| CIH – Certified Industrial Hygienist | MCAS – Marine Corps Air Station | SSHSP – Site Safety and Health Plan |
| CHMM – Certified hazardous Materials Manager | OSHA – Occupational Safety and Health Administration | SUXOS – Site UXO Supervisor |
| CSA – Canadian Standards Association | PG – Professional Geologist | Tec – Tetra Tech EC, Inc. |
| CSP – Certified Safety Professional | PPE – personal protective equipment | UXOSO – Unexploded Ordnance Safety Officer |
| CTO – Contract Task Order | RAC – Risk Assessment Code | UL – Underwriter’s Laboratories |
| DON – Department of the Navy | | |
AHA Signature Sheet

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

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Activity Hazard Analysis (AHA) #9

A draft AHA for this task is included below. This AHA will be reviewed by the SHM and the DON as part of the planning activities conducted during development and finalization of the APP. The draft AHA will be finalized prior to initiation of this phase of fieldwork by the staff performing the work, and will be submitted for final approval by the SHM and the DON prior to the preparatory phase inspection. The approved AHA will be included with the daily report. Any modifications to the approved AHA that result in a higher RAC than in the approved AHA will also be reviewed by the DON and SHM. The AHA will be maintained as a living document by the staff performing the work, under SSHO and SS oversight, to keep it current to the work being performed and the hazards presented by the work.

<table>
<thead>
<tr>
<th>Job/Task: Vegetation Management</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
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<tbody>
<tr>
<td>Project Location: IRP Site 1</td>
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<tr>
<td>Former MCAS El Toro, California</td>
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<tr>
<td>Contract Number: N62473-12-D-2006, CTO 0011</td>
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<td>Date Prepared: December 2016</td>
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<tr>
<td>Prepared by (Name/Title): Arthur Gunter, PG</td>
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<tr>
<td>Reviewed by (Name/Title): Roger Margotto, CIH, CSP, SHM</td>
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Risk Assessment Code (RAC) Matrix

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<tr>
<th>Severity</th>
<th>Probability</th>
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<tr>
<td></td>
<td>Frequent</td>
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<tr>
<td>Catastrophic</td>
<td>E</td>
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<tr>
<td>Critical</td>
<td>E</td>
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<tr>
<td>Marginal</td>
<td>H</td>
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<tr>
<td>Negligible</td>
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Notes: (Field Notes, Review Comments, etc.)
1. In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved SSHP. EM 385-1-1 will also be available on site or electronically for review of specific materials and mitigation measures.
2. Vegetation removal will only be done after an area has been surface-cleared of potentially explosive items.
3. Anthony Crino is designated as the Competent Person.

Step 1: Review each “Hazard” with identified safety “Controls” and determine RAC (See above)

“Probability” is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

“Severity” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk
## AHA #9 – Job/Task: Vegetation Management

<table>
<thead>
<tr>
<th>Job Steps</th>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
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<tbody>
<tr>
<td>1. Avoid damage to protected vegetation</td>
<td>Damage to protected or sensitive vegetation could occur.</td>
<td>Ensure the area is authorized for vegetation clearance prior to conducting these activities. Ensure any sensitive vegetation is marked for protection and avoided.</td>
<td>L</td>
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<tr>
<td>2. Avoid MEC</td>
<td>Workers could be injured by MEC.</td>
<td>UXO avoidance will be conducted by trained UXO technicians. Non-UXO personnel will be escorted while performing this task if not performed by UXO technicians. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered, and UXO technicians will secure the area. Non-UXO personnel will leave the area. If MEC/MPPEH is observed, the UXO technician will mark the area for UXO avoidance. The team will stop operations in the immediate area and take the following precautions: (1) MEC/MPPEH will not be moved. (2) The UXO technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the location will be recorded in the logbook. (3) Suspect MEC/MPPEH items discovered will be reported for turnover to the appropriate personnel. Until transfer occurs, the item will be watched over by the SUXOS or by the UXO technician. Refer to AHA #6 if magnetometer is used in support of vegetation clearance.</td>
<td>M</td>
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<tr>
<td>3. Use equipment to clear vegetation</td>
<td>Strains could result from use of tools, such as shovels, axes, chain saws, and brush trimmers. Workers could cut themselves using tools. Noise from power equipment – chain saws, weed cutters, vehicles – could cause hearing loss to workers. Workers could be struck by or fall against chain saw, if used.</td>
<td>Maintain steady pace when using tools and take adequate rest periods. Use appropriate tools for the task and maintain tools in good condition. Wear leather work gloves when using tools. Avoid working too close to other workers. Wear full denim or heavy pants when using weed and brush trimmers. Hearing protection is required when sound levels continuously exceed 84 dBA. Follow safe work practices. Wear cutting chaps.</td>
<td>M L</td>
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</table>
## AHA #9 – Job/Task: Vegetation Management

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<tr>
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<tbody>
<tr>
<td>Ensure that saw interlock is operable. The saw must automatically shut off when the trigger is released. Wear required safety gear – hard hat, steel-toed boots, safety glasses, and hearing protection.</td>
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<tr>
<td>3. Use equipment to clear vegetation (continued)</td>
<td>Exposure to poison oak, ivy, or sumac.</td>
<td>This type of vegetation needs to be managed in a manner that avoids spreading it around the site. It is best to identify the locations of poison ivy or oak and clear them separately in a manner that avoids spreading this type of vegetation throughout the job site.</td>
<td>M</td>
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<tr>
<td>Strains to workers from use of tools, such as shovels.</td>
<td>Maintain steady pace when using tools, and take adequate rest periods. If possible, rotate tasks among the workers. Use appropriate tools for the task, and maintain them in good condition.</td>
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<tr>
<td>Workers could experience strains from manually moving materials and equipment.</td>
<td>Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting, and getting help when moving bulky/heavy materials and equipment. Encourage a steady, sustainable work pace.</td>
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<tr>
<td>Workers could be exposed to heat or cold stress.</td>
<td>Monitor for heat or cold stress in accordance with Procedure EHS 4-06, Temperature Extremes. Provide fluids and rest breaks during warm weather, and while wearing impermeable protective clothing.</td>
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<td>L</td>
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<tr>
<td>Workers could experience eye hazards from flying debris.</td>
<td>Safety glasses are the minimum required eye protection for all work areas. Use dust control methods, as necessary. Locate a portable emergency eye wash at each work area. Flush objects from eyes; do not rub.</td>
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<tr>
<td>Lack of communication in widely dispersed areas could lead to a delayed response in an emergency.</td>
<td>Ensure that each work team has a telephone, or access to a telephone, for emergency communication. A work team may substitute a 2-way radio for a phone if the other radio party has access to a phone. If more than one team at a time is working, ensure that there is communication between the work teams and project management. Use the buddy system.</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
<td>RAC</td>
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<td>Workers could be struck by lightning.</td>
<td>Follow the 30-second rule (time between lightning strike and thunder) for shutdown of operations, or as determined by the SSHO. Immediately suspend operations when lightning is in the immediate vicinity and seek shelter in a building (preferred) or vehicle. Monitor the local weather report daily and as necessary for any severe weather warnings. Wait 30 minutes after the last lightning strike before resuming work. Don’t use or be in contact with metal fixtures or telephone lines when inside structures.</td>
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<tr>
<td>Workers could be injured by high winds.</td>
<td>Ensure that all debris/materials are secured. Shut down operations when wind speed is &gt; 30 mph sustained. Monitor the local weather report daily and as necessary for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies (safe refuge areas, emergency assembly areas).</td>
<td>L</td>
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</tr>
<tr>
<td>3. Use equipment to clear vegetation (continued)</td>
<td>Biological hazards, such as snakes, insects, ticks, or spiders, could cause poisoning, disease.</td>
<td>Look carefully for snakes before stepping into any area or before placing hands near the ground. If going through high grass or brush, use a walking stick to probe the area ahead of you to check for snakes. Watch for snakes when disturbing rubble or debris. Use insect repellent as necessary.</td>
<td>L</td>
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<tr>
<td>Off-road vehicle travel could injure workers.</td>
<td>Training on proper use and limitations of off-road vehicles will be provided and competence in use demonstrated. Equipment will not be operated on grades that exceed equipment manufacturer’s recommendations. Personnel will follow on- and off-road restrictions and speed limits.</td>
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<tr>
<td>Heavy equipment could injure workers.</td>
<td>Heavy equipment used for vegetation removal require acknowledgement from the operator whenever in the proximity of the equipment.</td>
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<tr>
<td>4. Fuel handling</td>
<td>Handling of fuel for chain saws, vehicles, and brush trimmer may expose workers to fuel.</td>
<td>Review SDS for fuel with all workers. Workers will be instructed on fuel transfer procedures. Wear protective nitrile gloves when handling fuel. Use procedures that prevent fuel from spilling. Fuel only in a designated area that has spill protection and control. Have spill control material available and clean up all spills immediately.</td>
<td>M</td>
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<tr>
<td>Spills can cause environmental damage.</td>
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<tr>
<td>Job Steps</td>
<td>Hazards</td>
<td>Controls</td>
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<tr>
<td>5. Use of mowing equipment</td>
<td>Refueling may cause spills or fire.</td>
<td>Refuel mowers or other equipment only in a designated area. Do not refuel any equipment that is located on a pickup truck or trailer. Refuel equipment on a level surface such as concrete. Clean up all spills immediately using readily available spill control materials. Report any spills. Do not refuel hot equipment. Allow the engine to cool. Smoking is never allowed during any fueling operation. Wear PPE and chemical protective gloves, such as nitrile gloves.</td>
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</table>

5. Use of mowing equipment (continued)

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Controls</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation may cause debris to fly out from mower and dust may be generated.</td>
<td>Perform a foreign object and debris check prior to using any mowing or lawn cutting equipment. Ensure that other people are not within the vicinity of cutting equipment. Other people must maintain a safe clearance distance. Inspect all equipment before use, especially any cutting blades and the attachments. Mower may tip while being operated, causing injury to workers.</td>
<td>Never ride a mower along the horizontal plane of a steep slope. Ride perpendicular to the grade when riding a mower up or downhill. Operate mower at a safe speed. Watch for pits, depressions, large rocks, and any other object that could destabilize the mower. Refueling may cause spills or fire.</td>
</tr>
<tr>
<td>Refueling may cause spills or fire.</td>
<td>Refuel lawn mowers or other equipment only in a designated area. Do not refuel any equipment that is located on a pickup truck or trailer. Refuel equipment on a level surface such as concrete. Clean up all spills immediately using readily available spill control materials. Report any spills. Do not refuel hot equipment. Allow the engine to cool. Smoking is never allowed during any fueling operation. Wear PPE and chemical protective gloves, such as nitrile gloves.</td>
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</tbody>
</table>
# AHA #9 – Job/Task: Vegetation Management

<table>
<thead>
<tr>
<th>Equipment to be Used</th>
<th>Training Requirements</th>
<th>Inspection Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vehicles</td>
<td>Drivers must have current state-issued driver’s license.</td>
<td>Daily and before use. Use equipment safety checklist.</td>
</tr>
<tr>
<td>2. Power and hand tools</td>
<td>Specific training for power and hand tools will be provided. Review operators’ manual for each tool and ensure that directions are followed.</td>
<td>Inspect before each use. Power tools must be listed by a recognized testing laboratory such as UL, CSA or FM.</td>
</tr>
<tr>
<td>4. First aid kits and other emergency equipment</td>
<td>Use of emergency equipment/first aid kits must be done by personnel familiar with this plan Instruction regarding the use and inspection criteria of the equipment, and what the equipment is used for, will be provided by or under direction of the UXOSO.</td>
<td>First aid kit, initially and at least weekly thereafter or after use for restocking. Fire extinguishers, initially and monthly thereafter.</td>
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</tbody>
</table>

**Abbreviations and Acronyms:**
- AHA – activity hazard analysis
- APP – Accident Prevention Plan
- CIH – Certified Industrial Hygienist
- CSA – Canadian Standards Association
- CSP – Certified Safety Professional
- dBA – decibels, A scale
- DON – United States Department of the Navy
- EM – Engineer Manual
- FM – Factory Mutual
- IRP – Installation Restoration Program
- IVS – instrument verification strip
- MCAS – Marine Corps Air Station
- MEC – munitions and explosives of concern
- mph – miles per hour
- MPPEH – material potentially presenting an explosive hazard
- PPE – personal protective equipment
- RAC – Risk Assessment Code
- SDS – Safety Data Sheet
- SHM – Safety and Health Manager
- SS – Site Supervisor
- SSHO – Site Safety and Health Officer
- SSHP – Site Safety and Health Plan
- SUXOS – Senior Unexploded Ordnance Supervisor
- TtEC – Tetra Tech EC, Inc.
- UL – Underwriter’s Laboratories
- UXO – unexploded ordinance
- UXOSO – UXO Safety Officer
**AHA Signature Sheet**

I have reviewed the above AHA and acknowledge the hazards involved with this work task and the controls that will help to minimize illness or injury during the tasks.

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>TITLE</th>
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APPENDIX B

CORPORATE SAFETY AND HEALTH POLICY STATEMENT
APPENDIX B

STATEMENT OF SAFETY AND HEALTH POLICY

Tetra Tech EC, Inc. (TtEC) is committed to ensuring the health, safety, and well-being of our employees and the communities in which we work, enhancing and protecting the environment, and providing quality services to our clients. Our Environmental, Safety, and Quality (ESQ) Policy provides the framework and underlying principles for our Environmental Management System and is an integral part of how we conduct business.

All TtEC associates have the right to work in a safe and healthful workplace, as well as the responsibility to help create and work in a safe and environmentally protective manner. In accordance with our Safety and Health Policy:

- We will complete our work successfully, with a great deal of attention to health and safety by:
  - Incorporating pollution prevention and loss prevention principles into our work process.
  - Employing well-trained personnel who understand and have the knowledge to fulfill their ESQ responsibilities.
- We will fully comply with all laws and regulations pertaining to our business, as well as company policies and procedures.
- We will commit ourselves to complying with the terms of our contracts and to meeting the four project objectives—knowing scope, budget, schedule, and level of quality.
- We will provide the level of quality our internal and external clients expect and pay for and use its attainment as our measure of success.
- We will safely and properly plan our work and work our plan.
- We will communicate and document the execution of our work.
- We will gather data and make decisions inclusively and involve employees and others affected by ESQ decisions inclusively.
- We will dedicate ourselves to continuous improvement by:
  - Establishing and periodically updating ESQ improvement objectives and targets.
  - Recognizing outstanding employee and project ESQ performance.

These commitments are defined in, and are fundamental to, our Client Service Quality®, Do It Right®, and Shared Vision®, and Zero Incident Performance® operating philosophies.
APPENDIX C

EHS PROGRAMS AND PROCEDURES
1.0 PURPOSE

The purpose of this procedure is to identify minimum requirements, and to provide guidance to Tetra Tech EC, Inc. (TtEC) project personnel concerning the management of construction tools and equipment on a construction project incorporating the Corporate operating principles of ‘Do It Right®’, ‘Client Service Quality®’, and ‘Shared VisionSM’.

2.0 SCOPE

This procedure applies to all TtEC projects that include a construction, O&M, and/or UXO component, including remediation construction.

3.0 MINIMUM REQUIREMENTS

3.1 DEFINITIONS

3.2 ROLES & RESPONSIBILITIES

3.3 SAFE OPERATION REQUIREMENTS FOR TOOLS

4.0 GUIDANCE

4.1 ADDITIONAL CONSIDERATIONS

5.0 REFERENCES

6.0 ATTACHMENTS
3.1.1 Construction Equipment

For the purposes of this procedure, construction equipment shall mean heavy equipment, such as excavators, scrapers, off-road trucks, dozers, road graders, compactors, dredges, and cranes; light equipment, such as skid-steers, forklifts, generators, and light plants; and operating systems such as screens, crushers, conveyors, pugmills, mobile treatment plants, and pumps. Any discussion of construction equipment shall be understood not to include cars, pickup trucks, flatbed trucks, etc. registered for use on public roadways, which shall be called vehicles hereinafter. Also for the purposes of this procedure, construction equipment shall be synonymous with Contractor’s Equipment, a term also commonly used in the construction industry to designate the types of equipment described above.

3.1.2 Terms

The terms “should, may, and might” as used in statements in this procedure are intended to denote a discretionary consideration; the terms “shall & must” are intended to impose a mandatory requirement. The terms “is, are, & will” as used in statements in this procedure are intended to denote discretionary or mandatory requirements that are addressed in other department/disciplines’ procedures. However, nothing contained herein should be interpreted as to prohibit development and approval of project-specific procedures or plans that take exception to mandatory direction presented in this procedure provided that the appropriate level of approval (Executive Vice President of Construction, Business Line Executive Vice President, or the Vice President ESQ Services as appropriate) is obtained for deviations from such requirements.

3.1.3 Tools of the Trade

Specific hand tools and or equipment (e.g., manlifts, trucks, trenchers, and pumps) normally provided by or to workers for the performance of their particular work activity.

3.2 Roles & Responsibilities

3.2.1 Equipment Supervisor

Depending on the project’s equipment needs, an individual may be designated as the Equipment Supervisor. Responsibilities of the Equipment Supervisor include:

- Determination of the equipment needs for the project;
- Providing input to the Work Plan concerning equipment;
- Identification of Contract and legal/regulatory requirements for mobilization of equipment on client facilities;
- Submittal of required certifications, inspection reports, and test reports for equipment;
- Arranging for the mobilization/demobilization of equipment in support of the project’s schedule, providing required notices, such as mobilization details and dates, and obtaining Contractual or legally required approvals for mobilization;
- Receipt inspection of equipment arriving at the site, including coordination of any client or third party inspection;
- Coordination with equipment yard personnel or vendors regarding equipment maintenance;
- Ensuring implementation of safe work practices for equipment utilization; and
  - Assuring that the return of demobilized equipment is performed in accordance with the terms of the rental/lease/PO agreement and documented correctly, or, for TtEC owned equipment, that the equipment transfer form is completed and coordinated with the Equipment Manager; and
- All other responsibilities as assigned by the Project Manager or Site Superintendent.

3.3 Safe Operation Requirements for Tools

3.3.1 Manual T-Post Drivers

There shall be no use of manual fence post drivers, such as those typically used to drive T-posts, without prior approval from the Project Environmental Safety Manager (PESM) or the Vice President of Construction. Any approval of the use of such a tool shall require the implementation of an Activity Hazard Analysis (AHA) to identify and control the hazards presented by the tool. The AHA shall address appropriate PPE and position for the task in order to avoid injury to the worker.

3.3.2 Tools

The Site Superintendent shall determine the nature and quantity of tools required for the construction effort and shall ensure that
adequate tools are provided in support of the schedule.

Tools may be assigned to workers or crews for the duration of their activities and shall be stored in gang boxes or other secured storage areas when not in use.

The Site Superintendent may designate certain tools to be issued from a tool control area on a daily basis. These tools should be signed out at the beginning of the work, returned to the tool control area at the end of the work, and signed back in.

3.3.3 Worker Provided Personal Tools

Workers may be required to provide personal tools of the trade for their particular work. Master mechanics, for example, may be required to provide tools required for repairs and maintenance of construction equipment and vehicles. Requirements for workers to provide their own tools shall be established based on the project requirements and shall be discussed at the Pre-Job Conference to be held in accordance with the requirements of the Labor Relations Guidelines LR-8, Pre-Job Conferences.

Any worker required or offering to provide personal tools shall be required to present a list of personal tools being provided upon reporting to the project site. The Site Superintendent shall inventory the tools against this list for verification that all listed tools have been provided. The list shall then be maintained for use in performing an inventory of the tools when the worker is to leave the site at the end of the worker’s assignment and shall be the basis for any claims for loss or damage.

The Site Superintendent shall ensure that any personal tools brought onto the project site receive a safety inspection. The safety inspection shall include as a minimum, the items addressed in Section 3.3.4 of this procedure.

The Site Superintendent should ensure that secure, lockable facilities are provided for the storage of worker provided personal tools.

The worker shall be responsible for notification of lost or damaged tools immediately on discovery of the loss. The limits of the project’s liability (if any) for loss or damage to personal tools provided by the workers should be established at the Pre-Job Conference.

Use of personal tools, other than addressed above, either by manual or by TtEC nonmanual personnel, should not be allowed except as specifically authorized by the Project Manager or Site Superintendent. Project personnel should be notified that TtEC will not be liable for any theft, loss, or damage of unauthorized personal tools on the project site.

3.3.4 Tool Safety Inspection

OSHA 29 CFR Part 1926 Subpart I Tools – Hand and Power provides guidance for tool safety. All tools shall be inspected for the following minimum features by the person using the tool prior to starting the work:

- Proper general condition of tools, electrical cords, and air hoses;
- Presence and serviceability of guards and safety devices;
- Proper electrical grounding or double insulation protection;
- Power tools properly equipped with constant pressure switches;
- Tool retainers installed on pneumatic tools;
- Proper adjustment of the tool; and
- Confirming that the load rating of the tool is sufficient for the work to be performed.

Unsafe tools shall be removed from service and the Site Superintendent advised of the condition for corrective action. An Out of Service tag should be placed on all unsafe or defective tools to prevent their inadvertent use by others. These tools should be physically segregated from the acceptable tools.

3.3.5 Environmental Safety and Quality Policy Implementation

TtEC’s Environmental Safety and Quality (ESQ) Policy, as included in Environmental Management System (EMS), shall be considered in the selection and utilization of construction equipment and vehicles for use in association with TtEC’s construction projects.

Selection of the construction equipment and vehicles shall consider relevant TtEC-wide and project-specific significant environmental aspects, objectives, and targets, as defined in EMS and as identified by the Project Manager in the project management planning documents required under Project Initiations/Operations Procedure, PO-1, Project Management Planning.

Selection of construction equipment and vehicles may have significant impacts on the environment, either adverse or beneficial. Proper
selection of the size and type of equipment and vehicles can reduce the adverse impacts from their operation.

Project procurement practices for construction equipment, parts, supplies, lubricants, and fuel shall be consistent with the principles of pollution prevention as discussed in the EMS and identified through the TIP process using CRL Procedure PO-2, Task Initiation. (For example, consideration should be given to such factors as rent versus buy options, disposable versus reusable filters, recycled versus virgin oils/fluids, recycling versus disposal of spent fluids and used parts, and fuel efficiency and economy of operation.)

Spent fluids, filters, and used parts shall be recycled to the extent practical, or otherwise disposed of in accordance with the environmental compliance elements of the Work Plan or EHS plan.

Proper utilization of construction equipment and vehicles can also reduce adverse impacts on the environment. (For example, it is TIEC’s policy to not allow unattended equipment and vehicles to be left with motors running. This is not only a safety consideration; it reduces adverse environmental impacts and is generally cost effective due to reduced fuel consumption.)

3.3.6 Insurance

The Project Manager shall ensure that all construction equipment, including TIEC-owned or rental/lease equipment, is covered by appropriate insurance policies for the intended use of the equipment. Property insurance on construction equipment is normally arranged by TIEC if TIEC bears the risk of loss or if TIEC is required to arrange such insurance. However, all rented/leased construction equipment valued in excess of $100,000, and all cranes regardless of their value shall be reported to the Administration and Compliance Department via the ‘Insurance Request for Leased Equipment’ (Attachment 5, and available in Tetra Links and from procurement) for specific inclusion under the TIEC property insurance policy. The procurement representative should be contacted to ensure that this occurs in each case. Notification is not required for equipment valued under $100,000 except when the construction equipment provider requests a certificate of insurance be provided, or the equipment is a crane.

The Project Manager, usually through the designated procurement representative, should ensure that duplicate insurance coverage is not provided through the equipment provider since this will increase the rental rates. In those cases where the provider requires insurance certificates to verify coverage by TIEC, the procurement representative should be contacted to obtain the appropriate documentation.

A Vehicle Insurance Form (available from the Vehicle Insurance Coordinator, Tetra Links or procurement) shall be processed and sent to the Vehicle Insurance Coordinator for all vehicles (leased, rented, or owned) which are registered and operated off jobsites on public highways.

3.3.7 Receipt and Inspection

All construction equipment shall be subject to a receipt inspection by a competent person and any Contract or otherwise required additional person(s) prior to acceptance at the project site. The inspections and tests shall be in accordance with the manufacturer’s recommendations. Most vendors provide a form for notation of any existing damage to the equipment to be filled out on receipt. The equipment should be inspected carefully to determine its condition, including any damage, missing or non-functional equipment. The agreement should be used as a basis to determine that everything required (e.g., the equipment, its condition, manuals, spares, documentation of inspections, and certifications) has been provided. All discrepancies should be noted on the form. A pre-inspection of the equipment prior to transport to the Project site should be considered. Particular attention shall be given to the following items:

- All safety equipment and its condition;
- Operator (when provided) certification for the equipment;
- Posted operating and safety instructions;
- All pollution control devices and their condition;
- Safe entry and egress, with steps, ladders, handholds, and platforms provided as required, including safe access to perform routine checks, maintenance, and refueling operations;
- Leaking fluids, such as hydraulic oil, engine oil, transmission fluid, and coolant;
- Deteriorated or cracked hydraulic and coolant hoses which could result in leaks or spills; and
- Presence of the manufacturer operation and maintenance manual.

Equipment or vehicles with deficient conditions relating to safety or protection of the environment shall not be placed into service until the deficiencies have been corrected and documented.

All construction equipment shall be subject to an operational check prior to acceptance at the project site. The operational check should verify that the equipment has the capability to function as intended or as required through the full range of its intended use.

Receipt of construction equipment shall be documented; with a copy of the receipt inspection report provided to the Equipment Supervisor and...
3.3.8 Protection from Environmental Extremes

All construction equipment shall be inspected daily (when in use) for safety and operability, including manufacturer’s recommended daily inspections. The inspection form/checklist should note any deficiencies for correction and serve as documentation of the inspection performance. The Equipment Supervisor shall be notified of any deficiency immediately. A Daily Equipment Inspection form, a sample of which is included as Attachment 2 to this procedure, should be filled out at the start of the shift and provided to the Equipment Supervisor. Other supplemental forms which may be used in conjunction with Attachment 2 are the equipment specific “Pre-operation Inspection” and/or “Function Tests” forms, which are normally supplied by the equipment manufacturer. This information is usually found in the equipment’s Operation Manual.

A separate Daily Equipment Inspection Report should be filled out for each shift if construction equipment is utilized on multiple shifts.

The Equipment Supervisor should use the information on Daily Equipment Inspection forms to schedule any repairs or preventive maintenance required for the equipment. Equipment with missing or defective safety features should not be put in service until repairs have been performed to bring the equipment into compliance with any applicable TIET EHS Program and/or regulatory requirements.

Implementation of the daily equipment inspections should be the subject of periodic verification inspections performed by the Project Manager, Site Superintendent, and/or the Environmental and Safety Supervisor (ESS). These periodic inspections should include verification that the required maintenance is being performed in a timely manner to ensure that unsafe conditions or impacts to the environment (e.g., spills, 3.3.9 Equipment Inspections

A sample Equipment/Vehicle Inspection Report is included as Attachment 1 to this procedure.

Construction equipment providers will often include terms and conditions on receipt documentation to be signed when construction equipment is delivered to the project site. Project personnel requested to sign this receipt documentation shall not sign any delivery forms unless authorized to do so by Legal of the Project Manager. Further, if they are required to sign delivery forms, they shall be instructed to cross out all terms and conditions, on both the front and back of the forms, before signing. Alternately, the person receiving the construction equipment should enter the following statement in the immediate vicinity of their signature: “In lieu of the terms and conditions set forth on this document, the Original Purchase Order (or appropriate form of agreement) terms and conditions apply to the receipt of this item(s).” These actions are necessary to avoid acceptance of additional or different terms and conditions.

Construction equipment delivered to the project site should be accompanied with operating and maintenance manuals. Cranes and lifting equipment shall include certification of satisfactory completion of annual inspection and have load charts posted in the cab. Additionally, some construction equipment may be supplied with common replacement parts, such as filters and belts, and any specialized tools required for routine operation or maintenance. (i.e. forks, buckets, lift arms, and tool carriers) These items should be carefully inventoried upon receipt, and documented on the receipt inspection report. Responsibility for protection and maintenance of the construction equipment shall be verified, and all measures necessary to protect the construction equipment from damage or loss will be instituted in accordance with the agreement, operating, and maintenance manuals or other instructions as appropriate.

Dispersion requirements for construction equipment found to not be in accordance with the rental/lease/sale agreement when received shall be confirmed with the vendor immediately.
3.3.11 Refresher Training and Evaluation

Refresher training in relevant topics shall be provided to Crane (as defined by OSHA 1910.180(a) operators, and Powered Industrial Truck (PIT) as defined by OSHA 1910.178(a)(1) operators prior to being allowed to continue operating when:

- The operator has been observed to operate the PIT/Crane in an unsafe manner.
- The operator has been involved in an accident or near-miss incident.
- The operator has received an evaluation that reveals that the operator is not operating the PIT/Crane safely.
- The operator is assigned to operate a different type of PIT/Crane; or
- A condition in the workplace changes in a manner that could affect safe operation of the PIT/Crane.

An evaluation of each PIT/Crane operator's performance shall be conducted at least once every three years.

Refresher training in relevant topics shall be provided to all other construction equipment operators when:

- The operator has been observed to operate the equipment in an unsafe manner.
- The operator has been involved in an accident or near-miss incident.
- The operator has received an evaluation that reveals that the operator is not operating the equipment safely.
- The operator is assigned to drive a different type of equipment; or
- A condition in the workplace changes in a manner that could affect safe operation of the equipment.

The employer shall certify that each operator has been trained and evaluated. The certification shall include the name of the operator, the type of equipment, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

3.3.12 Repairs

All construction equipment shall be repaired as necessary and maintained in good working order. Repairs to rented/leased construction equipment shall be in accordance with the terms of the rental/lease agreement. Repairs to rented/leased and
Construction equipment with deficiencies noted on the Daily Inspection Report should be repaired promptly. The Equipment Supervisor, with input from the Environmental and Safety Supervisor as appropriate, should evaluate if a piece of equipment or a vehicle should be removed from service until the deficiency is corrected.

Construction equipment that develops a fluid leak such as engine oil, hydraulic oil, transmission fluid, or coolant shall be removed from service until the deficient condition has been corrected.

Construction equipment with missing or inoperable exhaust systems, including spark or flame arrestors, mufflers, and catalytic converters, shall be removed from service until the deficient condition has been corrected.

Tampering with, removal, modification, or otherwise rendering inoperable any pollution control device on construction equipment shall not be allowed except as specifically authorized by the equipment manufacturer or appropriate authority and the Project Manager or Superintendent’s concurrence.

Only trained, qualified personnel shall be allowed to repair equipment. The project’s Work Plan should address repairs to equipment by designating required actions in the event of an equipment failure.

An Authorization for Capital Expenditure or Lease (AFCEL) is to be completed for all major repair work (i.e., $1500.00 and over) performed on TtEC-owned construction equipment in accordance with Accounting/Finance Procedure AF-8, Fixed Assets. (Note that on some construction equipment, the cost of a specific item, a replacement tire for example, may require the processing of an AFCEL due to the item cost.)

Costs for major repairs, as well as repairs for deficiencies, to TtEC-owned construction equipment shall be charged back to the project releasing the equipment if the need for repairs is identified within 30 days of the equipment’s release and removal from a project and there are indications that the repairs are needed as the result of lack of maintenance or failure of the releasing project to otherwise keep the equipment in good working order.

No repair shall be undertaken for damage covered by an insurance claim until the damage is reported to the Administration and Compliance Department and the insurer approves the repairs.

3.3.13 Documentation and Record Keeping

A file shall be established and maintained for each piece of construction equipment, and all records relating to that equipment shall be placed in the file, including the Receipt Inspection Report, annual inspections (for cranes), record of the date the equipment was first placed in service, Daily Equipment Inspection records, maintenance records, repair records, record of the last date that the equipment was in service, demobilization inspection report, and the decontamination certificate, if applicable. For ease of retrieval, all records pertaining to pieces of equipment should be maintained in separate folders for each piece of equipment.

Additional copies of inspection reports and records may be required to be maintained in other project files, such as the procurement files and/or the Environmental Health and Safety files, based on the project’s Documentation Plan.

The Equipment Supervisor should ensure that complete and accurate record of equipment utilization, including a list of idle equipment, is provided to the Quality Control Site Manager on a daily basis for inclusion in the Quality Control Daily Report.

It may be useful to maintain equipment utilization information on a spreadsheet depending on the size of the project. Information such as equipment mobilization date, date of first use, utilization of equipment by rental period (for example, if rental rate is based on hourly usage and is billed on a monthly cycle, there should be an entry for the number of hours the equipment was used in each billing period), scheduled equipment release date, actual release date, and demobilization date. This information may be useful in verification of vendor invoices, in review of production rates, for preparation of requests for change orders or equitable adjustment, or for backup for use in support of (or defense against) claims.

Copies of all maintenance and repair records for TtEC-owned construction equipment shall be forwarded to the TtEC Equipment Manager at the regional equipment yard on a periodic basis. This period should be monthly, and in no circumstances should it exceed quarterly. An Equipment Service Form is available from the Equipment Manager. This form shall be used to report unscheduled and preventative maintenance on TtEC-owned construction equipment.

The Equipment Manager produces a spreadsheet for TtEC-owned construction equipment that is distributed to the projects on a monthly basis. The Equipment Supervisor shall ensure that reports of mileage or meter readings and routine maintenance for all TtEC-owned construction equipment and vehicles assigned to the project are provided to the Equipment Manager for inclusion on the spreadsheet on a monthly basis. A Meter/Mileage Reading Update Form, available from the Equipment Manager, shall be used to report the required information.

The Equipment Supervisor should review the availability date included on the spreadsheet for TtEC-owned equipment and vehicles assigned to the project and inform the Equipment Manager of any required revisions to these dates.
The Equipment Supervisor shall complete an Equipment Transfer Report, available from the Equipment Manager, for all TtEC-owned construction equipment and vehicles to be mobilized to, and demobilized from the project. Copies of the Equipment Transfer Reports shall be provided to the Equipment Manager at the regional equipment yard.

There shall be no equipment disposal action (junk or sale) for TtEC-owned construction equipment or vehicles without prior notification and approval from the TtEC President.

4.0 GUIDANCE

4.1 Additional Considerations

4.1.1 Control of Government Property

Activities involving the use of Government property are to be controlled in accordance with Project Initiation/Operations Procedure PO-12, Government Property Control or by specific procedures negotiated with the Client in accordance with the contract’s terms and conditions; such procedures shall be consulted where appropriate. Such activities may involve the handling or installation of Government property, whether furnished by the Government to TtEC or acquired by TtEC for use in the performance of work and for which the Government has retained title.

Government property may include construction tools and equipment purchased as a project cost, as well as permanent materials or equipment purchased for incorporation into the work. Project-specific procedures for control of Government property are to address issues relevant to the use, storage, inventory control, maintenance, and/or final disposition of the Government property.

4.1.2 Spill Control and Emergency Response Dedicated Tools and Equipment

The project’s Emergency Response Plan, or Emergency Action Plan (refer to the Environmental, Health & Safety - Programs Procedure EHS 2-1, Emergency Preparedness, for discussion of when each is required) is to identify dedicated personal protective equipment and emergency response tools and equipment to be available for an emergency response to a spill or discharge of hazardous material.

Dedicated emergency response tools and equipment are to be segregated and identified for use in emergency response situations. In accordance with the requirements of EHS Procedure 2-1, Emergency Preparedness the use of dedicated emergency response tools or equipment for any other activity is not to be permitted.

4.1.3 Inventory Control

An individual should be designated as the Material Control Supervisor and should be responsible for inventory control of all tools issued from the tool control area. A log should be maintained for all tools issued and should record, as a minimum, the identification by name and employee number of the individual signing out the tool, the date and time the tool was signed out, the intended use of the tool (by area or system), an indication of when the tool is to be returned, and the time and date when the tool is returned.

Inventory control of tools assigned to individuals or crews should be performed on a daily basis as the tools are returned to the gang box or storage area. The crew foreman should be responsible for inventory control of tools assigned to the foreman’s crew.

The Site Superintendent should immediately be made aware of any missing tools and should take the appropriate action to investigate and/or replace the missing tools.

4.1.4 Disposition of Tools at Project Completion

The Project Manager should make a determination of the disposition of tools remaining at the end of the project. The project may not be reimbursed by the client for the purchase of tools on certain cost reimbursable and lump sum projects. On other projects, a dollar value for individual tools may establish whether or not the client provides any reimbursement. The terms and conditions of the contract should provide direction as to the required disposition of the tools.

Tools for which the project has been reimbursed by the client are to be dispositioned in accordance with the client’s preferences and the contract terms and conditions.

Tools purchased for the project as a project cost, and which are not to be turned over to the client, should be dispositioned by the Project Manager. Means of disposition may include, but not be limited to, declaring the tools surplus, sale of the tools, or providing the tools to another project. The Project Manager should consult with the appropriate Business Line Executive Vice Presidents, concerning disposition of project tools.

TtEC owned tools (i.e., not purchased as a project cost) should be dispositioned by the Project Manager based on consultation with the appropriate Business Line Executive Vice Presidents. Means of disposition of TtEC-owned tools may include, but not be limited to, declaring the tools surplus, sale of the tools, return of the tools to an equipment yard, or providing the tools to another project.

4.1.5 Company-Owned Equipment
TtEC utilizes regional equipment yard(s) for the temporary storage and maintenance of TtEC-owned construction equipment and vehicles when not currently assigned to a project. Available TtEC-owned equipment should be considered for support of a project’s construction effort based on an analysis of the benefits to the project and/or TtEC. When evaluating TtEC owned equipment the requirements discussed in 4.1.6 below should be considered when making the equipment selection.

4.1.6 Rental/Lease Equipment

Agreements for rental/lease of construction equipment should be coordinated through an authorized procurement representative to ensure that appropriate terms and conditions are included in the agreement. The Scope of Work for the agreement should be developed and reviewed carefully, including review by the Site Superintendent or Equipment Supervisor for inclusion of sufficient detail in order to clearly define the scope of work.

The Equipment Supervisor, or requisitioner if there is no designated Equipment Supervisor, should review the terms and conditions of all rental/lease agreements to determine that the following topics are adequately addressed:

- Receipt and return of the rental or leased equipment and any required accessories;
- Inspection and documentation of receipt and release;
- Provision of documentation required to be submitted, such as Occupational Safety and Health Administration (OSHA) accredited inspection reports, NDE reports, test reports (i.e. load test for cranes), typically annual inspections, and wire rope certification.
- Provision of all safety equipment and accessories, as required, such as fire extinguishers, seat belts, Roll Over Protection Structures (ROPS), Falling Object Protection Structures (FOPS), access steps, handholds, platforms, and anti two-block devices and load moment indicator (cranes);
- Provision of documentation demonstrating operator certification;
- Provision of Certificate of Compliance when required, for instance by NAVFAC P-307 Management of Weight Handling Equipment, Appendix P - Contractor Crane Requirements.
- Provision and requirements of routine and non-routine maintenance and repairs, including payment for labor, parts, filters, lubricants, and fluids;
- Documentation requirements for the above maintenance and repairs;
- Disposal/recycling requirements for used parts, filters, lubricants, and fluids;
- Items such as point of delivery, costs of delivery and return, rental charges during idle time, notification requirements for demobilization, and point of return;
- Appropriate rental rate provisions for straight time and overtime;
- Responsibility for damage to equipment;
- Insurance;
- Indemnification (if included);
- Payment for replacement of parts subject to normal wear and tear, such as tires, tracks, cutting edges, and teeth; and
- Documentation requirements required in support of invoices for basic rental rates and overtime rates, as well as labor, parts, filters, lubricants, and fluids.

Rental agreements should be structured to include normal wear and tear on the equipment in the basic rental rate. In all cases, there should be mutual agreement with the equipment vendor as to the condition of the equipment as it is delivered. This should include items such as the life expectancy of the parts subject to wear and tear, their condition on receipt (i.e., percentage of usable life remaining), and the expected condition on return of the equipment. There should be agreement on minor versus major repairs and on what constitutes normal wear and tear. Mutual agreement is essential to mitigate potential claims from vendors for excessive wear and tear.

4.1.7 Mobilization of Equipment
Mobilization of construction equipment may be a long lead time item and may require client or third party involvement or approvals to gain site access, depending on the required equipment. The Site Superintendent or Equipment Supervisor should determine the lead time required, including Contract submittal and advance notice/approval requirements, and plan for the mobilization of equipment to support the project’s schedule.

- Planning for mobilization of equipment should include a thorough review of Contract requirements for utilization of each equipment and site access requirements.
- Documentation of certification, and OSHA compliant annual inspection, load testing, safety devices (e.g., anti two-block) installed, wire rope certification, and operator’s certification for cranes (weight handling equipment) should be reviewed prior to initiating mobilization of cranes.

4.1.8 Equipment Maintenance

The Equipment Supervisor should be responsible for administration of a construction equipment maintenance program for the project. A spreadsheet of all TtEC-owned equipment, titled the Status of All Project Equipment, is maintained by the Construction Department providing notification of the scheduled maintenance requirements for each piece of equipment. Either this spreadsheet, or a project specific spreadsheet, should be maintained and statused on a periodic basis. Specific maintenance requirements may also be contained in specific contract negotiated property procedures or in other TtEC corporate procedures.

As construction equipment is received on site, it should be added to the spreadsheet for tracking of the required maintenance.

A review of the scheduled maintenance should be performed for all construction equipment to be used in the Exclusion Zone to determine the desirability of performing any upcoming scheduled maintenance prior to placing the equipment in service. It may be difficult and expensive to perform the maintenance under the conditions required in the Exclusion Zone, or to decontaminate the construction equipment in order to perform the maintenance under clean conditions. When the maintenance of equipment in the Exclusion Zone is anticipated, the Site Superintendent should ensure that qualified personnel are available with the appropriate medical clearances and certifications to work in the Exclusion Zone.

4.1.9 Construction Equipment Safe Operation Requirements

Standards for safe operation of equipment are contained in the documents identified herein, inclusive and in particular of the requirements for safe operation of lifting and rigging equipment and weight handling equipment. The Contract typically will specify certain documents/codes to be followed for the project. Accessibility of the identified documents is provided in section 5.0 References.

- The United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM 385-1-1, Chapters 16, 17, and 18, provide guidance concerning the safe operation of construction equipment.
- Safe operation of earth drilling equipment is addressed in the Environmental Health & Safety-Program Procedure EHS 6-2, Drill Rigs.
- Safe operation of hand and power tools is addressed in OSHA standard 29CFR Part 1926 Subpart I.
- Safe operation of cranes, derricks, hoists, elevators and conveyors is addressed in OSHA standard 29CFR Part 1926 Subpart N.
- Safe operation of motor vehicles, mechanized equipment and marine operations is addressed in 29CFR Part 1926 Subpart O.
- Rollover protective structures and overhead protection is addressed in 29CFR Part 1926 Subpart W.
- The United States Navy publication NAVFAC P-307 – Management of Weight Handling Equipment includes requirements for Contractor Cranes (see appendix P). Navy facilities issue Instructions specific to particular facilities such as ‘NAVSHIPYDPUGET INSTRUCTION 11262.4A’ which provides requirements for weight handling equipment at all Navy facilities within the Puget Sound.

4.1.10 Demobilization of Equipment

Construction equipment should be demobilized when no longer required for the work. The Executive Vice President of Construction should be provided with a status of TtEC-owned construction equipment and scheduled release dates in order to coordinate availability of equipment with other projects.

The Project Manager or designee should request demobilization instructions from the Executive Vice President of Construction or designee to determine the location to receive TtEC-owned equipment.

Construction equipment leaving the Exclusion Zone of a remediation construction project will be decontaminated in accordance with the requirements of the Environmental Health & Safety-Programs, Procedure EHS 3-4, Site and Contamination Control, and the site specific EHS Plan.

Individual state regulations may require cleaning of construction equipment leaving a site, not limited to remediation construction, in order to control the spread of microorganisms contained in the soil. Such requirements are to be identified in the project EHS Plan.
## 5.0 REFERENCES

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<td>2. ASME B30 committee publications &quot;Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings&quot; available at <a href="http://www.ihs.encom">www.ihs.encom</a> Note that this is a commercial subscription and requires a User ID and Password available from the TtEC Librarian</td>
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<td>3. DOE Technical Standard DOE-STP-1090 Hoisting and Rigging available at <a href="http://www.directives.doe.gov">www.directives.doe.gov</a> (select the Tech Standards tab, select DOE Technical Standards, select Approved Standards and select DOE_STD_1090 from the menu)</td>
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<td>8. Labor Relations Guidelines LR-8, Pre-Job Conferences</td>
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<td>16. OSHA 29 CFR Part 1910.180 Crawler Locomotive and Truck Cranes</td>
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<td>17. Project Initiation/Operations Procedure PO-1, Project Management</td>
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## 6.0 ATTACHMENTS

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<td>4. Operator/Driver Task Observation Checklist</td>
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<td>5. Insurance Request for Leased Equipment</td>
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Tetra Tech EC, Inc.

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http://info.tteci.net/apps/groups/compliance/corpproc.nsf/d9055562b7654d27852572cf0... 6/19/2012
### Equipment/Vehicle Inspection Report

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<tr>
<td>17. Interior</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>18. Glass</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>19. Wipers/Review Mirrors</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>20. Heater/AC/Defroster</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>21. Safety Equipment/Belts</td>
<td>☐</td>
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<tr>
<td>22. Signal Lights</td>
<td>☐</td>
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<tr>
<td>23. Mounted Equipment</td>
<td>☐</td>
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<tr>
<td>24. Mounted Attachments</td>
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<tr>
<td>25. Blade/Bucket</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>26. Boom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>27. Outriggers</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>28. Fire Ext./First Aid Kit2</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>29. Horn/Backup Alarm</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>30. Manufacturer Operating Manual</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>31. Head/Tail/Brake Lights</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>32. Cleanliness</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

1. Note estimated percentage of tread/track usefulness remaining
2. Fire Ext./First Aid Kit and all items in the cab and or bed must be secured

**Comments:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Inspected By:**

**DISTRIBUTION:** (1) Sent with equipment (2) Equipment Supervisor (3) PO File (4) Originator

**EQUIPMENT TRANSFER REPORT MUST ACCOMPANY THIS FORM**
# DAILY EQUIPMENT INSPECTION

**PROJECT**

**MANUFACTURER TYPE**

**UNIT #** ________ **MODEL** ___________ **DATE** ________________________

**ENGINE HRS/MILEAGE** _______ / _______ **SHIFT** ________________________

Check appropriate column and describe correction needed.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>If Good</th>
<th>NA</th>
<th>Correction Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering Mechanisms</td>
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</tr>
<tr>
<td>Service Brakes</td>
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<tr>
<td>Emergency Brakes</td>
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<tr>
<td>Parking Brake</td>
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<tr>
<td>Transmission &amp; Controls</td>
<td></td>
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<tr>
<td>Suspension &amp; Springs</td>
<td></td>
<td></td>
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<tr>
<td>Hydraulic Leaks</td>
<td></td>
<td></td>
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<tr>
<td>Exhaust System</td>
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<td></td>
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<tr>
<td>Warning Gauges</td>
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<tr>
<td>Windshield &amp; Wipers</td>
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<tr>
<td>Lights (Head &amp; Tail)</td>
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<tr>
<td>Brake Lights</td>
<td></td>
<td></td>
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<tr>
<td>Mirrors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat and Seat Belts (w/ ROPS)</td>
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<tr>
<td>Tires/Tread</td>
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<tr>
<td>Regular Horn</td>
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<tr>
<td>Audible Back-up Alarm</td>
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<tr>
<td>Steps, Hand-holds</td>
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<tr>
<td>Fire Extinguisher</td>
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<tr>
<td>Engine Coolant</td>
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<tr>
<td>Engine Oil</td>
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<tr>
<td>Hydraulics &amp; Operating Controls</td>
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<tr>
<td>Fenders/Mudflaps</td>
<td></td>
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<tr>
<td>Heater/defroster</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>All items in cab or bed secured</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleanliness inside and outside</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

1. Items required to be operational by OSHA 1926.602 before use.
2. Service brake must be capable of stopping and holding equipment fully loaded.

---

Operator Name (Printed)  
Operator Signature

Review:  
Superintendent ________________

Date Repairs or adjustments completed: ________________________________

Equipment Supervisor/Mechanic: ________________________________
# MOBILE AND CRAWLER CRANE MONTHLY CHECKLIST

**Crane Number / ID** ______________________  **Date** ______________________

**Project Name/No:** ______________________

<table>
<thead>
<tr>
<th>Item</th>
<th>Consideration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane Structure</td>
<td>Cracks, Corrosion, Deformation</td>
<td></td>
</tr>
<tr>
<td>Foundations to support loads</td>
<td>Cracks, Settlement</td>
<td></td>
</tr>
<tr>
<td>Booms</td>
<td>Cracks, Corrosion, Deformation</td>
<td></td>
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<tr>
<td>Bolts &amp; Rivets</td>
<td>Tightness, Corrosion</td>
<td></td>
</tr>
<tr>
<td>Boom Angle Indicator &amp; Chart</td>
<td>Accuracy, Visibility</td>
<td></td>
</tr>
<tr>
<td>Load Indicator(s)</td>
<td>Accuracy</td>
<td></td>
</tr>
<tr>
<td>Anti-Two Block Device</td>
<td>Functional</td>
<td></td>
</tr>
<tr>
<td>Engine or Motor</td>
<td>Performance &amp; Safety Compliance</td>
<td></td>
</tr>
<tr>
<td>Chain &amp; Sprocket</td>
<td>Wear and Stretch</td>
<td></td>
</tr>
<tr>
<td>Pawls or Dogs</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Pins, Shafts &amp; Axles</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Bearings &amp; Rollers</td>
<td>Wear, Cracks, Distortion</td>
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<tr>
<td>Gears</td>
<td>Wear, Cracks</td>
<td></td>
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<tr>
<td>Tires &amp; Wheels</td>
<td>Excessive Wear, Damage</td>
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</tr>
<tr>
<td>Wire Ropes/Lines</td>
<td>Condition, Lay</td>
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<tr>
<td>Main Drum Brake</td>
<td>Function, Adjustment</td>
<td></td>
</tr>
<tr>
<td>Lining</td>
<td>Excessive Wear</td>
<td></td>
</tr>
<tr>
<td>Drum Braking Surface</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Linkage &amp; Pins</td>
<td>Wear, Cracks, Distortion</td>
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</tr>
<tr>
<td>Actuating Cylinders &amp; Fittings (if any)</td>
<td>Leakage or Deterioriation</td>
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<tr>
<td>Auxiliary Drum Brake</td>
<td>Function, Adjustment</td>
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<tr>
<td>Lining</td>
<td>Excessive Wear</td>
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</tr>
<tr>
<td>Drum Braking Surface</td>
<td>Wear, Cracks, Distortion</td>
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</tr>
<tr>
<td>Linkage &amp; Pins</td>
<td>Wear, Cracks, Distortion</td>
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<tr>
<td>Actuating Cylinders &amp; Fittings (if any)</td>
<td>Leakage or Deterioriation</td>
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<td>3rd Drum Brake (if any)</td>
<td>Function, Adjustment</td>
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<tr>
<td>Lining</td>
<td>Excessive Wear</td>
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</tr>
<tr>
<td>Drum Braking Surface</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Linkage &amp; Pins</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Actuating Cylinders &amp; Fittings (if any)</td>
<td>Leakage or Deterioriation</td>
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</tr>
<tr>
<td>Boom Hoist Brakes</td>
<td>Function, Adjustment</td>
<td></td>
</tr>
</tbody>
</table>
MOBILE AND CRAWLER CRANE MONTHLY CHECKLIST

Crane Number / ID____________________ Date_____________________

Project Name/No:______________________________

<table>
<thead>
<tr>
<th>Item</th>
<th>Consideration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lining</td>
<td>Excessive Wear</td>
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</tr>
<tr>
<td>Drum Braking Surface</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Linkage &amp; Pins</td>
<td>Wear, Cracks, Distortion</td>
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<tr>
<td>Actuating Cylinders &amp; Fittings (if any)</td>
<td>Leakage or Deterioration</td>
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</tr>
<tr>
<td>Travel Brake or Locks</td>
<td>Function, Adjustment</td>
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</tr>
<tr>
<td>Lining</td>
<td>Excessive Wear</td>
<td></td>
</tr>
<tr>
<td>Drum Braking Surface</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Linkage &amp; Pins</td>
<td>Wear, Cracks, Distortion</td>
<td></td>
</tr>
<tr>
<td>Actuating Cylinders &amp; Fittings (if any)</td>
<td>Leakage or Deterioration</td>
<td></td>
</tr>
<tr>
<td>Lead Block</td>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>Hooks</td>
<td>Cracks, Distortion</td>
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<tr>
<td>Hook, Swivel</td>
<td>Cracks, Wear, Function</td>
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<td>Sheaves</td>
<td>Wear, Cracks, Distortion, Rope Fit</td>
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<tr>
<td>Computers</td>
<td>Calibrated</td>
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<tr>
<td>Counterweight System</td>
<td>Attaching Linkage OK</td>
<td></td>
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</tbody>
</table>

/                                            

Print Name                                                                                       Signature
# OPERATOR/DRIVER TASK OBSERVATION CHECKLIST

<table>
<thead>
<tr>
<th>Operating Safety Observations</th>
<th>S</th>
<th>U</th>
<th>NA</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> Pre-use inspection prior to starting</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1. Conducts daily pre-use inspection.</td>
<td></td>
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</tr>
<tr>
<td>2. Mounts &amp; dismounts carefully-3 point contact.</td>
<td></td>
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<tr>
<td>3. Uses the seat belt all times while seated. Sounds horn before starting engine.</td>
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<tr>
<td>4. Checks equipment warning devices.</td>
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<tr>
<td>5. Checks hydraulic systems (if so equipped). Ensures system is filled and free from leakage.</td>
<td></td>
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<tr>
<td>6. Checks air system (if so equipped). Ensures all connections are tight.</td>
<td></td>
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<tr>
<td>7. Checks engine oil level. Ensures all plugs, filler caps, and other fittings are secure and not leaking.</td>
<td></td>
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<tr>
<td>8. Checks for broken, missing, excessively worn or damaged parts, and reports immediately.</td>
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<tr>
<td>10. For dump trucks, checks front wheel seal oil levels.</td>
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<tr>
<td>11. Checks fuel level and for fuel system leaks.</td>
<td></td>
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<tr>
<td>12. Coolant check—Should never open a hot system or pour cold coolant into radiator if the engine is very hot.</td>
<td></td>
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</tr>
<tr>
<td>13. For safe visibility, cleans the windshield, mirrors and light lenses.</td>
<td></td>
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</tr>
<tr>
<td>14. For articulating machines, checks to ensure that the steering frame lock or link have been removed and properly stored.</td>
<td></td>
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</tr>
<tr>
<td>15. Checks for and maintains safe access to the cab (3 point contact). For safe mounting, clears the steps, grab rails, and floor and seat of mud and water.</td>
<td></td>
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</tr>
<tr>
<td>16. Secures tools and keeps the floor free of debris.</td>
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<tr>
<td>17. For safe operation wipes steering wheel, foot pedals, hand levers and knobs clean of oil and grease.</td>
<td></td>
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</tr>
<tr>
<td>18. Checks first aid kit and fire extinguisher. Reports missing items to the foreman or supervisor.</td>
<td></td>
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<tr>
<td>19. Checks equipment for warning tags.</td>
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</tr>
<tr>
<td><strong>B.</strong> Starting</td>
<td></td>
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</tr>
<tr>
<td>1. Mounts &amp; dismounts carefully-3 point contact.</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Uses the seat belt at all times while seated. Sounds horn before starting engine.</td>
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</tr>
<tr>
<td>3. Checks equipment warning devices.</td>
<td></td>
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<tr>
<td>4. Uses job specific PPE (e.g., hard hats, safety shoes, safety glasses, overalls, gloves, traffic vests, and ear protection).</td>
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<tr>
<td>5. Ensures the bowl, bucket, etc. is on the ground.</td>
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<tr>
<td>6. For starting, checks all controls to be sure they are in proper position.</td>
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<tr>
<td>7. Does not crank an electric starter for more than 30 seconds. Allows two minutes to cool prior to next attempt.</td>
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<tr>
<td>8. For steering safety, tests before moving. Turns the wheels to full left and full right.</td>
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<tr>
<td>9. Checks service and parking breaks for proper operation.</td>
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<tr>
<td>10. Checks the backup alarm.</td>
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<tr>
<td>11. Ensures head lamps and safety lighting are in working order.</td>
<td></td>
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</tbody>
</table>
### Operating Safety Observations

<table>
<thead>
<tr>
<th>C. Operation</th>
<th>S</th>
<th>U</th>
<th>NA</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Before moving, places the bucket, bowl, blade, etc., into the transport position and secures all accessory equipment.</td>
<td></td>
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</tr>
<tr>
<td>2. Obeys traffic &amp; other posted/published site safety practices &amp; rules.</td>
<td></td>
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<tr>
<td>3. Maintains control of equipment at all times.</td>
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<tr>
<td>4. Gives right-of-way to loaded machines or trucks.</td>
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<tr>
<td>5. Minimizes engine overspeed on downgrades &amp; when shifting.</td>
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<tr>
<td>6. Does not transport passengers without proper provisions.</td>
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<tr>
<td>7. Does not engage in horseplay.</td>
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<tr>
<td>8. Crosses ditches at an angle, proceeding slowly.</td>
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<tr>
<td>9. Avoids large obstacles, deep holes &amp; soft edges.</td>
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<tr>
<td>10. Slows down before turning.</td>
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<tr>
<td>11. Stays in gear on a downgrade.</td>
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</tr>
<tr>
<td>12. When running across a hillside, proceeds slowly. Never turns sharply uphill or downhill.</td>
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</tr>
<tr>
<td>14. Maintains safe stopping distance behind other equipment.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15. Shifting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Always stops the machine/truck and runs the engine at low idle speed to shift from forward into reverse.</td>
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</tr>
<tr>
<td>b. Downshifts one speed range at a time.</td>
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<td></td>
</tr>
<tr>
<td>c. Applies the retarder and/or service brakes to reduce speed before entering sharp turns, fill areas, and downgrades.</td>
<td></td>
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</tr>
<tr>
<td>d. For machines, always leaves the shift lever in neutral position when stopped.</td>
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<td></td>
</tr>
<tr>
<td>16. Braking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Avoids applying brake continuously on a downgrade unless system is so designed.</td>
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<tr>
<td>b. Uses the engine for additional brake force-or, if so equipped, the auxiliary retarder.</td>
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<tr>
<td>c. Anticipates grade and selects proper gear range accordingly.</td>
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<tr>
<td>d. Brakes firmly in one application. Avoids fanning the brake pedal.</td>
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<tr>
<td>e. Uses each brake system only for its intended purpose.</td>
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<td>17. Turning</td>
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<tr>
<td>a. Does not cut corners too close when making sharp turns.</td>
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<tr>
<td>b. Maintains engine speed high enough for normal steering.</td>
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<tr>
<td>c. Downshifts when necessary or appropriate.</td>
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<tr>
<td>d. For machines, carries the load as low as conditions permit to maintain stability.</td>
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<tr>
<td>18. Hauling</td>
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<tr>
<td>a. Regulates speed to road conditions. Reduces speed before turning. Avoids over speeding the engine.</td>
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<tr>
<td>b. Downshifts when approaching a downgrade. Downshifts when necessary on an upgrade to avoid stalling the engine.</td>
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<tr>
<td>c. Obeys traffic rules and spotters.</td>
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<tr>
<td>19. Parking Precautions</td>
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<tr>
<td>a. Selects level ground whenever possible.</td>
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<tr>
<td>b. When parking on a grade, positions equipment at right angles to the slope; and sets parking brake if so equipped in addition to lowering bowl, bucket, etc.</td>
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<td>c. Parks a reasonable distance from other equipment.</td>
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<td>d. When parking on haul roads, picks the safest place, where the equipment is visible from both directions.</td>
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<tr>
<td>Operating Safety Observations</td>
<td>S</td>
<td>U</td>
<td>NA</td>
<td>Comments</td>
</tr>
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<td>-------------------------------</td>
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<tr>
<td>20. Demonstrates proficiency through smooth operation of controls (e.g., speed of operation appropriate for the conditions, not jerky or hesitant).</td>
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<tr>
<td>21. Maintains eye contact with other operators, drivers, and ground personnel.</td>
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<td>22. Responds appropriately to signals from flaggers, spotters, operators directing equipment movements.</td>
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<tr>
<td>23. Stops operation when ground personnel are out of line-of-sight.</td>
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<tr>
<td>24. Positions and orients machine for safe operation (e.g., safe distance from edge of excavations, tracks perpendicular to excavation, clear distance maintained to fixed obstructions).</td>
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<tr>
<td>25. Barricades, cones, tape set up to maintain clear zone within swing radius of counterweight.</td>
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<td>26. Maintains safe work area (e.g., windrow at edge of stockpiles, safe slopes).</td>
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</tbody>
</table>

**D. Shutdown**

1. Lowers the bowl, bucket, etc. to the ground. Lowers and secures the bed on dump trucks.
2. Reduces engine speed. Sets parking brake.
3. On machines, places transmission in neutral and locks shift lever if so equipped.
4. Allows hot engine to cool gradually before stopping it.
5. Secures equipment to prevent unauthorized starting and movement.
6. Bleeds the air tanks, if so equipped.
7. Dismounting—doesn’t jump off, uses handrails and steps, and faces the machine/truck when getting off.
8. Warning tags—attaches appropriate warning tags to steering wheel to prevent accidents.

**E. Overall Appraisal**

Overall appraisal of operator/driver

S = Satisfactory
U = Unsatisfactory
NA = Non applicable

Note: For unsatisfactory observations also indicate the immediate corrective action taken (e.g., training, verbal or written warning, or reassignment).
Tetra Tech EC, Inc.
Insurance Request for Leased Equipment

FROM: 
TO: Dan Fisher

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>IS THIS ITEM A LICENSED VEHICLE?</strong> IF YES, PLEASE PROCESS THE “TTECIVEHICLE INSURANCE REQUEST FORM”</td>
</tr>
<tr>
<td>2.</td>
<td>DATE FORM COMPLETED</td>
</tr>
<tr>
<td>3.</td>
<td>REQUESTOR NAME, PHONE NUMBER AND OFFICE LOCATION</td>
</tr>
<tr>
<td>4.</td>
<td>JOB SITE CONTACT (Name and Phone Number)</td>
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<tr>
<td>5.</td>
<td>PROJECT NAME</td>
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<tr>
<td>6.</td>
<td>LESSOR’S COMPLETE NAME AND ADDRESS</td>
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<tr>
<td>7.</td>
<td>TERM OF THE LEASE (please be specific, i.e., 6/15/98 to 6/15/99)</td>
</tr>
<tr>
<td>8.</td>
<td>TYPE OF EQUIPMENT &amp; SERIAL NUMBER <strong>Please contact Dan Fisher ASAP regarding insurance for cranes</strong></td>
</tr>
<tr>
<td>9.</td>
<td>DECLARED VALUE OF EQUIPMENT</td>
</tr>
<tr>
<td>10.</td>
<td>CHARGE NUMBER (FOR VALUE OF EQUIPMENT OVER $500,000)</td>
</tr>
<tr>
<td>11.</td>
<td>HAS LESSOR SPECIFICALLY REQUESTED LOSS PAYEE STATUS? IF YES, PLEASE SPECIFY DATE DUE.</td>
</tr>
</tbody>
</table>

**PO/Subcontract attached**

**Terms and conditions attached**

If guidance is needed, please call Dan Fisher @ (973) 630-8198. Version 6.
Table of Contents

1.0 PURPOSE

2.0 SCOPE

3.0 MINIMUM REQUIREMENTS

4.0 GUIDANCE

5.0 REFERENCES

1.0 PURPOSE

The purpose of this program is to outline personnel responsibilities relative to implementing the Tetra Tech EC, Inc. (TtEC) Environmental, Health and Safety (EHS) program and achieving the objectives of the Environmental, Safety and Quality (ESQ) policy.

2.0 SCOPE

This program applies to all TtEC operations.

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

3.1.1 Employees

TtEC and subcontractor employees have the responsibility to:

- Work in a safe, healthy, and environmentally compliant manner, in accordance with TtEC programs, TtEC procedures, TtEC work rules, and applicable laws and government regulations.
- Be an active participant in the project’s Voluntary Protection Program (VPP), when applicable.
- Participate in resolving problems and corrective actions.
- Strive for Zero Incident Performance® (ZIP).
- Stop work if an imminent danger situation exists.
- Notify their supervisor immediately of any work-related injury, illness, spill, release, permit exceedence, or high loss potential incident; of any environmental issue or safety hazard in the workplace; or of any concern regarding the TtEC

EHS 1-1: Responsibilities for Program Implementation

Last Revision By: Andrew Hopper on 02/13/2012
Created By: Lisa Kaminski on 06/09/2008

Purpose: The purpose of this program is to outline personnel responsibilities relative to implementing the Tetra Tech EC, Inc. (TtEC) Environmental, Health and Safety (EHS) program and achieving the objectives of the Environmental, Safety and Quality (ESQ) policy.

Version Date: 08/06/2008 - New

Category: Company Procedures

Sub Category: Departmental/Discipline


Document Type: Procedure

Document Owner: Skip Parry

Approved By: [Signature]
3.1.2 Line Management

Line Management, the Project Manager or Officer Manager, ensures that all company activities are executed in accordance with TtEC EHS programs, procedures, and applicable regulations. Line managers have primary EHS responsibility and have EHS personnel support to help them fulfill this responsibility. Line managers have the responsibility to integrate loss control principles into all operations and to ensure that:

a. TtEC's safety culture is preserved by demonstrating commitment and program involvement.
b. Safety remains a major project goal and is not subordinated to other demands.
c. Project-specific continuous improvement goals and objectives are based on the TtEC's ZIP Operating Philosophy and apply to self-perform and subcontractor operations alike.
d. Project goals and objectives are developed based on EHS events and issues, and are communicated to TtEC employees and subcontractors.
e. All projects are implemented in compliance with all environmental, safety and health laws and regulations, EHS program requirements, and Environmental Management System (EMS) requirements.
f. EHS plans are developed, approved, and implemented in accordance with TtEC requirements.
g. Personnel understand the requirements of the project EHS plan(s) and each individual understands his/her responsibility for plan implementation.
h. Personnel have all required training and are capable of performing all assigned tasks.
i. Corporate professionals or external resources, such as private consultants, are available for project support as needed.
j. Project staff members are aware of, and have access to, technical information that TtEC maintains in the Corporate Reference Library, various EHS databases, and online regulatory subscription services. Additional EHS reference books and technical information are also available to project staff upon request.
k. Facilities and equipment meet TtEC and government regulations.
l. Work rules are enforced.
m. Inspections and incident investigations are conducted per program requirements.
n. Effective corrective actions are implemented in a timely manner following inspections, audits, incident investigations, etc.
o. Employees, including subcontractors, are not only encouraged, but are required to notify their supervisor of any actual or potential health and safety hazards in the workplace and develop safe work methods and controls to be implemented in project Activity Hazard Analyses (AHAs). Employees, and subcontractors, are also assured that not only will they not be harassed for reporting problems, they may be rewarded for it.
p. Clients are notified of TtEC incident reporting procedures.
q. Appropriate disciplinary action is implemented by line supervision when necessary.
r. Environmental and Safety Coordinators (ESC) are assigned for each home office, in coordination with the Manager, EHS Services.

Management responsibilities necessary to maintain a safe, healthful, and environmentally compliant workplace are identified in each procedure of the TtEC EHS program.

3.1.3 EHS Personnel

EHS personnel assist management with implementation of TtEC EHS programs and procedures, and help to ensure that operations are performed in compliance with applicable laws and regulations. EHS personnel have the responsibility to:

a. Ensure that TtEC employees understand the requirements of TtEC EHS programs and procedures through training and communication. (ESS)
b. Develop or assist with the development of EHS plans in conjunction with project personnel. (ESS)
c. Approve or obtain approval of all EHS plans. (PESM)
d. Assist management with EHS plan implementation. (ESS, PESM)
e. Perform specific tasks in accordance with EHS plans. (ESS, PESM)
f. Ensure that TtEC employees receive required EHS regulatory training. (PESM)
g. Function as a technical resource of all environmental compliance, safety, loss control, and industrial hygiene issues. (PESM)
h. Fulfill the specific responsibilities for project EHS personnel that are identified within each EHS procedure. (ESS, PESM)
i. On each project with an EHS plan, an Environmental and Safety Supervisor (ESS), is assigned to assist line management with EHS Program implementation. The ESS may have collateral duties.

3.1.4 Environmental and Safety Coordinator

The ESC has responsibility to coordinate the administrative EHS functions in offices. The ESC has the responsibility to:

a. Assist in coordinating EHS training by identifying training needs, and conducting or arranging for training.
b. Ensure that appropriate EHS records are maintained and forwarded to the Director, ESQ in accordance with EHS programs.
c. Assist in completing and forwarding copies of incident reports and investigations to the Manager, EHS Services, and the Director, Health and Safety Programs.
d. Assist in implementing EHS committees.
e. Assist in developing, implementing, and maintaining EHS awareness programs.
f. Assist the Operations Manager in conducting and documenting quarterly office and warehouse EHS inspections and in closing out and documenting corrective actions taken.
g. Ensure Emergency Response Plans are written, implemented, maintained, and communicated to employees.
h. Ensure mechanism exists in the office to identify, communicate, and correct employee EHS concerns.
i. Ensure an adequate ergonomics program is implemented.

3.1.5 Managers, EHS Services

The Managers, EHS Services have responsibility to:

a. Establish goals, direction, and performance standards to EHS personnel within their region.
   i. Ensure availability of required resources within region.
   ii. Manage work loads and distribution of area staffing (employee mix).
   iii. Ensure professional development of staff.
b. Communicate and monitor performance of EHS personnel.
c. Provide feedback and status reports, including statistics to the Director, EHS Programs.
d. Provide senior technical support to operations management.
e. Raise/elevate issues of potential noncompliance to ESQ Program Directors.
f. Ensure, in coordination with the Operations Manager, that an ESC is assigned to each home office.
g. Provide oversight, evaluation, and training for collateral duty personnel, and approve project assignments.
h. Monitor projects being conducted in region through continued interface with area, office, and project management.
i. Support proposal and Business Development efforts.
j. Approve EHS plans, as appropriate.
k. Make technical and regulatory interpretations as required.

3.1.6 ESQ Service Directors

The Director, Environmental Health and Safety Services, and Director, Quality Services have responsibility to:

a. Maintain ultimate authority in respective disciplines for program implementation, technical issues, and staffing decisions.
b. Maintain and update program standards, and ensure that they meet appropriate regulatory and TtEC requirements.
c. Provide input on staffing issues including performance appraisals and professional development.
d. Participate in ESQ program audits.
e. Identify and ensure appropriate resolution of issues related to respective technical area.
f. Identify technical information needs and disseminate technical information.
g. Support proposal and business development efforts and coordinate technical support on major proposals.
h. Perform internal and external project support.
i. Update and maintain training programs relative to their technical areas.
j. Foster departmental integration through leadership and example.
k. Ensure that incidents are properly investigated with appropriate follow-up and closure.

3.1.7 Vice President, Environmental, Safety and Quality Services

The Vice President, ESQ Services is responsible for all departmental activities and has the responsibility to:

a. Provide overall direction and leadership of the ESQ program.
b. Provide the necessary support to line management to ensure that Corporate ESQ and EMS programs are implemented.
c. Coordinate EHS related national contracts.
d. Provide major proposal and business development support.
e. Maintain the TtEC ESQ programs and guidance documents.
f. Make recommendations to TtEC management to improve the quality of the TtEC ESQ program.
g. Oversee ESQ training program development and implementation to help ensure that TIEC and subcontractor employees perform their jobs in accordance with ESQ programs, procedures, and applicable laws and regulations.
h. Manage the TtEC medical surveillance program.
i. Ensure effective communication to all TIEC employees on EHS issues, incidents, and regulations.
j. Prepare final VPP self-evaluation reports to each applicable OSHA region as described in Section 3.2 below.

These responsibilities may be delegated to the ESQ Program Directors.

3.2 Voluntary Protection Program (VPP) Annual Self-Evaluation

For projects that have adopted the VPP, line management shall conduct an annual self-evaluation of the five elements of VPP and the project-specific VPP requirements. In the last quarter of each year, line management for each active VPP project
performs an annual self-evaluation of the five elements of VPP for the previous year. This evaluation is not the same as a safety audit; it is a review and assessment of the effectiveness of the VPP elements:
  a. Management Leadership
  b. Employee Involvement
  c. Worksite analysis
  d. Hazard Prevention and Control
  e. Health and Safety Training

The annual self-evaluation shall assess the project's natural work groups, including subcontractors, and applicable components of the EHS program to verify VPP implementation and achievement of goals and objectives. Self-evaluations should also include an assessment of action items completed and recommendations for improvements.

The line manager shall transmit a copy of the project's VPP self-evaluation to the TiEC Vice President, ESQ Services.

The Vice President, ESQ Services will prepare the final report to each applicable OSHA region in narrative form, and include a description of any success stories, such as:
  a. Reductions in worker's comp rates
  b. Increases in employee involvement
  c. Improvements in employee morale, etc.

Line management will also provide the following information to the TiEC Vice President ESQ Services for self-performed and applicable subcontractor work for inclusion in the annual VPP report:
- Annual rate of injury incidence
- Lost workday cases
- Employment figures
- Hours worked by employees and subcontractors

Significant project organizational or ownership changes, or changes with the authorized collective bargaining agent(s), require that new VPP Statements of Commitment be signed. These changes require notification and signed statements be sent to the applicable OSHA Regional VPP Administrator within 60 days.

4.0 GUIDANCE

4.1 Definitions

4.1.1 Environmental and Safety Coordinator (ESC)

The ESC and a TiEC employee assigned to coordinate EHS activities in a home office. The ESC performs EHS activities on a part-time basis, and has collateral duties. The ESC is designated by the Manager, EHS Services and is usually a member of the ESQ department. However, where no ESQ personnel are located in the home office, the ESC is selected from other departments. Employees who have completed the Environmental and Safety Supervisor (ESS) course will be given priority to perform ESC responsibilities. ESC responsibilities are defined throughout the EHS procedures.

4.1.2 Environmental and Safety Supervisor (ESS)

The ESS is a project employee assigned to oversee and assist with the implementation of the EHS plan and EMS and EHS programs. The ESS is qualified as the Health and Safety Supervisor required by 29 Code of Federal Regulations (CFR) 1910.120. The ESS may either be a dedicated full-time position or a collateral duty function. The ESS reports through the project organization to both the Site Manager and the Project Environmental and Safety Manager (PESM). ESS responsibilities are defined throughout the EHS procedures.

The ESS is qualified by the Director, EHS Services in accordance with EHS 1-11. The PESM designates specific employees to a project to perform the ESS role.

4.1.3 Project Environmental and Safety Manager (PESM)

The PESM is the TiEC employee assigned to assist the Project Manager in the development of a project-specific EHS plan and in the implementation of EMS and EHS programs. The PESM is a Senior EHS Scientist and typically oversees multiple projects. The PESM has approval authority for EHS issues, and assumes 'key person' roles such as "Certified Industrial Hygienist," "Corporate Health and Safety Officer," "Environmental Compliance Manager," or "EHS Manager" for the project. The PESM reports to both the Project or Program Manager and the Manager, EHS Services. PESM responsibilities are defined throughout the EHS procedures.
5.0 REFERENCES

<table>
<thead>
<tr>
<th>Please Describe Your Reference Here</th>
<th>Place Your Link in this Column</th>
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<tbody>
<tr>
<td>1. Voluntary Protection Program (VPP) Policy</td>
<td><img src="#" alt="Link" /></td>
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<tr>
<td>2. Environmental Management System (EMS)</td>
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Tetra Tech EC, Inc.

NOTICE OF OWNERSHIP AND CONDITIONS OF USE

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Tetra Tech EC, Inc.

Proprietary Information
1.0 PURPOSE AND SCOPE

The purpose of this procedure is to establish a process for periodic inspections of project sites. This procedure applies to all Tetra Tech EC, Inc. (TtEC) project sites, including subcontractor activities. Project-related daily inspections are addressed in the project-specific Safety and Health Plans or Accident Prevention Plans.

2.0 DEFINITIONS

Definitions are provided for the purpose of understanding their intent as they pertain to a procedure and projects requiring quality program planning. A Master List of Definitions is located in the Corporate Reference Library on the info.tteci.net site.

3.0 PROCEDURE

3.1 Roles and Responsibilities

3.1.1 Project Manager

The Project Manager (PM) is responsible for:

- Planning and budgeting for inspections as part of the project planning process, in accordance with Procedure PO-01, Project Management Planning
- Ensuring that inspections are conducted and documented in accordance with this procedure
- Reviewing Environment, Health, and Safety (EHS) inspection reports with on-site management

The Director of Safety and TtEC Legal Department should be notified upon receipt of any enforcement documents (refer to Procedure EHS 1-10, External Regulatory Inspection and Notifications, for more detailed information). The Director of Safety may delegate the follow-up responsibilities.

3.1.2 Site Superintendent

The Site Superintendent (SS), or Site Manager/Field Operations Lead, as designated in the project plans by title and responsibility as the senior site supervisor, is responsible for:

- Ensuring that weekly EHS inspections are being performed and documented in accordance with this procedure
• Participating in weekly EHS inspections as practical, with assistance from the Site Safety and Health Officer (SSHO)
• Ensuring that action items are developed, documented, implemented, and tracked to closure
• Conducting a weekly inspection at the project site for projects encompassing 1 or more weeks of consecutive workdays.

The weekly inspection will:
  o Include site conditions, employee and subcontractor behaviors and work practices, pollution prevention and waste management practices, wastewater and other environmental conditions, or any other applicable requirements specified in the project EHS Plan(s).
  o Be documented in an inspection report identifying the date, time, site conditions/operations, activities observed, personnel conducting the inspection, findings, recommended action items, individual responsible for implementation of each action item, and schedule for implementation (refer to the EHS Weekly Checklist and Action Item Report for more detailed information). A copy of the inspection report will be forwarded to the Director of Safety or Program Safety Manager.

3.1.3 Director of Safety

The Director of Safety is responsible for:
• Reviewing and updating this procedure and the associated inspection checklists, as necessary
• Monitoring conformance with the Safety and Health Manager (SHM) inspection requirements
• Developing Lessons Learned Reports, Event Reports, or Zero Incident Performance® (ZIP) Bulletins for selected inspection findings
• Ensuring that individuals responsible for conducting inspections understand the TtEC Safety Program requirements; applicable federal, state and local laws and regulations; client requirements; and proper inspection techniques

3.1.4 Safety and Health Manager

The SHM is responsible for:
• Approving and documenting the frequency of inspections conducted
• Performing the SHM inspections and/or designating the appropriate technical specialist, as necessary, per the project schedule and budget
• Immediately communicating significant violations or potential violations to the PM and the Director of Safety
• Preparing the SHM Inspection Checklist, and issuing the report to the Program Manager, PM, and SS within 10 working days of the inspection
• Ensuring environmental management system findings, or safety findings, at the discretion of the SHM, are communicated to the Director of Quality, or designee, and Environmental Management System (EMS) Coordinator for proper followup
surveillance and root cause evaluation, in accordance with QP-13, Surveillances, or QP-17, Quality Event Reporting

• Monitoring on-site tracking and closure of action items/deficiencies
• Confirming that the nonconformances that can be remedied during the inspection are corrected
• Providing training in proper inspection techniques, and other training to address action items, as required
• Reviewing EHS inspection reports with on-site management

3.1.5 Site Safety and Health Officer

The SSHO assigned to a field project is responsible for:

• Performing informal daily inspections of the worksite and documenting observations and action items, including closure of action items, in the safety logbook
• Assisting the PM or SS with conducting and documenting weekly inspections
• Reviewing the weekly inspection checklists for completeness, thoroughness, and trends
• Assessing trends in weekly and monthly EHS inspection results pertaining to action items and applying the lessons learned to similar situations at the project site and on other projects
• Logging deficiencies on the Deficiency Tracking Log, or equivalent, and tracking to closure, as required in the project safety plan

3.2 Safety and Health Manager Inspections

SHM inspections should be included in the established budget for all field projects. The SHM either will perform the inspection and/or designate an appropriate technical specialist to do so. The SHM will utilize a hierarchical risk-based approach to determine the inspection frequency.

The actions described below should be taken as part of the SHM inspection process:

a. The inspector should review project documents (Contract, Risk Management Checklist, Work Plans, EHS Plan(s), including any pertinent decision documents, subcontractor approvals, permits, etc., before the inspection.

b. The SHM should utilize the Safety and Health Manager Inspection Checklist to perform the site inspection. Only the portions of the checklist applicable to the project being inspected will be utilized. The SHM should modify the inspection checklist as necessary for major projects.

c. The project Environmental Protection and Waste Management Plans (or relative sections of the EHS Plan or Work Plans) may be used as the basis for the inspection to ensure the plan(s) is being implemented at the project site.

d. The checklist items to be used for a given inspection will be determined by the SHM, based on the scope and risks of the project.

e. The inspection frequency should be identified in the project EHS Plan. Inspections
should occur soon after site mobilization and initiation of site activities. For most long-duration remediation projects, quarterly inspections are warranted. Subsequent SHM inspections will be based upon the results of previous inspections; the greater the risk, the greater should be the number of inspections.

g. The SHM inspection will include:

- Identification of high-risk activities and a visual inspection of the site. Areas of the project site that may be accessed and inspected include, but are not limited to, exclusion zones, buildings, and waste storage areas.
- Completion of SHM Inspection Checklist or equivalent documentation.
- Review of on-site records, as applicable (e.g., permits, agency approvals, waste characterization documentation, including, waste profiles, waste manifests, discharge monitoring reports, training records).
- Identification of nonconformance by the SHM.
- Documentation of conformance and nonconformance on the SHM Inspection Checklists.
- Training of project and subcontract personnel, when possible, to address nonconformances.
- Positive recognition of conformance.
- Identification of any observed positive practices.

h. The SHM, or any worker on site, will stop work if any conditions or work practices are identified that pose imminent danger to the environment or to the safety and health of personnel.

i. The SHM will immediately call the Director of Safety to report significant inspection findings, including those that might require agency reporting. The Director of Safety, in conjunction with the TtEC Legal Department, will help the PM and SHM determine if the finding requires agency reporting. If a determination is made that a finding must be reported, the client will be notified in accordance with the EHS Plan notification requirements and Procedure EHS 1-07, Event Reporting and Investigation.

j. The SHM will issue the inspection report, including checklists and action items, to the responsible Vice President, Program Manager, PM, and SS within 10 working days of the inspection. Inspection reports may include checklists and action items, and should be completed using the EHS Weekly Inspection Checklists and Action Item Report or equivalent.

k. The PM and SS will handle the issues identified during inspection using one of the following methods:

   a. Deficiencies will be logged on the project site Deficiency Tracking Log, and tracked to closure by the SSHO.
b. All action items should be classified by the SHM as either Major or Minor, or contain a recommendation. In addressing the action items, Major findings will receive first priority.

c. Action items will be addressed by the PM. The PM will notify the SHM when the action items are completed. The SHM will review the completed action items to ensure completeness and appropriate closure of all action items.

i. The SHM will close the inspection and confirm it is closed in writing, through email, or through annotation of the Inspection Report.

3.3 Inspection Finding Classification

The definitions for Major Findings and Minor Findings are provided below.

**Major Finding** – A finding that indicates the real-time presence of a potential or imminent hazard, significant regulatory violation, or may result in imminent harm to people, property, or the environment. Major findings are typically observed in the field at the time of inspection, and require immediate corrective action to reduce the risk of loss. Major findings must receive top priority for correction.

**Minor Finding** – An observed finding that, by itself, is not a direct hazard, or does not have the potential to result in harm to human health or the environment. Minor findings are usually associated with documentation errors, programmatic deficiencies, recordkeeping, reporting, or management/organizational practices.

Example #1: Findings Associated with Stormwater Control Systems

a. Major – A significant breach in an erosion control feature (e.g., missing or deteriorated hay bales).
b. Minor – Failure to maintain documentation of required periodic inspections of erosion control features.

Example #2: Compliance with U.S. Occupational Safety and Health Administration Ladder Standards

a. Major – Defective extension ladder observed.
b. Minor – Failure to ensure all ladders are routinely inspected by a Competent Person.

3.4 Other Inspection Finding Tool

The SSHO and all TIEC employees and TIEC subcontractor employees should be continuously aware of workplace and environmental conditions and the work practices of their fellow workers. If a substandard condition is identified, it will be brought to the attention of the individual or supervisor, and corrected in accordance with Procedure EHS 1-07, Event Reporting and Investigation. The ZIP Slip can be used to report exceptional practices or substandard conditions, in accordance with Procedure HR-08, Recognition Programs. The Compliance Hot Line can also be used for anonymous reporting (refer to Procedure HR-14, Employee Reporting, Hotline, and Non-Retaliation, for more detailed information).

3.5 Documentation and Recordkeeping

Inspection results should be analyzed for root causes. At least annually, the Director of
Safety, or designee, will review SHM inspection findings to identify trends. This review should be documented and forwarded to the responsible Vice Presidents.

The Director of Safety, responsible Vice Presidents, and EMS Coordinator will use the analysis to develop program and environmental objectives and targets, as appropriate.

Records of all inspections and closure of identified action items related to EHS inspections will be documented and maintained in the files as follows:

- Informal Inspections – Project Files
- Weekly Inspections – Project Files
- SHM Inspection Checklist – Project Files, Deficiency Tracking Log, and Safety Department files, where applicable
- Closure of SHM Inspection Checklist – Project Files, Deficiency Tracking Log, and Safety Department files, where applicable

4.0 REFERENCES
EHS 1-07, Event Reporting and Investigation
EHS 1-10, External Regulatory Inspection and Notifications
HR-08, Recognition Programs
HR-14, Employee Reporting, Hotline, and Non-Retaliation
PO-01, Project Management Planning
PO-08, Document Control and Records Management
QP-13, Surveillances
QP-17, Quality Event Reporting

5.0 RECORDS
EHS inspection checklists, reports, action items or other related documentation will be retained in the project files, or Safety Department files when appropriate, in accordance with Procedure PO-08, Document Control and Records Management.

6.0 GUIDELINES
Safety and Health Manager Inspection Checklist
Weekly Inspection Checklist and Action Item Report
1.0 PURPOSE

OSHA requires the protection of workers from electrical shock when using electrical tools and cordsets at construction sites that are not connected to part of the permanent building or facility. The procedure is not applicable to permanent facilities (e.g., offices, manufacturing plants, retail sales).

2.0 SCOPE

This procedure provides the minimum implementation requirements for an Electrical Safety program at Tetra Tech EC, Inc (TtEC) controlled construction sites in accordance with OSHA 1926.404 (Subpart K Electrical) and 1910.304

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

3.1.1 Line Management

Site Supervisors have the responsibility to:
- Assure that all electrical tools and cordsets used by employees that are not protected by GFCIs are included in an Assured Equipment Grounding Program, along with other sources of power including generators over 5kW capacity.
- Provide qualified personnel and equipment to test both GFCIs and electrical grounding.
- Provide training to project personnel on the safe use of electrical power on the project including the requirements for daily inspections and tests on equipment prior to use.
- Designate one or more Competent Persons for testing the GFCIs.

3.1.2 Environmental, Health & Safety Personnel

The project Environmental Safety Supervisor (ESS) will monitor for compliance with this instruction and observe for changing conditions or damage that could affect equipment grounding.

3.1.3 Competent Persons

The Competent Person(s) will perform the inspections and tests at the frequencies indicated, documenting the results.

3.2 Definitions

The following terms are used within this procedure:
Ground Fault Circuit Interrupter (GFCI) – a fast acting circuit breaker that senses small imbalances in a circuit caused by current leakage and opens shutting off the electricity.

Cordsets (extension cords) – 12 AWG or greater, three wire Hard or Extra Hard duty rated extension cords are required for construction.

4.0 DISCUSSION

For 120 volt, single phase 15 and 20 Ampere applications, OSHA allows the use of Ground Fault Circuit Interrupters (GFCI) or an Assured Equipment Grounding Program. TtEC Policy is to use GFCIs whenever possible as they offer greater worker protection.

If GFCIs are not used, an Assured Grounding Program is required (Note: When some, but not all cordsets are equipped with GFCIs, then all cordsets must be part of an Assured Grounding Program, inspected and tested accordingly).

Any electrical receptacle not protected by GFCI must be included in an Assured Equipment Grounding program.

To satisfy the OSHA requirements, an Assured Equipment Grounding Program must include:
- Have a written description of the AEG Program, including procedures, available at the jobsite.
- Have specific procedures for the inspection and testing of the grounding system(s)
- The required tests must be recorded and the recorded tests made available at the jobsite to OSHA or any affected employee upon request.
- The employer must designate one or more competent persons to implement the program.

Projects requiring an Assured Equipment Grounding program may adopt the ES&H Guide HSG 3-1 as their Project Program.

5.0 INSPECTION & TESTS

5.1 GFCI Systems

5.1.1 Verifications of GFCI Protected Cordsets and Tools

Users will verify GFCI operability on a daily basis by pressing the test and reset buttons prior to using the GFCI. Documentation is not required. Any device failing to trip or reset will be removed from service. GFCIs will be installed as high on the system as possible, either in the circuit box or receptacle whenever possible.

5.1.2 Testing of GFCIs

On a monthly basis, GFCIs must be tested by the competent person.

It is recommended that GFCIs be tested with an attached load (A plug-in continuity tester would suffice as an attached load – typical tester shown below). If the lights on the continuity tester go off when the GFCI test button is pressed, the GFCI can be assumed to be operating correctly. If the light stays on, or the test mechanism fails to operate, the GFCI is faulty and should be removed immediately from service. Verify that polarity is not reversed, and that a ground exists.

5.2 Records

A record of the equipment that was tested and passed will be maintained, including a description of the item tested, and the date of test. This record can be in the form of a log sheet, tags, labels or other markings.

6.0 REFERENCES

Please Describe Your Reference Here

Place Your Link in this Column

http://info.tteci.net/apps/groups/compliance/corpproc.nsf/d9055562b7654d27852572cf0... 6/19/2012
# 7.0 ATTACHMENTS

## ATTACHMENT A

**Testing of Ground Fault Circuit Interrupter Information**

(Taken from OSHA Standard Interpretation dated 2/10/1992 Ground Fault Circuit Interrupter Information)

"OSHA 29 CFR, Section 1926.404(b)(1) does not require GFCIs to be tested. However, 1926.20(b)(2) does require the frequent and regular inspections of equipment. The instructions with GFCIs indicate that they should be tested monthly. If an employee can demonstrate, for example by means of logs or procedures, that he or she tests the GFCIs monthly and promptly replaces those found defective, than a serious citation may not be appropriate for defective GFCIs found upon inspection, proved that the defective devices are replaced promptly.

"...Testing of the GFCI is not intended to include determining the trip level of a GFCI."

"...The (OSHA) Office of Electrical, Electronic, and Mechanical Engineering Safety recommends that the compliance staff use the test button on a GFCI in combination with an attached load plugged into the circuit to be tested rather than a GFCI Tester. A plug-in ground continuity tester would suffice as an attached load, if the lights on the continuity tester go out when the test button is pressed, the GFCI can be assumed to be operating correctly. If the lights stay on or if the test mechanism fails to operate, the GFCI is faulty."

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**Tetra Tech EC, Inc.**

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Purpose:
This program provides requirements and recommendations relative to identification, location, avoidance, and management of underground utilities, appurtenances, and structures during intrusive activities.

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1.0 PURPOSE

This program provides requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities, as defined in Section 4.0. The program also addresses actions to be taken in response to encountering or contacting underground utilities.

2.0 SCOPE

These requirements are applicable to all Tetra Tech EC, Inc. (TTEC) operations. The procedures address the requirements and recommendations for identifying and locating, working around, and encountering or contacting underground utilities.

3.0 MAINTENANCE

The Director, Environmental, Safety and Quality (ESQ) Programs, is responsible for updating this procedure. Approval authority rests with TTEC's President and Chief Executive Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director Compliance and Corporate Counsel.

4.0 DEFINITIONS

4.1 Aggressive Methods

The use of mechanized equipment such as excavators, backhoes, drill rigs, directional drilling, road saws, etc. Non-Aggressive methods involve the use of manual or non-mechanized methods such as hand-digging with shovels and air/hydro/vacuum methods.

4.2 Buffer Zone

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. TTEC requires the imposition of a four-foot Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. Since most jurisdictions recognize Buffer Zones which vary somewhere in the range of 18 to 36 inches, this distance must be verified by consulting the applicable state regulations before excavating so that adjustments to surface markings can be made to achieve the TTEC-required four-foot buffer zone.

Referred to as the “Tolerance Zone”, “Safety Zone”, or “Approximate Location of Underground Utilities” in some jurisdictions.

Information relative to excavation within the buffer zone is contained in Section 5.2.2.4.

4.3 Competent Person

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the “One-Call” system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for utility identification, avoidance, and protection.

4.4 De-Energize

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.
4.5 Excavation

An operation for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to; digging, blasting, augering, backfilling, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering, pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), fence or sign post installation. TiEC requires that the designated One-Call agency for the applicable jurisdiction be contacted any time an intrusive activity is planned.

4.6 Jurisdiction

The authority having legal jurisdiction relative to regulations and requirements for notification of excavation activities and associated identification and marking. In the United States, the states have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way.

4.7 Locate

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that approximately determines the location of a line or facility.

4.8 Locate Request

A communication between an entity performing intrusive activities and a utility marking agency (One-Call, etc).

4.9 Observer

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within four feet of the outside edge of the buffer zone. This person remains in close communication with the equipment operator(s) and will stop the activity if needed.

4.10 One-Call Agency

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public areas.

4.11 Positive Response

Communication with the entity performing intrusive activities, prior to the activity, to ensure that all contacted (typically via the One-Call agency) owner/operators have located and marked the underground utilities.

4.12 Potholing

The practice of exposing an underground facility by safe, non-aggressive excavation methods in order to ascertain the precise horizontal and vertical position and orientation of underground lines or utilities.

4.13 Underground Utility

An underground or submerged conductor, pipe, or structure used in providing electric or communications service (including but not limited to, traffic control loops and similar underground or submerged devices), or an underground or submerged pipe used in carrying, providing, or gathering gas, oil or oil product, sewage, storm drainage, water or other liquid service (including, but not limited to, irrigation systems), and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:

- Natural gas pipelines
- High voltage electric cables
Water pipelines
• Fiber optic telecommunications lines
• Steam pipelines
• Gasoline, oil, or other fuels
• Sewer pipelines
• Hazardous Materials
• Underground Storage Tanks (USTs)
• Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

Note: Electrical and pressurized mechanical underground utilities that are not energized shall be considered as applicable to the requirements of this procedure until they are disconnected and removed or protected by a lockout/tagout system approved by TtEC (see Section 5.2.2.6)

4.14 Underground Utility Owner

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

4.15 White Lining

The practice whereby the entity which intends to perform intrusive activities pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a practice that does prevent utility contact incidents.

5.0 DISCUSSION

5.1 Responsibilities

5.1.1 Competent Person

The Competent Person shall be responsible for:

• Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
• Contacting the appropriate One-Call agency or private locating service, as applicable.
• Recording One-Call locate numbers.
• If necessary, renewing One-Call locate numbers before expiration.
• Ensuring that white-lining of the area to be excavated is performed.
• Ensuring that a “positive response” has been received from every utility owner/operator identified by the One-Call agency and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities.
• Completion of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
• Reviewing applicable AHAs with all project members before work begins.
• Conducting training on communication protocols to be used by the excavation observer and equipment operator.
• Ensuring Implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).
• Conducting daily inspections of the excavation area to make sure that all markings are intact.
• Maintaining required records.
• Providing the Environmental and Safety Supervisor (ESS) with all required documentation on a daily basis.

5.1.2 Observer

Whenever intrusive operations with mechanized equipment are being conducted within four feet of the outside edge of the buffer zone, horizontally and vertically, an observer must be assigned to monitor the activities. The observer is responsible for:

• Observing the operation to ensure that the operator stops operations if utilities are observed.
• Reviewing hand signals and other forms of communication with the operator.
• Properly signaling the operator.
Stopping the operation immediately if the observer’s attention must be diverted even momentarily.
Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
Maintaining required records, such as logbook entries, or other, as requested by line management.

### 5.1.3 Line Management

The Project Manager (PM) shall be responsible for:

- Ensuring compliance with this procedure.
- Providing the necessary resources for compliance with this procedure.
- Designating Competent Personnel in consultation with the Project Environmental, Health and Safety Manager (PESM) prior to the start of work.

### 5.1.4 Environmental, Health and Safety Personnel

The Environmental and Safety Supervisor (ESS) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this procedure.
- Consulting with the PM and Competent Person on underground utility issues.

### 5.2 Procedure

The following sections provide the requirements and recommendations of this procedure, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering or contacting underground utilities during the execution of intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.

#### 5.2.1 Identifying and Locating Underground Utilities

The possibility of the existence of underground utilities must be evaluated as early as possible in the planning phase for any project which involves intrusive activities, as defined in Section 4.2. The Task Initiation Procedure (TIP) form should be used for documentation of the identification of this potential hazard and the procedures to be followed to address them. The following sections describe various methods for identifying and locating utilities on a site. Plans should be verified during the readiness review. The Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B) must be completed before any activities meeting the definition of excavation in Section 4.2 are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project.

All underground utilities on a site involving excavation as defined in Section 4.4, must be located and identified before intrusive activities commence, by one or more of the following entities:

- The Utility Owner
- A Private or Public Utility Locating Service
- An Approved TIEC Competent Person

These options are described in greater detail in the following Sub-Sections:

#### 5.2.1.1 Pre-Planning and the Site EHSP

- The Site-Specific Environmental Health and Safety Plan (EHSP) developed for the project must:
  - Identify the location and types of underground utilities that are believed to be present on the site.
  - Reference this procedure (EHS 3-15), and describe how it will be implemented on the project.
  - Contain an Activity Hazard Analysis in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
  - Contain, as an appendix, a copy of the applicable regulations from the state of jurisdiction where excavation activities are to be performed. These can usually be obtained via the Internet.
  - Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.
  - Address underground utilities and potential associated scenarios in the emergency response section of the EHSP.
5.2.1.2 “One-Call” Locating and Marking Services

Every state has utility marking service programs having various names such as “One-Call”, “Dig-Safe”, “Call-Before-You-Dig”, “Dig-Safely”, and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead time for the agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the “Call-Before-You-Dig Call Center Directory”, which can be accessed on the Internet at the WebPage (http://www.agc.org/galleries/default-file/State%20One%20call%20Centers%20Laws.doc) sponsored by “Underground Focus” magazine.
- Once notified, the One-Call agency will provide the contractor with a unique “locate number” or “reference number”.
- The positive responses shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and cross-checked with the list of utility owners that the One-Call agency stated that they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call agency must be notified.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to “work under our locate number”. Subcontractors to TtEC may excavate under the locate number secured by TtEC, provided that they are excavating within the area which was previously white-lined by TtEC and subsequently marked. **However, the One-Call agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number.** If a TtEC subcontractor will be excavating in an area not white-lined by TtEC, then the TtEC subcontractor must request a new locate.
- The area where work is to be performed shall be white-lined by TtEC personnel before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.
- The One-Call agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded.
- The utility owners should provide a “positive response” relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark it’s underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.
- The positive responses shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and cross-checked with the list of utility owners that the One-Call agency stated that they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners must be documented by TtEC using a still, digital, or video camera. The photo-documentation shall be maintained with the project files indefinitely.
- The markings placed by the utility owners or marking services shall follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code appears below.

### American Public Works Association Uniform Color Code

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Electric Power Lines, Cables, Conduit</td>
</tr>
<tr>
<td>Orange</td>
<td>Communications, Telephone, Cable TV</td>
</tr>
<tr>
<td>Yellow</td>
<td>Gas, Oil, Steam, Petroleum or Gaseous Materials</td>
</tr>
<tr>
<td>Green</td>
<td>Sewers and Drains</td>
</tr>
<tr>
<td>Blue</td>
<td>Potable Water Systems</td>
</tr>
<tr>
<td>Purple</td>
<td>Reclaimed Water, Irrigation, Slurry Lines</td>
</tr>
<tr>
<td>Pink</td>
<td>Temporary Survey Markings</td>
</tr>
<tr>
<td>White</td>
<td>Proposed Excavation</td>
</tr>
</tbody>
</table>

5.2.1.3 Private Utility Locating and Marking Services
As discussed in Section 5.2.1.1, One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property. In the event that excavation activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities within the white-lined area shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property. Additionally, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements of 5.2.1.4. must be followed.

The above requirements are also intended to address the potential presence of unknown or undocumented underground utilities, therefore, the area to be excavated must also be evaluated by the PM to determine if the potential for unknown or undocumented underground utilities exist. If the determination is made that the presence of these unknown or undocumented underground utilities is unlikely, then a variance should be requested to eliminate the requirement to identify them.

A list of vendors providing locating and marking services can be found in the “Network of Underground Damage Prevention Professionals” which can be accessed on the Internet at the “Underspace” WebPage (http://underspace.com/index.htm).

- Variance to this requirement above must be approved by the PM and PESM.

5.2.1.4 Self-Performance of Utility Locating and Marking

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services described in 5.2.1.1 and 5.2.1.2 are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances, such as long-term projects where excavation is a primary task, and the presence of underground utilities is extensive, it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
  - Magnetic field-based locators or path tracers
  - Buried electronic marker systems (EMS)
  - Ground penetration radar-based buried –structure detectors
  - Acoustics-based plastic pipe locators
  - Active probes, beacons, or sondes for non-metallic pipes
  - Magnetic polyethylene pipe
  - Before self-performing any underground utility locating on a project, approval must be obtained from the TtEC Director, EHS Services.

5.2.2 Working Near or Around Underground Utilities

After the site has been properly evaluated for the presence of underground utilities, intrusive activities may begin. Since there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

5.2.2.1 Work Site Review

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

5.2.2.2 Preservation of Marks

During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

5.2.2.3 Excavation Observer

Whenever intrusive operations are being conducted within four feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.
5.2.2.4 Excavation Within The Buffer Zone

Performing intrusive activities within the buffer zone requires careful adherence to proper guidelines and procedures to minimize the risk of contact with underground utilities.

The purpose of the buffer zone is to designate and define an area where careful, prudent, and reasonable excavation practices are to be used to prevent contact with underground utilities. However, there may be occasions where it is necessary to perform aggressive excavation methods in this designated area.

The boundaries of the buffer zone as defined in Section 4.1 will be observed at all times during intrusive activities. Aggressive excavation methods (excavators, backhoes, drill rigs) must be restricted to areas outside of the 4-foot buffer zone unless a special exemption to this requirement is obtained.

Consider whether the objective of the project can be completed without performing intrusive activities in the buffer zone at all. This will greatly reduce the risks presented by performing work in close proximity to underground utilities. If after consideration, the determination is made that intrusive activities in the buffer zone are necessary, then a formal exemption request shall be made to the PESM according to the guidelines below.

A request to utilize aggressive excavation methods in the buffer zone may be made if:

- There is no other appropriate and reasonable alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (and purged if necessary), verified as de-energized, and locked-out (per Section 5.2.2.6); or
- the depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and
- for utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- application for the exemption has been submitted to the PESM via a Field Change Notification (FCN); and
- the exemption has been granted and approved in writing by the PESM on the FCN form.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities as described in Section 5.2.2.5 shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the FCN.
- When evaluating the use of aggressive excavation methods in the buffer zone, the PESM will consider the type of utility involved and the associated risk potential.

Based on this evaluation, the PESM may impose further conditions and requirements, which will be detailed in the FCN.

Even if the above exemption conditions are met, the PESM has authority to deny the request, the reasons for which will be described in the FCN.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. Non-aggressive, or non-mechanized equipment is used in order to prevent mechanical contact with underground utilities which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
- Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.
- If conductive hand tools must be used near electrical lines, then the PESM shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.
- Hydro-excavation (water pressure).
- Air excavation (air pressure).
- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

5.2.2.5 Protection of Underground Utilities

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.
When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection may be appropriate. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:

- Heavy timbers, similar to swamp mats.
- Sheets of plywood.
- Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
  - Timber shoring underneath the utility.
  - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
  - Design by a PE for complicated or large applications.
  - Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
    - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept two feet from the edge of excavations, as required by OSHA.
    - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.
    - When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
    - Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.
    - Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

### 5.2.2.7 Damage Discovery

During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine in there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection.
5.2.3 Encountering or Contacting Underground Utilities

In the event that encountering or contacting an underground utility occurs, it is imperative that the appropriate actions are taken to minimize damage to the utility, prevent personal injury, and minimize indirect effects.

5.2.3.1 Encountering Underground Utilities

It is possible that underground utilities will be encountered in locations that have previously been “cleared” of having underground utilities by the locating service, or are found outside of the area which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Intrusive activities must be curtailed.
- The One-Call agency or private location service must be contacted immediately.
- The PM and PESM must be notified.
- No further intrusive activities may be conducted until:
  - The One-Call agency/private location service and/or the subject utility owner visit the site;
  - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and
  - The orientation and depth of the subject utility has been determined and suitably marked.
- A TIEC Incident Report and Investigation form must be completed per EHS 1-7. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.

5.2.3.2 Contacting Underground Utilities

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Intrusive activities must be stopped immediately.
- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the SSHP.

EXCEPTION: If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential. Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the SSHP.
- The One-Call agency or if known, the utility owner must be contacted immediately.
- The PM and PESM must be notified.
- No further intrusive activities may be conducted until:
  - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
  - The orientation and depth of the subject utility has been determined and suitably marked.
  - Permission from the emergency responders to resume work has been given.
- A TIEC Incident Report and Investigation form must be completed per EHS 1-7. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

5.3 Training

Competent Persons shall have adequate experience and/or training to carry out the requirements of this procedure.

6.0 SOURCES OF INFORMATION

6.1 Organizations

- Common Ground Alliance
Center for Subsurface Strategic Action (CSSA)

DigSafely

National Utility Contractors Association (NUCA)

National Utility Locating Contractors Association (NULCA)

Underground Focus Magazine

NUCA State Listing of One-Call centers

Utility Safety Magazine

6.2 Vendors and Commercial Sites

- RadioDetection, Inc. (Detection Instruments)
- Heath Consultants (Detection Instruments)
- Ben Meadows Company (Detection Instruments)
- So-Deep, Inc. (Complete Utilities Services)
- Concept Engineering Group, Inc. (Air Excavation Equipment)
- Rycom Instruments, Inc. (Detection Instruments)
- Schonstedt Instrument Company (Detection Instruments)
- Forestry Suppliers, Inc. (Fiberglass Probe – “Fiberglass Tile Probe”, Part #77543, Approx. $20.00, Telephone 800-647-5368)

7.0 REFERENCES


8.0 ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist
Attachment B – Underground Utilities Management Checklist

Attachment 1
Tetra Tech EC, Inc.
EHS 3-15 - ATTACHMENT A
UNDERGROUND UTILITIES LOCATING AND MARKING CHECKLIST

Click the icon below to launch or download.

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.

http://info.tteci.net/apps/groups/compliance/corpproc.nsf/d9055562b7654d27852572cf0...
ATTACHMENT 2
Tetra Tech EC, Inc.
EHS 3-15 - ATTACHMENT B
UNDERGROUND UTILITIES MANAGEMENT CHECKLIST

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Tetra Tech EC, Inc.

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7.0 REFERENCES

• Common Ground Study of One-Call Systems and Damage Prevention Best Practices, August, 1999, Sponsored by US DOT.

8.0 ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist
Attachment B – Underground Utilities Management Checklist

ATTACHMENT 1
Tetra Tech EC, Inc.
EHS 3-15 - ATTACHMENT A
UNDERGROUND UTILITIES LOCATING AND MARKING CHECKLIST

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ATTACHMENT 2
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EHS 3-15 - ATTACHMENT B
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**EHS 3-15 - ATTACHMENT A**
UNDERGROUND UTILITY LOCATING AND MARKING CHECKLIST

To be Completed by PM and/or “Competent Person”
Complete Form as Location/Marking Progresses and Maintain in Site Files

<table>
<thead>
<tr>
<th>PROJECT INFORMATION:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetra Tech EC Competent Person:</td>
<td></td>
</tr>
<tr>
<td>Task/Activity:</td>
<td></td>
</tr>
<tr>
<td>Tetra Tech EC Subcontractor:</td>
<td>☐ No  ☐ Yes:</td>
</tr>
<tr>
<td>Private Locating Service Required:</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>Property Owner:</td>
<td></td>
</tr>
<tr>
<td>If Not, Explain:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTIFICATION:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating Service Name:</td>
<td></td>
</tr>
<tr>
<td>Locating Service Tel. Number:</td>
<td></td>
</tr>
<tr>
<td>Date Locating Service Notified:</td>
<td></td>
</tr>
<tr>
<td>Locate Ticket Number:</td>
<td></td>
</tr>
<tr>
<td>Address of Property to be Marked:</td>
<td></td>
</tr>
<tr>
<td>Locate Ticket Expiration Date:</td>
<td></td>
</tr>
<tr>
<td>Nearest Intersecting Street:</td>
<td></td>
</tr>
<tr>
<td>Are There Any Utilities on the Properties That the Locating Service Will Not Contact?</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>Specify:</td>
<td></td>
</tr>
</tbody>
</table>

Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities, etc.

### TABLE 1
**ON-SITE UTILITY INFORMATION**

<table>
<thead>
<tr>
<th>NAME OF UTILITY COMPANY</th>
<th>TYPE OF UTILITY</th>
<th>COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric</td>
<td>RED</td>
<td></td>
</tr>
<tr>
<td>Communications, Phone, CATV</td>
<td>ORANGE</td>
<td></td>
</tr>
<tr>
<td>Gas, Oil, Steam, Petroleum</td>
<td>YELLOW</td>
<td></td>
</tr>
<tr>
<td>Sewers, Drains</td>
<td>GREEN</td>
<td></td>
</tr>
<tr>
<td>Potable Water</td>
<td>BLUE</td>
<td></td>
</tr>
<tr>
<td>Reclaimed Water, Irrigation</td>
<td>PURPLE</td>
<td></td>
</tr>
<tr>
<td>Temporary Survey Markings</td>
<td>PINK</td>
<td></td>
</tr>
</tbody>
</table>

To be performed by excavator prior to utility mark-out. Proposed Excavation WHITE

White-Lining Completed? ☐ No Explain: ___________ ☐ Yes: Date: ___________ By Whom? ___________

**LOCATING AND MARKING:**

Have All Utilities Identified in Table 1 Been Marked? ☐ Yes  ☐ No  (If Not, Contact Locating Service for Resolution)

| ☐ Yes ☐ No ☐ No Marks ☐ Incorrect Location ☐ Too Wide ☐ Other: ______________ |
|测量: | Not All Utilities Marked Per Table 1 (notify marking service) |
|Measurements Taken: ☐ Yes ☐ No |
|Documentation of Marks: ☐ Photos ☐ Video ☐ Other: ______________ |

**EXCAVATION:**

Utilities Accurately Marked? ☐ Yes  ☐ No
If no, describe:

Were Unmarked or Mis-Marked Utilities Encountered? ☐ Yes  ☐ No
If Yes, Specify: ______________

Locating Service Notified? ☐ Yes  ☐ No
Will Excavation Continue Past Locate Number Expiration? ☐ Yes  ☐ No
If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: ______________
Any Other Problems/Concerns? Specify: ______________

Form Completed By: ____________________ Signature: ____________________ Date: ______________
# EHS 3-15 - ATTACHMENT B

## UNDERGROUND UTILITIES MANAGEMENT CHECKLIST

**TETRA TECH EC, INC.**

To be Completed by PM and/or “Competent Person”
Complete Form as Project Progresses and Maintain in Site Files.

<table>
<thead>
<tr>
<th>PHASE</th>
<th>TASK</th>
<th>Y E S</th>
<th>N O</th>
<th>N A</th>
<th>COMMENTS Required if Response is No or NA. (Reference Item Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Planning</strong></td>
<td>1. Excavation in Work Scope? (As defined in EHS 3-15, Section 4.4)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>2. Underground Utilities Identified in TIP?</td>
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<td></td>
<td>3. Competent Person Assigned?</td>
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<td></td>
<td>4. Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?</td>
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<tr>
<td></td>
<td>5. EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)</td>
<td></td>
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</tr>
<tr>
<td><strong>Identifying, Locating and Marking</strong></td>
<td>6. Locating and Marking Checklist Initiated? (Attachment A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Identification and Address of Property Determined, Including Nearest Intersection?</td>
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<td></td>
<td>8. One-Call Agency Contacted?</td>
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<tr>
<td></td>
<td>9. Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only)</td>
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<tr>
<td></td>
<td>10. Additional Marker/Locator Identified?</td>
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<td></td>
<td>11. Additional Marker/Locator Qualified?</td>
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<td></td>
<td>12. TiEC Self-Performing Location and Marking?</td>
<td></td>
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<tr>
<td></td>
<td>13. If Yes to 12 Above, Approval From TiEC Director EHS Services?</td>
<td></td>
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<tr>
<td></td>
<td>15. TiEC Present When Markings Completed?</td>
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<tr>
<td></td>
<td>16. All Utilities Marked? (Refer to Attachment A, Table 1)</td>
<td></td>
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<td></td>
<td>17. All Markings Photo/Video Documented?</td>
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<tr>
<td></td>
<td>18. Area Checked for Signs of Previous Excavation? (subsidence, new grass, patching, etc)</td>
<td></td>
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<tr>
<td></td>
<td>19. All Applicable Information Recorded on Attachment A?</td>
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<td></td>
<td>20. Multiple Contractors Excavating On-Site?</td>
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<td></td>
<td>21. Separate Locate Requests for All Contractors?</td>
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<tr>
<td></td>
<td>22. TiEC Subcontractors Excavating in TiEC White-Lined Area(s)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23. If Yes to 22 Above, One-Call Agency Contacted to Determine if TiEC Subcontractor Can be Added to Existing Locate Ticket?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Excavation Activities</strong></td>
<td>24. Meeting and Site Walk-Over Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)</td>
<td></td>
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<tr>
<td></td>
<td>25. AHA and EHSP Review Conducted With Personnel?</td>
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<tr>
<td></td>
<td>26. Do Site Activities Have Potential to Obliterate Utility Markings?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Excavation Activities – Cont’d</strong></td>
<td>27. If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# UNDERGROUND UTILITIES MANAGEMENT CHECKLIST

<table>
<thead>
<tr>
<th>PHASE</th>
<th>TASK</th>
<th>Y</th>
<th>E</th>
<th>S</th>
<th>N</th>
<th>O</th>
<th>N</th>
<th>A</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28. Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 4 Feet of the Buffer Zone?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Required if Response is No or NA. (Reference Item Number)</td>
</tr>
<tr>
<td></td>
<td>29. Have Operator and Observer Reviewed Commands and Signals?</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30. Has TIEC-Required 4-Foot Buffer Zone Been Marked on Either Side of Markings Placed by Locator?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation Within Buffer Zone</td>
<td>31. Is Excavation Within The Buffer Zone Absolutely Necessary?</td>
<td></td>
<td></td>
<td></td>
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<td>32. If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.</td>
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<td>33. If No to 32 Above, Has a Buffer Zone Exemption Request (FCN) Been Approved by The PESM? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.</td>
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<td>34. If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or, Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?</td>
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<td>35. If Yes to 34 Above, Have All of The Following Conditions Been Met? For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility? Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone? Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities? Has The FCN Requesting The Buffer Zone Exemption Been Signed by The PESM? If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.</td>
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<td>Working Around Exposed Utilities</td>
<td>36. If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?</td>
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<td>37. Have Spoils Been Placed as far Away From the Excavation as Feasible?</td>
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<td>38. Has the Utility Been De-Energized?</td>
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<td>(If Any Portion of the 4-Foot Buffer Zone around a Utility is Inside of the White-Lined Area)</td>
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<td>39. Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?</td>
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<td>Working Around Exposed Utilities –Cont’d</td>
<td>40. If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?</td>
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<td>41. If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)</td>
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<td>42. Has the Isolation Point Been Tagged?</td>
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<td>Damage Discovery</td>
<td>43. Has Pre-Existing Damage to a Utility Been Discovered During Excavation?</td>
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<td>44. If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?</td>
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<td>45. If Yes to 43 Above, Have Photographs Been taken?</td>
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<td>PHASE</td>
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<td>Encountering or Contacting Underground Utilities</td>
<td>46. Have Utilities Been Encountered in Locations That Have Not Been Marked?</td>
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<td>Required if Response is No or NA. (Reference Item Number)</td>
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<td>47. If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?</td>
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<td>48. If Yes to 46 Above, Has the PM and PESM Been Notified?</td>
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<td>49. If Yes to 46 Above, Has a TiEC Incident Report per EHS 1-7 Been Completed? (Include Photographs)</td>
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<td>50. Has Excavation Equipment Come In Contact With Underground utilities?</td>
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<td>51. If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?</td>
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<td>52. If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?</td>
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<td>53. If Yes to 50 Above, Has the Area Been Secured?</td>
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<td>54. If Yes to 50 Above, Have Emergency Responders Been Notified?</td>
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<td>55. If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?</td>
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<td>56. If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?</td>
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<td>57. If Yes to 50 Above, Were Intrusive Activities Curtailed Until; Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?</td>
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<td>58. If Yes to 50 Above, Has a TiFW Incident Report per EHS 1-7 Been Completed? (Include Photographs)</td>
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Tetra Tech EC, Inc.
Procedure EHS 3-15 UndergroundUtil (Attachment B)
Proprietary Information
Table of Contents
See Below

1.0 PURPOSE

The purpose of this procedure is to prevent heat and cold stress related injuries and illnesses at field operations.

2.0 SCOPE

This procedure applies to all Tetra Tech EC, Inc. ("the Company") and subcontractor field personnel that may be exposed to heat or cold stress during the performance of their field work assignments.

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

3.1.1 Line Management

General responsibilities are found in EHS 1-1, Responsibilities for Program Implementation. Procedure specific responsibilities are:

Site Supervisors have the responsibility to:

a. Evaluate the work activities and anticipated temperatures that may affect worker productivity or harm workers.

b. Provide resources and facilities necessary to prevent health effects from temperature extremes.

c. Enforce work rules related to such prevention.

3.1.2 Environmental, Health and Safety Personnel

The Project Environmental and Safety Manager (PESM) will make the initial determination of heat and cold stress prevention requirements as part of the site EHS Plan (see EHS 3-2, EHS Plans) and oversee the implementation of this program on a project basis for all Company field programs.

The Environmental Safety Supervisor (ESS) will assist with implementation of heat and cold stress prevention programs. The ESS will, in most cases, be the person responsible for monitoring heat and cold stress on the job, determining work/rest and work/warm-up schedules where used, and will implement emergency response or corrective action, if needed. The ESS will train site personnel on the effects of temperature extremes and the site prevention program, and will maintain records related to this program.

The ESS will implement the appropriate heat stress or cold stress requirements when temperatures indicate a potential heat or cold stress condition. The ESS will work with the line management to implement work rest regimens or other administrative controls such as ceasing certain activities, changing PPE, or engineering controls such as warming areas, cooling areas or shifting work schedules.
**3.2 General Program Requirements**

Adverse temperature conditions must be considered when planning site operations. Heat and cold stress injuries are completely avoidable with the proper education and work monitoring.

Implementing organizations will determine if contractual or regulatory requirements apply. Numerous Federal Agencies (e.g. USCOE, DOE) will contractually impose requirements related to temperature extremes. Also several states have passed regulations with requirements that will be applicable when working in those areas. In these cases, the information in the Guidance section and the attachments may become requirements.

---

**4.0 GUIDANCE**

This section contains optional guidance information to successfully execute the procedure.

**4.1 Definitions**

**4.1.1 Body Core Temperature**

The temperature of the organs within the trunk of the body.

**4.1.2 Deep Frostbite**

The tissue beneath the skin is solid to the touch; it may involve a full thickness freeze to the bone. This is an extreme emergency and can result in permanent tissue loss.

**4.1.3 Frostbite**

Freezing of body tissue.

**4.1.4 Frostnip or Incipient Frostbite**

A cold related injury that progresses slowly and is painless while developing. The victim is usually unaware that he/she has frost nip. The skin first becomes reddened, then changes to white; no freezing of tissue occurs.

**4.1.5 Heat Cramp**

Painful muscle spasms usually occurring on the arms, legs, and abdomen; caused by excessive loss of body electrolytes from profuse sweating.

**4.1.6 Heat Exhaustion/Fatigue**

Heat Exhaustion is a form of shock that occurs when the body loses large amounts of water and electrolytes from excessive perspiration after exposure to heat and physical activity; also called heat prostration. Symptoms include profuse sweating, pale, cool, sweaty skin and other symptoms identified in Attachment 1, Section 1.3. Heat fatigue refers to the temporary state of discomfort and mental or psychological strain arising from prolonged heat exposure. Works unaccustomed to the heat are particularly susceptible and can suffer, to varying degrees, a decline in task performance, coordination, alertness, and vigilance.

**4.1.7 Heat Rash**

Profuse tiny raised red vesicles (blister-like) on affected areas of the skin which cause a prickling sensation during heat exposure.

**4.1.8 Heat Stroke**

A life-threatening condition caused by rapidly rising body core temperature that occurs when the body's temperature regulating mechanisms are overwhelmed. Sweating stops and the skin is dry and hot.

**4.1.9 Hyperthermia**

A rise in body core temperature above 99.6°F.

**4.1.10 Hypothermia**
Decreased body core temperature from prolonged exposure to freezing or near-freezing temperatures. This is the most life-threatening cold injury and affects the entire body with possible localized severe cooling. Hypothermia is defined as the deep body temperature dropping below 96.8°F (36°C).

4.1.11 Superficial Frostbite
Frostbite which affects the skin and tissue just beneath the skin. The skin is firm and waxy, tissue beneath is soft and numb. The skin turns purple and may tingle and burn during warming.

4.1.12 Wet-Bulb Globe Temperature (WBGT) Index
Method used to measure the environmental factors (e.g., temperature, relative humidity) which impact the body's physiological responses to heat.

4.1.13 Wind-Chill Factor or Equivalent Chill Temperature (ECT)
An index describing the effect of the cooling power of moving air on exposed flesh. The effect of wind velocity at a certain temperature is expressed as the equivalent cooling effect of a lower temperature with still air.

4.1.14 Work/Recovery Regimen
The ratio of time spent working to time spent resting in an area designed to relieve heat related conditions. This ratio is expressed in one hour periods. Example: A work/recovery regimen of 75% work, 25% rest corresponds to 45 minutes work, 15 minutes rest each hour.

4.2 General Program Guidance
Excessively hot or cold working environments can produce a number of different injuries. Critical to the ability to care for those injuries is a basic understanding of the way in which the body maintains its temperature and how it physiologically adjusts to extremes of heat and cold.

Preventing Heat and Cold Stress is prevented by planning in advance, and by training affected personnel in the symptoms of temperature extremes. OSHA has not established a temperature extremes standard, instead relying on the general duty clause.

The US Army Corps of Engineers has established requirements for work under its control in "EM-385-1-1, most current edition and ACGIH TLV/BEI Guide, most current edition."

The ACGIH Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices has updated its recommendations "in the ACGIH TLV/BEI Guide, most current edition." These recommendations are incorporated in the appropriate sections.

Several states have also passed regulations or temperature extremes (e.g. Washington, California).

Three attachments are attached to provide information related to temperature extremes:
- Attachment 1 provides information on the body's physiological responses to heat and cold stress.
- Attachment 2 provides information on Heat Stress Monitoring and Work/Rest Regimens.
- Attachment 3 provides information on Cold Stress Monitoring and Work Recovery Regimens.

Proper care of victims who are suffering from the effects of heat or cold exposure will help to minimize injuries and speed recovery. On the other hand, improper treatment of these emergencies can result in serious injury, disability, or death.

The most effective first aid for any injury is prevention. When acceptable monitoring and prevention programs are followed, there should be no victims.

4.3 Heat Stress
A heat stress prevention program will be implemented when ambient temperatures exceed 70°F (21° C) for personnel wearing permeable clothing. Wet Bulb Globe Temperature Index (WBGT) or physiological monitoring will be conducted. When a WBGT Index is not available, or workers are wearing impermeable clothing, or the WBGT is not representative to the actual work area (enclosed work areas, work over asphalt or reflective materials etc.) physiological (pulse, temperature) monitoring may be used in its place.

WBGT devices located away from the project (up to several miles) maybe used for monitoring the project if the general weather and measured work surfaces are similar.

4.3.1 Selection of Chemical Protective Clothing
The PESM will review site data and working conditions and select the personal protective equipment ensemble...
that best protects the employees from site hazards. The risk of heat related illness will be fully considered in balancing the risks and benefits of the PPE.

4.3.2 Hydration
The Company will supply cool potable water or other suitable drinks (e.g., sport electrolyte replacements) for fluid replacement. Employees involved in the heat stress prevention program will be trained and encouraged to drink at a rate of approximately 8 oz. every 20 minutes. Individual disposable cups will be used and kept in closed containers or dispensers. Alternately, cool bottled water or sports drinks in individual sealed bottles may be provided.

4.3.3 Cool Rest Areas
Shaded rest areas will be provided. On large remediation projects, air conditioned rest areas should be provided for workers exposed to heat stress conditions. In low humidity locations, evaporative coolers or misting devices and fans can be used to provide cool down locations. On smaller projects, personnel can use air-conditioned vehicles as cool down areas.

4.3.4 Other Prevention Elements
The PESM, ESS and the Project Manager will incorporate other elements into the heat stress prevention program as necessary. The selected elements will be described in the EHS plans. Engineering controls are preferred. Where their use is not feasible, the program must incorporate administrative/work practice controls, personal protective equipment, or a combination. Examples of prevention program elements include:

a. Engineering Controls
   - Air conditioned cabs for heavy equipment and vehicles (such controls may eliminate the need for other program elements).
   - Fans, blowers, or misters
   - Cool water for drenching personnel in impermeable clothing. This can be provided through a garden hose, a garden sprayer filled with ice water, a clean drum full of water for “hard hat dipping” for containers of ice water and clean towels in the rest area to hasten cool down.

b. Administrative and Work Practice Controls
   - Adjusting work schedules to do the bulk of the work during the cooler parts of the day.
   - Acclimating workers.
   - Implementing work/rest regimens (See Attachment 2 for Work/Rest Regimen Procedures)

c. Personal Protective Equipment
   - Ice Vests
   - Circulating water vests
   - Vortex tubes and air circulating vests
Where ice vests and circulating water vests are used, rest periods of approximately 15 minutes should be taken when ice packs or batteries need to be changed. Continuous work over long periods of time with these devices may present an increased musculoskeletal injury risk due to the extra weight. Since the duration of the cooling effectiveness of these devices will vary with heat and work loads, users must be instructed to leave the area to replenish ice or batteries at the first sign of loss of cooling.

d. Monitoring
   A program of environmental and physiological monitoring must be established in order to use work/rest regimens to verify the effectiveness of the regimens. The monitoring procedures are described in Attachment 2.

4.3.5 Training
All site personnel must receive training on the following topics:

a. Health effects of hot environments and symptoms of heat related illness.

b. Personal risk factors; including use of some medications (e.g. blood pressure, allergy, renal or sweat gland functions), physical condition, insufficient sleep; attempting full work loads when not fully acclimatized and dehydration due to consumption of alcohol, consumption of caffeine or other diuretics.

c. Effect of personal protective equipment on heat stress conditions.

d. Preventive measures
   - Physiological monitoring methods and thresholds
   - Acclimatization

e. Fluid replacement; including taking frequent breaks for fluid replacement on an as-needed basis, maintaining hydration and electrolyte balances.

f. Elements of the site Heat Stress Prevention Program.

g. First aid and emergency response

Records shall be maintained in accordance with EHS 1-9, Recordkeeping.

4.4 Cold Stress
At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trenchfoot or immersion foot, and hypothermia as well as slippery surfaces, brittle equipment, poor judgment and taking short cuts. ACGIH guidelines are provided in Attachment 3.
The Company will implement the following cold stress prevention program elements when there is a potential for cold related injuries. Workers should be protected from exposure to cold so the core body temperature does not fall below the Threshold Limit Value of 96.8°F (36°C).

4.4.1 Personnel Protective Equipment

The following personal protective equipment will be provided as necessary to Company employees when conditions indicate a potential for cold-related injury. Subcontractors will be expected to supply appropriate equipment to their employees.

a. Hard hat liners, face covers
b. Gloves or glove liners, chemical sock and glove warmers
c. Rain gear or water impermeable coveralls and gloves for potentially wet operations
d. Fleeced boot liners where rubber steel-toe boots are used
e. Winter coveralls

4.4.2 Engineering Controls

A variety of engineering controls shall be evaluated to minimize cold stress. These include:

a. General or spot heating should be used to increase temperature at the workplace.
b. If fine work is to be performed with bare hands in a cold environment, special provisions should be made to keep the workers' hands warm. Warm air jets, radiant heaters, or contact warm plates can be used.
c. The work area should be shielded from winds and drafts that may affect the wind chill factor.
d. The air velocity in refrigerated rooms should be minimized as much as possible, and should not exceed 2.2 mile/hour (1m/sec) in the work zone.
e. At temperatures below freezing, metal handles of tools and control bars should be covered with thermal insulating material.
f. Unprotected metal chair sets should not be used as they conduct heat away from the body.
g. When necessary, equipment and processes should be substituted, isolated, relocated, or redesigned to reduce cold stress at the worksite.
h. Power tools, hoists, cranes, or lifting aids should be used to reduce metabolic workload.
i. Heated warming shelters such as tents and cabins should be made available if work is performed continuously in an equivalent chill temperature of 20°F or below.
j. The ESS may implement a work-rest schedule to reduce exposure to cold stress.
k. Scheduled rest breaks should be enforced.
l. Personnel exposed to the cold should be provided the opportunity for frequent intake of warm, sweet, caffeine-free, nonalcoholic liquids or soup.
m. Work should be moved to warmer areas whenever possible.
n. Extra workers should be assigned to highly demanding tasks.
o. Workers should be allowed to pace themselves, taking breaks when needed.
p. Workers shall be trained in the prevention, symptoms, and emergency response to cold stress.
q. Utilize the "buddy system" to monitor cold stress symptoms among the workers.
r. Allow new employees time to adjust or "acclimate" to cold conditions.
s. Minimize the need to sit or stand in one place for long periods of time.
t. Minimize the amount of work time spent in a cold environment.

u. Allow for the weight and bulkiness of protective clothing when estimating work performance goals and tasks.

4.4.3 Warm Rest Areas

The Company will make warm rest areas, e.g., heated trailers, available for rest breaks in cold weather. Employees will be permitted and encouraged to use the heated trailers whenever they experience symptoms of cold stress.

4.4.4 Work/Warm-Up Schedules

The work/warm-up schedule found in the ACGIH for cold stress will be followed as a guideline unless a government project, where they are required by ACOE or DOE regulation (Attachment 3). In addition, the Company will make warm-up periods available to employees who need to change into dry clothing to prevent immersion foot or hypothermia.

4.4.5 Training

All Company employees and subcontractors will be trained in:

a. The effects of cold stress, including frostbite, immersion foot and hypothermia.

b. Conditions that can lead to hypothermia, including work practices, clothing, activity levels, wind chill.

c. Personal risk factors, including use of some medications, physical condition, insufficient sleep, dehydration due to consumption of caffeine, alcohol or other diuretics.

d. Recognition of the symptoms.

e. Methods employees can use to protect themselves.

f. First aid procedures and recognition of medical emergencies.

Records shall be maintained in accordance with EHS 1-9, Recordkeeping.

5.0 REFERENCES

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<td>3. National Safety Council</td>
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<td>10. US Army Corps of Engineers, Safety &amp; Health Manual (EM</td>
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### 6.0 ATTACHMENTS

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1.0 HEAT STRESS

Hot weather can cause physical discomfort, loss of efficiency, and personal injury. The human body strives to maintain a constant core temperature of 98.6°F (37°C). If this temperature is to be maintained, heat loss must equal heat production. This balance is maintained by variations in the blood flow to the outer part of the body. When the core temperature rises, blood vessels beneath the skin dilate, and the blood brings increased heat to the skin, where it is dissipated by radiation and convection. This works only as long as the skin temperature is higher than the temperature of the outside environment. Heat loss by radiation convection is impossible when the temperature of the outside air approaches or exceeds the temperature of the skin. The body will now rely on dissipation through evaporation of sweat. But the sweat mechanism also has limits. The normal adult can sweat only about one liter per hour and can sweat at that rate for only a few hours at a time. In addition, sweating is effective only if the relative air humidity is low. Sweat evaporation ceases entirely when the relative humidity reaches 75 percent.

Of particular concern in heat stress monitoring is the use of personal protective clothing which decreases natural body ventilation and greatly increases the temperature and humidity to the skin. If precautions are not taken, heat stress will progress into a heat-related injury. Heat-related injuries fall into three major categories: heat cramps/fatigue, heat exhaustion, and heat stroke.

1.1 Heat Cramps

Heat cramps are the least common and least severe of heat injuries. Heat cramps are thought to occur when the electrolytic balance in the blood between water, calcium, and sodium (salt) is altered. Low blood salt level, from profuse sweating and inadequate salt consumption, is the usual cause, as well as poor conditioning.

1.1.1 Symptoms

a. Severe muscle cramps and pain, especially of the upper legs, calves, and abdomen, and occasionally in the arms
b. Faintness and dizziness
c. Possible nausea and vomiting

1.1.2 Treatment

Emergency care will include:

a. Remove victim from the hot environment and allow victim to rest and cool down
b. Provide small amounts of cool water or use a commercial sport drink and allow victim to sip this solution to hydrate. Avoid drinks with caffeine or alcohol.
c. To relieve pain, gently stretch the involved muscle group; gently message cramps as long as it does not increase the pain or discomfort.

The victim should avoid exertion of any kind for 12 hours. A victim of heat cramps is prone to recurrence.

1.2 Heat Fatigue

Heat Fatigue is most likely to affect new or un-acclimatized workers.

1.2.1 Symptoms

a. Loss of energy, extreme tiredness

b. Stumbling, staggering, or loss of balance. The loss of balance is a particular risk to workers on elevated surfaces or climbing.

c. Excessive skin redness as body moves blood to surface

d. Lack of judgment recognizing the onset of heat fatigue and taking action to remove themselves from the environment for cool down and hydration

1.2.2 Treatment

a. Remove from the hot work environment for cool down

b. Provide fluids (cool water or sport drinks to re-hydrate the victim

c. Extend cool-down period or cessation of work for the day with extra hydration and rest

d. Enhance observations by other workers and physiological monitoring

e. Provide individual work/rest regimens until acclimatized

1.3 Heat Exhaustion

1.3.1 Symptoms

Heat exhaustion is the most common heat injury and usually occurs in an individual who is involved with heavy physical exertion in a hot, humid environment, and is wearing protective clothing. Heat exhaustion is a mild state of physical shock caused by the pooling of blood in the vessels just below the skin, causing blood to flow away from the major organs of the body. Due to prolonged and profuse sweating, the body also loses large amounts of salt and water.

The symptoms of heat exhaustion include:

a. Profuse sweating

b. Pale, cool, sweaty skin

c. Headache and extreme weakness, fatigue

d. Nausea and possible vomiting
e. Dizziness and faintness
f. Collapse and possible brief unconsciousness
g. Body core temperature from 100.4°F (38° C) to 104°F (40° C), although skin temperature may even be slightly below normal.

1.3.2 Treatment

Emergency care will include:

a. Remove victim from the hot environment and out of the exclusion zone
b. Lie victim down with feet slightly raised
c. Remove as much clothing as reasonable (especially personal protective clothing); loosen what cannot be removed
d. Apply cold, wet compresses to the skin; fanning will also aid in cooling
e. If the victim is fully alert, allow him/her to drink water at the same rate, that was used for the emergency care of heat cramps
f. If the victim vomits, do not give fluids by mouth, transport him/her to a hospital immediately (dehydration is the most critical problem in heat exhaustion victim; intravenous fluids will have to be given)
g. Take temperature every 10 minutes, if the victim's temperature is above 101°F (38.3 C) or shows a steady increase, transport to a hospital immediately and start sponging him/her off with cool water

1.4 Heat Stroke

Heat stroke is a true life-threatening emergency having a mortality rate of 20 to 70 percent. This condition results when the heat regulating mechanisms of the body break down and fail to cool the body sufficiently. The body temperature rises to between 104°F and 110°F (40.6 – 43.3° C); no sweating occurs in about 50 percent of the victims. Because no cooling takes place, the body stores increasingly more heat, and eventually brain cells are damaged, causing permanent disability or death.

There are two basic kinds of heat stroke: classic heat stroke and exertional heat stroke. Classic heat stroke, in which people lose the ability to sweat, generally effects the elderly or chronically ill. Exertional heat stroke, in which victims retain the ability to sweat, is accompanied by physical exertion and muscle stress. Exertional heat stroke is the type that will be most commonly encountered on a field operation requiring strenuous physical activity.

1.4.1 Symptoms

a. Oral temperature of 104°F (40° C) or higher
b. Hot, reddish skin, skin is usually dry
c. Headache
d. Dry mouth  

e. Shortness of breath  

f. Nausea or vomiting  

g. Increasing dizziness and weakness  

h. Mental confusion and anxiety; victims may show unusual irritability, aggression, combative agitation, or hysterical behavior  

i. Convulsions, sudden collapse and possible unconsciousness; all heat stroke victims having varying levels of consciousness, ranging from disorientation to coma  

1.4.2 Treatment  

Emergency care will include:  

a. Remove the victim from the hot environment and from the exclusion zone  

b. Call for trained emergency medical personnel immediately  

c. Remove as much clothing as reasonable (especially personal protective clothing); cut clothing with bandage scissors, if necessary, being careful not to injure victim  

d. Pour cool water over the victim, avoiding his nose and mouth  

e. Fan the victim  

f. Place cold packs under the arms and against neck, groin and ankles  

g. Wrap victim in a wet blanket  

h. Continue a combination of these methods until the oral temperature falls below 103°F (39.4°C) (take measures to prevent chilling, if necessary, i.e., use slower cooling if the victim starts shivering  

i. Elevate the head and shoulders slightly during cooling  

j. Never give the victim anything to drink unless fully conscious and vomiting is unlikely  

Because heat stroke involves the entire body, a number of complications may result including brain swelling, convulsions, coma, kidney failure, liver failure, high blood pressure and heart failure.  

Therefore, always transport the victim to a hospital even if the body core temperature has lowered to near normal.  

1.5 Heat Stroke Verses Heat Exhaustion  

The two most reliable and distinct differences between heat stroke and heat exhaustion are:
1.5.1 Heat Stroke

a. Skin flushed (red); may be dry; hot to touch (note: Personnel who have been wearing impermeable clothing may have wet skin from earlier sweating that has ceased.)

b. Oral temperature above 104°F (40°C)

1.5.2 Heat Exhaustion

a. Skin pale; wet or clammy; cool to touch

b. Oral temperature usually normal

2.0 COLD STRESS

Hypothermia is a drop in the core body temperature below 96.8°F (36°C). The first symptoms of hypothermia are uncontrollable shivering and the sensation of cold at about 95°F (35°C); this is followed by a slowed and sometimes irregular heart beat, a weakened pulse and a drop in blood pressure. Vague or slow slurred speech, memory lapses, apathy, incoherence and drowsiness can occur. Other symptoms may include cool skin, slow, irregular breathing, apparent exhaustion, and fatigue after rest.

2.1 Prevention

Hypothermia is caused by prolonged exposure to a cold environment, whether air, water, or snow and ice. Adequate dry clothing with appropriate insulating capacity must be provided to workers to prevent hypothermia, especially if work is performed in air temperatures below 40°F (4.4°C). Wind chill is a critical factor. Work at a slow but steady pace. The job should be a "no sweat" operation.

Unless there are unusual or extenuating circumstances, cold injury to other than the extremities (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 hypothermia. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are special precautions that should be considered for these workers. 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.

2.2 Treatment

First aid for mild hypothermia will be performed as follows:

a. End the exposure - get the victim out of the cold and wet

b. Replace wet clothing with dry or add insulation to clothing

c. Offer warm, non-alcoholic fluids

d. Increase exercise

e. Seek shelter from wind, wet and cold
CAUTION: If the victim remains cold for a number of hours, chemical changes may have taken place which, on re-warming, may cause major medical problems for the victim and which could result in death. Severely hypothermic victims are best warmed in the hospital under controlled conditions. If a severely hypothermic victim cannot be transported to a hospital within a few hours, re-warming should begin in the field.

2.3 Frostbite

2.3.1 Prevention

Frostbite can be prevented by wearing sufficient protection to prevent skin from coming into prolonged contact with a freezing environment. The following steps can be taken.

a. Wear sufficient clothing. Mittens are better than gloves. Face masks and wool stocking caps are better than hats. Wind and waterproof hoods protect the face and neck.

b. Clothing should be loose enough to prevent constriction of blood vessels. Boots must be roomy enough to permit movement of the toes with no feeling of tightness.

c. Do not contact conductive metals or contact gasoline or other solvents with bare skin as rapid evaporation of solvents may quickly lead to frozen tissues in a cold environment.

d. Exercise the toes and fingers to maintain circulation.

e. Observe the condition of your partners' face, hands and ears frequently for signs of frostbite.

f. Avoid smoking and drinking alcoholic beverages.

2.3.2 Symptoms

Frostbite can occur either before or after the onset of hypothermia when body tissue (usually an extremity) is exposed to freezing temperatures. Frostbite occurs when the fluids surrounding tissue cells freezes. The danger of frostbite increases with increased wind chill and/or reduced temperatures below 32°F (0°C). Frostbite can also occur if tissues are in prolonged contact with a frozen material or object. Skin contact with frozen metal, for example, can result in frostbite in a short period of time, even in a warm environment.

There are three degrees of frostbite:

a. First degree - freezing without blistering or peeling, "frostnip"

b. Second degree - freezing with blistering and/or peeling, and

c. Third degree - freezing resulting in the death of skin tissue and possibly the death of underlying tissues as well

Symptoms of frostbite include the following:

a. The skin changes color to white or grayish-yellow, progresses to reddish-violet, and finally turns black as the tissue dies

b. Pain may be felt at first, but subsides
c. Blisters may appear, and
d. The affected area is cold and numb

2.3.3 Treatment

First aid for superficial (first degree) frostbite is as follows:

a. Place a warm body part next to the frozen area, applying firm, steady pressure.
b. DO NOT RUB THE AREA. Rubbing may cause further damage to already injured skin.
c. Protect the area from further freezing.

First aid for deep frostbite (second and third degree) is as follows:

a. KEEP THE FROZEN PART FROZEN!
b. Prevent further injury: avoid rubbing and further freezing of unaffected tissue.
c. If the part has thawed, the part should NOT be allowed to refreeze or bear weight. A victim with thawed feet should be carried out.
d. Give the victim plenty of fluids and evacuate to medical assistance as soon as possible.

2.4 Trench Foot

2.4.1 Symptoms

This condition may be caused by long, continuous exposure to cold without freezing, combined with persistent dampness or actual immersion in water. Edema (swelling), tingling, itching, and severe pain occur, and may be followed by blistering, death of skin tissue, and ulceration. When other areas of the body are affected besides the feet, the condition is known as chilblains.

2.4.2 Prevention

Trench foot and chilblains can be prevented by keeping the body as dry as possible at all times. Waterproof boots should be worn when required, but provisions must be made for preventing excessive perspiration to accumulate inside the boots. Socks should be changed at least twice daily and the boots wiped dry inside with each change of socks. The feet should also be wiped dry and foot powder applied.

2.4.3 Treatment

Affected body parts should not be rubbed or massaged, but bathed in water using plain white soap. Dry thoroughly and elevate the body part, allowing the body part to be exposed at room temperatures. If the feet are affected, do not walk during treatment.
HEAT STRESS MONITORING AND WORK/REST REGIMENS

1.0 INTRODUCTION

Establishing a work/rest regimen that allows work to be completed in a timely manner while providing adequate rest time to prevent heat stress requires involvement of the ESS, Project Supervisors, and individuals involved. In many cases, particularly when wearing normal field type clothing (i.e., level D), awareness and communication are the key elements to a successful program. Allowing and encouraging rest periods on an "as needed" basis while ensuring vigilance for initial symptoms of heat stress, encourages this success.

There are times when this approach is not appropriate. When heat stress contributing protective clothing (e.g., respirators, impermeable coveralls) are worn for extended periods, or when "as needed" work/rest regimens adversely impact either the individuals exposed to the heat source or work completion, a more formal work/rest regimen will be established.

Formal work/rest regimens are based on when Action Levels and TLV limits are approached and:
1) monitoring ambient conditions (e.g., with a Wet Bulb Globe Temperature Index (WBGT), estimating work loads and establishing work/rest times, 2) monitoring physiological conditions and adjusting work/rest periods, 3) applying Job Specific Controls.

The WBGT, physiological monitors, and personnel heat stress monitors will be used in accordance with manufacturer's instructions. Personnel heat stress monitors will be approved for use by the PESM.

This attachment includes guidance for monitoring and preventing heat stress and heat strain in accordance with the 2007 ACGIH. The 2007 ACGIH Guidelines were revised to include an Action Level and a Threshold Limit Value based on WBGT measurements). The goal is to maintain body core temperatures within +/- 1.8° F of 98.6° F (+/-1° C. of 37° C) The TLV represents conditions under which it is believed that nearly all acclimatized, adequately hydrated, unmedicated, healthy workers may be repeatedly exposed without adverse health effects. The Action Limit is similarly protective of unacclimatized workers and represents conditions for which a heat stress management program should be considered.

This guidance is not a fine line between safe and dangerous. Therefore professional judgment is of particular importance in assessing the level of heat stress and physiological heat strain to provide for protecting nearly all healthy workers with due consideration of individual types and type of work.
The decision process shown in Figure 1-1 should be started if 1) a qualitative exposure assessment indicates the possibility of heat stress, 2) there are reports of discomfort due to heat stress, or 3) professional judgment indicates heat stress conditions.

Figure 1-1 – Evaluating Heat Stress and Strain

Note: At the option and judgement of the ESS, physiological monitoring may be commenced at any time, supplementing or replacing WBGT monitoring.
2.0 WBGT-BASED WORK/RECOVERY REGIMENS

2.1 Work/Recovery Regimens

When required, the WBGT Index will be used in conjunction with the work load, protective clothing, and other factors to determine the appropriate work/recovery regimen and need for physiological monitoring for personnel.

The ESS will monitor the temperature, work loads, and protective clothing. The WBGT will be adjusted based on the clothing adjustment factors. The Work Loads and the WBGT will then be used to determine the Work and recovery cycles for the workers involved.

The work/recovery regimen using the WBGT procedure will be used as a guideline, as the WBGT is only an index of the environment. Table 2-1 identifies the Clothing Adjustment factors.

<table>
<thead>
<tr>
<th>Clothing Type</th>
<th>Addition to WBGT Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Clothes (Long Sleeve Shirt and Pants)</td>
<td>0°F (0°C)</td>
</tr>
<tr>
<td>Cotton (woven material) Coveralls</td>
<td>0°F (0°C)</td>
</tr>
<tr>
<td>Double Layer woven Clothing</td>
<td>5.4°F (3°C)</td>
</tr>
<tr>
<td>SMS Polypropylene Coveralls</td>
<td>1.0°F (.5°C)</td>
</tr>
<tr>
<td>Polyolefin Coveralls</td>
<td>1.8°F (1°C)</td>
</tr>
<tr>
<td>Limited-Use Vapor Barrier coveralls</td>
<td>19.8°F (11°C)</td>
</tr>
</tbody>
</table>

Notes on Table 2-1:
For example, WBGT Index is 86°F. If double layer woven overalls (5.4°F) are used with acclimatized workers the Corrected Index Temperature is 91.9°F.

These values must not be used for completely encapsulating suits, often called Level A. Clothing Adjustment factors cannot be added for multiple layers. The coveralls assume that only modesty clothing is worn underneath, not a second layer of clothing.

These values may also apply to other protective clothing, such as rain suits, when worn where the body is fully covered and the worker does not have the option of opening or venting the clothing while working (e.g. individuals in a radiological zone or other hazardous areas.

Tables 2-2-A and 2-2-B outline the work/recovery regimens based upon WBGT temperature and workload.

<table>
<thead>
<tr>
<th>Allocation of Work in a Cycle of Work and Recovery</th>
<th>Work Load Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light</td>
</tr>
<tr>
<td>75% to 100%</td>
<td>82.4 (28.0)</td>
</tr>
<tr>
<td>50% to 75%</td>
<td>83.3 (28.5)</td>
</tr>
<tr>
<td>25% to 50%</td>
<td>85.1 (29.5)</td>
</tr>
<tr>
<td>0% to 25%</td>
<td>86.0 (30.0)</td>
</tr>
</tbody>
</table>
### Table 2-2B Permissible Heat Exposure Threshold Limit Values

(Values are given in °F and (°C) WBGT)*

<table>
<thead>
<tr>
<th>Allocation of Work in a Cycle of Work and Recovery</th>
<th>Work Load Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light</td>
</tr>
<tr>
<td>75% to 100%</td>
<td>87.8  (31.0)</td>
</tr>
<tr>
<td>50% to 75%</td>
<td>87.8  (31.0)</td>
</tr>
<tr>
<td>25% to 50%</td>
<td>89.6  (32.0)</td>
</tr>
<tr>
<td>0% to 25%</td>
<td>90.5  (32.5)</td>
</tr>
</tbody>
</table>

Notes on Table 2-2-A & 2-2-B:

a. The values in Table 2-2A & 2-2B are for fully acclimatized workers wearing light weight pants and long sleeved shirts. For conditions other than this, use this table with the Clothing Adjustment factors from Table 2-1. For unacclimatized workers, the Action Limit Values should be used as TLVs.

b. These values assume that workers drink frequently and have properly increased salting of food prior to exposure.

c. These values are guidelines. Actual levels may be modified based on individual physiological response and actual work and rest conditions.

d. These values assume that the rest location is cool enough to alleviate heat load conditions.

e. See Table 2-2C for Work Load Categories.

f. Values in the table are applied by reference to the “Work-Rest Regimen” section and assume 8-hour workdays in a 5-day workweek with conventional break.

g. Because of the physiological strain associated with Heavy and Very Heavy work among less fit workers, regardless of the WBGT Index, criteria values are not provided for continuous work and for up to 25% rest in an hour for Very Heavy work. The screening criteria are not recommended, and a detailed analysis and/or physiological monitoring should be used.

h. WBGT Index values are expressed to the nearest .5°C and .1°F

Table 2-2C provides examples of work activity categories for use in table 2-2A and 2-2B. Recovery rest areas should be near the work areas, shaded, and with adequate supplies of cool water. Aids to assist in evaporative cooling such as fans or blowers should be considered.

### Table 2-2C Work Load Categories

<table>
<thead>
<tr>
<th>Categories</th>
<th>Example Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting</td>
<td>Sitting quietly</td>
</tr>
<tr>
<td>Light</td>
<td>Sitting with light manual work with and or hands and arms, and driving. Standing with some light arm work and occasional walking.</td>
</tr>
<tr>
<td>Level</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Moderate</td>
<td>Sustained moderate hand and arm work, moderate arm and leg work, moderate arm and trunk work, or light pushing and pulling. Normal walking.</td>
</tr>
<tr>
<td>Heavy</td>
<td>Intense arm and trunk work, carrying, shoveling, manual sawing, pushing and pulling heavy loads; walking at a fast rate.</td>
</tr>
<tr>
<td>Very Heavy</td>
<td>Very intense activity at fast to maximum pace,</td>
</tr>
</tbody>
</table>

2.2 Acclimatization

Acclimatization is a gradual physiological adaptation that improves an individual’s ability to tolerate heat stress. Full heat acclimatization requires physical activity under heat-stress conditions similar to those anticipated for the work. With a recent history of heat-stress exposures of at least 2 continuous hours (e.g. 5 of the last 7 days to 10 of 14 days) a worker can be considered acclimatized for the purposes of the TLV shown in table 2-2B. Its loss begins when the activity under those heat-stress conditions is discontinued, and a noticeable loss occurs after 4 days and may be completely lost in 3 to 4 weeks. Because acclimatization is to the level of the heat stress exposure, a person will not fully acclimatize to a sudden higher level, such as during a heat wave.

Numerous factors can affect acclimatization and a worker’s ability to work in heat, including age and off-work activities (amount of sleep, consumption of alcoholic beverages, prescription and nonprescription medications (e.g. antihistamines and other medications that decrease the body’s ability to carry water or reduce sweating).

2.3 WBGT Determination

WBGT device should be operated in accordance with the manufacturer’s instructions. The location of the WBGT device should be evaluated based on the work. Work inside buildings (no wind), within depressions or excavations, over asphalt or black liners (such as HPDE) would dictate that the device should be located near the area to account for the difference in the globe temperature due to radiance and reflection. Work on open soil/gravel will have a lesser affect on the readings and will allow the readings to be indicative of a large area (up to several miles). (Note WBGT Index readings for the area can frequently be obtained on a real-time basis from weather stations, or from the internet).

3.0 HEAT STRAIN GENERAL WORK CONTROLS

General controls for Heat Strain prevention and control include:

- Provide accurate verbal and written instructions, annual training programs and other information about heat stress and strain.
- Encourage drinking small volumes (approximately 1 cup) of cool, palatable water (or other acceptable fluid replacement drink, (e.g. sport drink) about every 20 minutes.
- Permit self-limitation of exposures and encourage co-worker observation to detect signs and symptoms of heat strain in others.
- Counsel and monitor those who take medications that may compromise normal cardiovascular, blood pressure, body temperature regulation, renal or sweat gland functions and those who abuse or are recovering from the abuse of alcohol or other intoxicants.
- Encourage healthy life-styles, idea body weight and electrolyte balance.
• Adjust expectations of those returning to work after absence from hot exposure situations and encourage consumption of salty foods (with approval of physician if on a salt-restricted diet).
• Consider preplacement medical screening to identify those susceptible to systemic heat injury.
• Monitor the heat stress conditions and reports of heat related disorders.

4.0 JOB SPECIFIC CONTROLS FOR HEAT STRAIN STRESS

When excessive heat strain is observed or predicted based on monitoring, the some or all of the following Job Specific Controls should be considered:
• Engineering controls that reduce the metabolic rate, provide general air movement, reduce process heat and water vapor release, and shield radiant heat sources, among others.
• Administrative controls that set acceptable exposure times, allow sufficient recovery, and limit physiological strain.
• Personal protection that is demonstrated effective for the specific work practices and conditions at the location.

5.0 PHYSIOLOGICAL MONITORING

5.1 Monitoring Frequencies

Physiological monitoring will commence at the discretion of the ESS, or when WBGT Index monitoring is not used and the ambient temperatures exceed 70°F (21°C). Physiological monitoring may be used whenever work/recovery regimens are implemented to verify the effectiveness of the work/rest ratio including the cool down periods. Physiological monitoring should be used whenever workers have the potential to exceed the TWA or TLV, and must be used when personnel are working in impermeable clothing.

Work in impermeable protective clothing should include consideration of a buddy rule (no lone workers), particularly at higher temperatures. The observers should be watching for sudden or severe fatigue, lightheadedness, loss of balance, loss of judgment or clumsiness that may indicate heat fatigue or heat stress.

The monitoring frequencies may be adjusted for individuals after experience with their work in heat stress environments has been gained provided the work involved, PPE, and other factors remain the same.

Attachment 4 is an Example forms that may be used for WBGT monitoring and individual physiological monitoring.

5.2 Pulse Rate Monitoring

The level of stress may also be monitored by an individual’s pulse rate. If either of the following occur, the individual should be removed from heat stress exposure:

• A sustained (several minutes) heart rate is in excess of 180 beats per minute (bpm) minus the individual’s age in years (180-age), for individuals with normal cardiac performance. or
• A recovery heart rate greater than 120 bpm one minute after a peak work effort

The affected individual should be removed from the heat stress exposure and allowed to recover.
A recovery heart rate less than 110 bpm at indicates the individual can return to work but the work period should be adjusted. Shorten the next work period by one third while maintaining the same rest period. Increase the monitoring on the individual.

Pulse rates can be taken with an electronic pulse meter, or manually with a stopwatch for 30 seconds.

5.3 Body Core Temperature

Obtaining an accurate body core temperature for sustained work can be difficult, as the body will start to cool as soon as work is stopped or if protective clothing is removed and evaporation rates are increased. Monitor personnel as soon as possible to obtain an accurate temperature following the manufacturer’s instructions for the particular instrument used. A body core temperature greater than 101.3°F (38.5°C) for medically selected and acclimatized personnel, or greater than 100.4°F (38°C) in unselected, unacclimatized workers may mark excessive heat strain and an individual’s exposure to heat stress should be discontinued.

Average body temperature varies between individuals and within individuals, typically fluctuating 1 degree F above or below the scientific “norm” of 98.6°F (37°C) oral temperature, depending on activity and general health.

Temperatures taken at the ear (tympanic temperature) has been developed. Current information indicates that an ear temperature reading will be 0.5 to 1.0°F (0.3 to 0.6°C) higher than an oral temperature reading, since the eardrum shares blood supply with the hypothalamus in the brain. An armpit (axillary) temperature is typically 0.5 to 1.0°F (0.3 to 0.6°C) lower than an oral temperature reading and may take up to 10 minutes to get an accurate reading.

Temporal or forehead thermometers use skin temperature to determine the body temperature. Due to the variations of the location and effects of evaporation, these are not as accurate as electronic and ear thermometers, however they offer other benefits of speed and accessibility when an individual may be fully suited.

Take the oral, ear or temporal temperature immediately at the start of the rest period. If the temperature exceeds 99.5°F (37.5°C) (oral or adjusted to oral) shorten the next work period by a third. Do not return the worker to hot work in semi-permeable or impermeable clothing until the body temperature is less than 99.5°F (37.5°C).

Body temperatures may be taken with disposable oral thermometers or infrared ear drum scanners. Temporal infrared thermometers are also available and may be considered to be less intrusive to the workers than oral or ear measurement devices.

(Note- Instruments coming in contact with skin or body fluids (sweat, saliva, etc) should either be used with disposable covers or sanitized between use.)

5.4 Removal from Exposure

If an individual requires a shortening of the work period on more than two consecutive monitoring periods, or repeatedly over a few days, they should be removed from exposure to hot environments, wearing semi-permeable, impermeable protective clothing until examined and cleared for such work by the consulting physician.

If a worker appears to be disoriented or confused, suffers inexplicable irritability, malaise, or chills, the worker should be removed for rest in a cool location with rapidly circulating air and kept under skilled observation. Absent medical advice
to the contrary, treat this as an emergency with immediate transport to a hospital. An emergency response plan is necessary.

The heat stroke victim is often manic, disorientated, confused, and delirious or unconscious. treat this as an emergency with immediate transport to a hospital. The victim’s body core temperature is greater than 104°F (40°C). If signs of heat stroke appear, start aggressive cooling immediately. Emergency care and hospitalization are essential. An emergency response plan is necessary.

Prolonged increases in deep body temperature and chronic exposures to high level of heat stress are associated with other disorders, such as temporary infertility (male and female), elevated heart rate, sleep disturbance, fatigue and irritability. During the first trimester of pregnancy, a sustained core temperature greater than 102.2°F (39°C) may endanger the fetus.
1.0 INTRODUCTION

Cold Stress TLVs are intended 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 96.8°F (36°C) and to prevent cold injury to body extremities. For a single, occasional exposure to a cold environment, a drop in the core temperature to no lower than 95°F (35°C) 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.

This attachment includes guidance for monitoring and preventing cold stress in accordance with the 2007 ACGIH.

2.0 COLD STRESS EVALUATION AND CONTROL

Workers that will subject to working in cold environments should be familiarized with the symptoms and effects of cold work. This should include awareness of the effects of medication, use of alcohol on the worker, as well as recognizing the symptoms of frostnip, frostbite, and hypothermia.

The ESS with support by the PESM should evaluate the workplace conditions and implement the controls appropriate for the work being performed and the work environment.

2.1 Thresholds

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

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

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

- If fine work is to be performed with bare hands for more than 10-20 minutes in a temperature below 60.8°F (16°C), special provisions should be made for keeping workers hands warm, such as warm air jets, radiant heaters or contact warm plates. Metal handles of tools and control bars should be covered with thermal insulating materials below 30.2°F (-1°C).
- If the air temperature falls below 60.8°F (16°C) for sedentary, 39.2°F (4°C) for light, 19.4°F (-7°C) for moderate work, and fine manual dexterity is not required, then gloves should be used by workers.
- To prevent frostbite, the workers should wear anti-contact gloves.
• When cold surfaces below 19.4°F (-7°C) are probable, a warning to workers should be given to prevent inadvertent contact by bare skin.
• If air temperatures are 0°F (-17.5°C) or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so they can be handled and used without removing the mittens.

Provisions for additional total body protection are required if work is performed in an environment at or below 39.2°F (4°C), including:
• Workers should wear cold protective clothing appropriate for the level of cold and physical activity.
• If the air velocity at the work 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 the worker may become wet on the job site, the outer type of 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 changed as it becomes wetted. Outer garments should have provisions for easy ventilation in order to prevent wetting of inner layers by sweat. If a worker’s clothes have become wet by sweat, the worker should change into dry clothes before entering the cold area. Workers should change socks and any removable liners or felt insoles at regular daily intervals, or use vapor barrier boots.
• If exposed area of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should supplied in auxiliary heated versions.
• If the available clothing does not give adequate protection to prevent frostbite or hypothermia, work should be modified or suspended until adequate clothing is available or until weathers conditions improve.
• Workers handling evaporative liquids (gasoline, alcohol, etc) at air temperatures below 39.2°F (4°C) should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporate cooling.

2.2 Work Warming Regimens

For work performed continuously in the cold at an equivalent chill temperature (ECT) or below 19.4°F (-7°C), heated warming shelters should be made available nearby with workers encouraged to use these shelters at regular intervals. The frequency of use should be dependent of the severity of the exposure. Table 2 provides a Work/Warm-up schedule for a four-hour schedule.

The onsite of shivering, minor frostbite, the feeling of excessive fatigue, drowsiness, or euphoria are indications for immediate return to the shelter. When entering the heated shelters, outer clothing should be removed and the remainder of clothing loosened or opened to permit sweat evaporation or a change of dry clothing provided.

Dehydration occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee or other diuretics should be limited.

For work practices at or below 10.4°F (-12°C) the following should be considered:
• Workers 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 performed, rest periods should taken in heated shelters and the opportunity for changing into dry clothing provided.
• New employees should not be required to work fulltime in the cold during the first few days until they become accustomed to the working conditions and the required protective clothing.
• The weight and bulkiness of clothing should be factored into the estimates of required work performance and weights to be lifted by the worker.
• Work should be organized so that sitting still or standing still for long periods is minimized. Unprotected metal chairs should not be used. The worker should be protected from drafts to the greatest extent possible.
• Eye protection for workers employed out-of-doors in a snow or ice covered condition should be supplied. Special safety goggles to protect against ultraviolet light and glare that can cause temporary conjunctivitis and or temporary loss of vision, and blowing ice crystals when there is an expanse of snow coverage.
• Workers should be instructed in safety and health procedures related to cold environments work, including:
  o Proper rewarming procedures
  o First aid treatment
  o Proper eating and drinking habits
  o Recognition of impending frostbite
  o Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
  o Safe work practices

2.3 Workplace Monitoring

Suitable thermometry should be arranged at the any workplace where the environment is below 60.8°F (16°C) so that overall compliance with the TLV can be maintained. Whenever the air temperature falls below 30.2°F (-1°C), the dry bulb temperature should be measured and recorded at least every 4 hours.

Wind speed should be monitored and recorded when the rate exceeds 5 mph (2 m/s). When monitoring, the Equivalent Chill Temperature (ECT) should be recorded with the temperature and wind speed.

Individual employees should be excluded from working in cold at 30.2°F (-1°C) or below if they are suffering from diseases or taking medication which interferes with normal body temperature regulation or reduces tolerance to work in cold environments. Workers who are routinely exposed to temperatures below -11.2°F (-24°C) with no wind, or -18°F (0°C) with wind speeds above 5 mph should be medically evaluated as suitable for such temperatures.

Provisions for providing first aid for trauma sustained in freezing or subzero conditions are required because an injured worker is predisposed to cold injury and should be protected against preventing hypothermia or freezing of damaged tissues in addition to providing the first aid.
Table 1 - Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

<table>
<thead>
<tr>
<th>Estimated Wind Speed (in mph)</th>
<th>Actual Temperature Reading (° F)</th>
<th>Equivalent Chill Temperatures (° F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>calm</td>
<td>50</td>
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<tr>
<td>5</td>
<td>48</td>
<td>37</td>
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<td>20</td>
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<td>18</td>
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<tr>
<td>25</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>35</td>
<td>27</td>
<td>11</td>
</tr>
</tbody>
</table>

Wind Speeds > 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

Trenchfoot and immersion foot may occur at any point on this chart

Grayed areas = Equivalent Chill Temperature requiring dry clothing to maintain core body temperature above 96.8° F (36° C) per cold stress TLV

* Developed by U.S Army Research Institute of Environmental Medicine, Natick, MA. As provided in American Conference Of Governmental Industrial Hygienists TLVs and BEIs 2006
### TABLE 2 – WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT

<table>
<thead>
<tr>
<th>Air Temperature Sunny Sky</th>
<th>No Noticeable Wind</th>
<th>5 mph Wind (8 k/hr)</th>
<th>10 mph Wind (16 K/hr)</th>
<th>15 mph Wind (24 k/hr)</th>
<th>20 mph Wind (32 k/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F (Approx)</td>
<td>°C (Approx.)</td>
<td>Max. Work Period</td>
<td>No. of Breaks</td>
<td>Max. Work Period</td>
<td>No. of Breaks</td>
</tr>
<tr>
<td>-15 to -19</td>
<td>-26 to -28</td>
<td>Normal breaks</td>
<td>1</td>
<td>Normal breaks</td>
<td>1</td>
</tr>
<tr>
<td>-20 to -24</td>
<td>-29 to -31</td>
<td>Normal Breaks</td>
<td>1</td>
<td>75 min.</td>
<td>2</td>
</tr>
<tr>
<td>-25 to -29</td>
<td>-32 to 34</td>
<td>75 min.</td>
<td>2</td>
<td>55 min.</td>
<td>3</td>
</tr>
<tr>
<td>-30 to -34</td>
<td>-35 to -37</td>
<td>55 min.</td>
<td>3</td>
<td>40 min.</td>
<td>4</td>
</tr>
<tr>
<td>-35 to -39</td>
<td>-38 to -39</td>
<td>40 min.</td>
<td>4</td>
<td>30 min.</td>
<td>5</td>
</tr>
<tr>
<td>-40 to -44</td>
<td>-40 to -42</td>
<td>30 min.</td>
<td>5</td>
<td>Non-Emergency work should cease</td>
<td></td>
</tr>
<tr>
<td>-45 &amp; below</td>
<td>-43 &amp; below</td>
<td>Non-Emergency work should cease</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break (e.g. lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step low. For example, at -30 F (-35 C) 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).

2. 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 & drifting snow.

3. TLVs apply only for workers in dry clothing.
## HEAT STRESS MONITORING LOG

**DATE:** ____  **WBGT Location:** ____________________________

<table>
<thead>
<tr>
<th>TIME</th>
<th>WBGT</th>
<th>AIR TEMP</th>
<th>NOTES &amp; NOTIFICATIONS</th>
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</tbody>
</table>

WBGT – Wet Bulb Globe Temperature
Heat Strain potential Worker Body Core Temp: 101.3°F for acclimated Workers, 100.4°F for unacclimated workers

Monitor Name: _________________________________________________
1.0 PURPOSE

The purpose of this program is to establish minimum requirements for the proper selection, use, and care of respiratory protection equipment by workers at Tetra Tech EC, Inc. (TiEC) project sites and to ensure compliance with OSHA, 29 CFR 1910.134.

2.0 SCOPE

This program applies to all TiEC operations.
3.0 MAINTENANCE

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for updating this procedure. Approval authority rests with TtEC's President and Chief Executive Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director Compliance and Corporate Counsel.

4.0 DEFINITIONS

4.1 Hazardous Atmosphere

Any atmosphere containing a potentially toxic gas, vapor, dust, fume, mist, or pesticide, or any oxygen-deficient atmosphere.

4.2 Oxygen-Deficient Atmosphere

An atmosphere containing less than 19.5 percent oxygen by volume at sea level.

5.0 DISCUSSION

5.1 Responsibilities

5.1.1 Line Management

Site supervisors are responsible for ensuring that the proper respiratory protective equipment (RPE) is used when required in accordance with the site Environmental, Health and Safety (EHS) plans in the intended manner.

5.1.2 Environmental, Health and Safety Personnel

The Environmental and Safety Coordinators (ESC) are responsible for ensuring that personnel based in their office receive annual training and fit testing for RPE.

The Project Environmental and Safety Manager (PESM) is responsible for selection and specification of RPE in accordance with the requirements of this program, EHS 5-1 (Personal Protective Equipment) and EHS 3-2 (EHS Plans), and applicable regulations.

The Environmental and Safety Supervisor (ESS) is responsible for:

- Ensuring that personnel have the necessary training and fit testing for the use of each type of respirator and ensuring that proper documentation is available
- Monitoring the use of RPE
- Ensuring that RPE is maintained and inspected in accordance with the EHS plans and program requirements
- Evaluating the effectiveness of the respiratory protection program on each site, and
- Recommending changes to the types of RPE being used, as necessary.
5.1.3 Corporate Medical Consultant

The Corporate Medical Consultant (CMC) is responsible for providing clearance for TiEC personnel to use RPE in accordance with EHS 4-5, Medical Surveillance.

5.2 Selection of Respiratory Protective Equipment

All respiratory equipment utilized on TiEC projects shall be certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH). The type of respiratory protection selected is based upon potential hazards at a specific site. Selection of appropriate respiratory protection is documented in the EHS plans (see procedure PO-1, Project Management Planning.) and approved by the ESQ Regional Manager, PESM and/or a Certified Industrial Hygienist.

There are three general classes of respiratory protection available:

- Self-contained breathing apparatus (SCBA),
- Air-supplied devices, and
- Air-purifying devices.

To select which type of respiratory protection is appropriate for a given project, the following questions must be answered:

1. Is there a possibility of an oxygen-deficient atmosphere?
2. Are the contaminants and concentrations in the worker breathing zones known or unknown?
3. What are the allowable concentration limits (permissible exposure limits or threshold limit values) for the contaminants? What are their physical properties?
4. What are the maximum expected concentrations of known contaminants? Are the concentrations Immediately Dangerous to Life and Health (IDLH)?
5. What is the expected duration of personnel exposure?
6. What are the warning properties and symptoms of the contaminants?
7. Can the contaminant be absorbed through the skin and/or eyes?
8. Are the contaminants flammable?
9. Is there any other pertinent information concerning the contaminants that may be pertinent to selecting appropriate respiratory protection?

Atmosphere-supplying respirators (i.e., pressure demand SCBAs or airline systems) shall be used when one of the following occurs: 1) the hazardous substance has been identified and requires the highest level of protection based on the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; 2) site operations involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates; or 3) operations are being conducted in confined, poorly ventilated areas that could contain hazardous concentrations of atmospheric vapors, gases, or particulates and/or reduced oxygen concentrations less than 19.5 percent. Escape packs are used with all airline systems. Note: Employees shall not be required to enter atmospheres that are immediately dangerous to life or health without the approval of the Project Environmental and Safety Manager, or without specific hazardous atmosphere rescue training.

Negative pressure air purifying respirators, equipped with appropriate filter cartridges for the expected contaminants, may be used only when the atmospheric contaminants have been identified, and expected concentrations are within limits that can be effectively removed by the respirator cartridges. For air purifying respirators used for protection against gases or vapors, a cartridge change schedule shall be included in the EHS Plan along with a description of the information or data relied upon to develop the schedule. In most cases this will consist of recommendations by the manufacturers when they become available.

5.3 Fit Testing

A qualitative fit test shall be conducted for each employee during the initial 40-hour health and safety training course and/or at site-specific training and annually thereafter. Fit testing may also be performed when a condition that may effect the face fit of the respirator has occurred, such as weight gain or loss, dental work, facial surgery, or deformity. Employees shall be clean shaven during fit testing.

Qualitative fit tests shall be administered using irritant smoke or Bitrex in accordance with the OSHA respiratory protection...
standard in 29 CFR 1910.134, Appendix A. (Attachment A of this procedure contains the protocol for the irritant smoke test. If using the Bitrex test kit, follow the protocol in the OSHA standard.)

Qualitative Fit testing will be limited to situations where a negative pressure respirator is used and a protection factor of 10 or less is needed. If a protective factor of greater than 10 is needed, the EHS plan will require either a positive pressure/pressure demand respirator or quantitative fit-testing of the negative pressure respirator.

All positive pressure/pressure demand respirators with tight-fitting facepieces will be fit-tested qualitatively or quantitatively in the negative pressure mode.

A record of the fit test shall be maintained utilizing the qualitative respirator fit test record form (Attachment B). Records of employee respiratory protection training shall be maintained by each office ESC and by the ESS in each project file.

5.4 Respirator Use

All TIEC personnel are required to:

- Use RPE when required and in the proper manner;
- Inspect RPE prior to each use and obtain replacement equipment when found to be defective;
- Perform a user seal check each time they put on a tight-fitting respirator;
- Take proper care of the RPE;
- Be clean shaven where the seal of the respirator contacts the face whenever using RPE; and
- Leave the respirator use areas whenever necessary to wash their face or respirator to avoid skin irritation; if they detect contaminant breakthrough, a change in breathing resistance, or leakage of the facepiece; or to change filters or cylinders.

Low temperatures may fog the lenses of the respirator and use of anti-fog spray and a nose cup may be beneficial. Nose cups are part of the NIOSH approval for air supplied respirators at ambient temperatures of 32°F and below. Minimum temperatures recommended by the manufacturer for operation of a SCBA shall be consulted prior to use in low temperatures.

Under no circumstances are employees permitted to use escape provisions of atmosphere-supplying respirators for routine and egress of work areas.

Wearing any respirator in conjunction with other types of protective equipment will impose some physiological stress on the wearer. Use of respirators in conjunction with protective clothing can greatly affect human response and endurance, especially in hot environments. See EHS 4-6, Temperature Extremes, for additional information.

5.5 Cleaning and Storage

Each person has the responsibility to clean, disinfect, and care for their respirator in accordance with the training they have received. The following procedure shall be followed for cleaning and storage of respiratory protection equipment.

- Personal respirators shall be cleaned and disinfected after each day's use, or more frequently, if necessary.
- Respirators for emergency use and all SCBAs shall be cleaned and inspected after each use, and inspected on a monthly basis. Monthly inspections shall be documented, including serial number, date, findings, and remedial action and signature inspector.
- Routine cleaning shall be completed as follows:
  - Remove the filters and dispose of per the EHS plan's requirements, if applicable.
  - Wash respirator in disinfecting solution.
  - Rinse respirator in clean water.
  - Allow respirator adequate time to air dry.
- Routine inspection shall be completed as follows:
  - Check all connections for gaskets and "O" rings and proper tightness.
  - Check the condition of the face piece and its parts for tears, cracks, abrasions, or brittleness.
  - Check the condition of the connecting air hose, regulator, and harness, if applicable.
  - Check the condition of the headband for tears, cracks, abrasions, or brittleness.
  - Inspect all rubber or elastic parts for pliability and signs of deterioration.
5.6 Air Monitoring of Work Areas

To determine if the selected respiratory protection is appropriate, the work area shall be monitored for contaminant concentrations at the beginning of each phase of work activity as required by the site safety plan. Sampling should be in the breathing zone of the exposed employee. Periodic sampling throughout the project will be conducted per the EHS plans to ensure that the selected respirator protection is appropriate.

5.7 Evaluation of the Program

Site supervisors and the ESS shall monitor the project implementation of the respiratory program during routine and informal inspections. PESM will perform evaluations of project implementation of the program during EHS inspections. The inspections shall include consultation with affected employees required to use respirators. The Director, Health and Safety Programs will evaluate overall program implementation through a review of inspection reports, incident reports and investigations, and audit reports.

See C-2, Audits, and EHS 3-3, Inspections, for information on the TtEC audit and inspection programs.

5.8 Medical Surveillance

Site personnel shall meet the medical surveillance requirements of OSHA 29 CFR 1910.134, 1910.120 and EHS 4-5, Medical Surveillance, for respirator use prior to engaging in any field work requiring or potentially requiring the use of a respirator. Personnel with medical conditions which prevent or limit their ability to wear a respirator shall be notified in writing by the CMC.

5.9 IDLH Atmospheres

TtEC personnel shall immediately evacuate areas where an IDLH atmosphere develops. TtEC personnel shall not enter IDLH atmospheres except for rescue or when authorized by the PESM. If necessary, at least one standby person equipped with proper rescue equipment and a pressure demand SCBA is present. Communication between the field team and the standby person is maintained at all times. If the IDLH atmosphere exists in a confined space, the entry shall be conducted in accordance with EHS 6-1, Confined Space Entry.

5.10 Training

Personnel required to use respiratory protection shall be trained in the selection, use, and maintenance of the equipment. Respiratory protection training is included as part of the initial health and safety training, the 8-hour refresher course, and the site-specific training described in EHS 1-11, Training. The training shall be conducted annually. Site-specific respiratory protection training includes the following:

- Hazard identification to include symptoms of exposure;
- Use of engineering controls to minimize exposure, and an explanation of why engineering controls are not feasible;
- A description of the type of respiratory protection chosen and the protection provided to the employee;
- Assurance that the employee understands the protection capabilities and limitations of the method of respiratory protection utilized;
• Recognition of medical signs and symptoms that may limit or prevent effective use of respirators;

• A thorough demonstration of the selected method of respiratory protection to include how to put it on, how to check the seals, use, troubleshooting, and maintenance followed by hands-on training by the employee;

• How to use the respirator in an emergency, including situations in which the respirator malfunctions; and

• A description of the on-site storage and maintenance facilities for maintaining respiratory protection equipment.

Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

6.0 REFERENCES

Compliance Procedure C-2, Audits
Environmental, Health & Safety - Programs Procedure EHS 1-9, Recordkeeping
Environmental, Health & Safety - Programs Procedure EHS 1-11, Training
Environmental, Health & Safety - Programs Procedure EHS 3-2, Environmental, Health & Safety Plan(s)
Environmental, Health & Safety - Programs Procedure EHS 3-3, Inspections
Environmental, Health & Safety - Programs Procedure EHS 4-5, Medical Surveillance
Environmental, Health & Safety - Programs Procedure EHS 4-6, Temperature Extremes
Environmental, Health & Safety - Programs Procedure EHS 5-1, Personal Protective Equipment
Environmental, Health & Safety - Programs Procedure EHS 6-1, Confined Space Entry
OSHA (U.S. Department of Labor, Occupational Safety and Health Administration)
Project Initiations/Operations Procedure PO-1, Project Management Planning

7.0 ATTACHMENTS

Attachment A - Irritant Fume Protocol
Attachment B - Qualitative Respirator Fit Test Form

EHS 5-2 ATTACHMENT A
IRRITANT FUME PROTOCOL

Click the icon below to launch or download.

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.

EHS 5-2 ATTACHMENT B
QUALITATIVE RESPIRATOR FIT TEST RECORD

Click the icon below to launch or download.

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.
TETRA TECH EC, INC.

IRRITANT FUME PROTOCOL

1. The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize him with the characteristic odor of each.

2. The test subject shall properly don the respirator selected as above, and wear it for at least 10 minutes before starting the fit test.

3. The test conductor shall review this protocol with the test subject before testing.

4. The test subject shall perform the conventional positive pressure and negative pressure fit checks. Failure of either check shall be cause to select an alternate respirator.

5. Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part No. 5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver 200 milliliters per minutes.

6. Advise the test subject that the smoke can be irritating to the eyes and instruct him to keep his eyes closed while the test is performed.

7. The test conductor shall direct the stream of irritant smoke from the tube towards the face seal area of the test subject. The test conductor shall begin at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

8. The following exercises shall be performed while the respirator seal is being challenged by the smoke. Each shall be performed for one minute.

   i. Normal breathing.

   ii. Deep breathing. Be certain breaths are *deep* and *regular*.

   iii. Turning head from side-to-side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have test subject inhale when his head is at either side.

   iv. Nodding head up-and-down. Be certain motions are complete. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the fully up position.

   v. Talking - slowly and distinctly, count backwards from 100, or read the rainbow passage which follows this protocol.

   vi. Normal breathing.
IRRITANT FUME PROTOCOL

9. If the irritant smoke produces an involuntary reaction (cough) by the test subject, the test conductor shall stop the test. In this case the tested respirator is rejected and another respirator shall be selected.

10. Each test subject passing the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube to determine whether he reacts to the smoke. Failure to evoke a response shall void the fit test.

11. Steps B4, B7, B8 of this protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the irritant smoke.

12. Respirator successfully tested by the protocol may be used in contaminated atmospheres up to ten times the PEL. In other words, this protocol may be used to assign protection factors not exceeding ten.

RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.
QUALITATIVE RESPIRATOR FIT TEST RECORD

Date of Test: ____________________ Project/Location: ________________________________

Print Name: ______________________ Print Tester's Name: _______________________________

<table>
<thead>
<tr>
<th>TEST 1</th>
<th>TEST 2</th>
<th>TEST 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respirator Manufacturer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facepiece style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type cartridge used for test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive/negative pressure check (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test agent (Irritant fume or Isoamyl acetate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitive to test agent (Yes or No)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal breathing (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep breathing (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moving head side to side (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaking - (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bending (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jogging (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal breathing (Pass or Fail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passed test (Yes or No)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I understand the limitations of the respirator(s) for which I was tested; how to inspect, use, and maintain the respirator; and, how to obtain information about the respirator use requirements on the project(s) on which I work. I also understand that it is my responsibility to inspect my respirator prior to each use.

Signature of Person Tested: _______________________________________________________

The fit test(s) was performed according to the fit test procedure specified in the Tetra Tech EC, Inc. Respiratory Protection Program, EHS 5-2.

Signature of Tester: ______________________________________________________________
1.0 PURPOSE

This program provides the requirements for activities involving excavations in accordance with 29 CFR 1926, Subpart P - Excavations.
2.0 SCOPE

These requirements are applicable to all Tetra Tech EC, Inc. (TtEC) operations.

3.0 MAINTENANCE

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for updating this procedure. Approval authority rests with TtEC's President and Chief Executive Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director Compliance and Corporate Counsel.

4.0 DEFINITIONS

4.1 Benching

A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

4.2 Competent Person

A competent person is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

4.3 Excavation

Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

4.4 Hazardous Atmosphere

An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

4.5 Protective Systems

A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

4.6 Sloping

A method of protecting employees from cave-ins by forming sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
4.7 Support System

A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

4.8 Trench

A narrow excavation made below the surface of the ground. In general the depth is greater than the width, but the width of a trench measured at the bottom is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less, the excavation is also considered to be a trench.

5.0 DISCUSSION

5.1 Responsibilities

5.1.1 Competent Person

The competent person(s) shall be responsible for:
- Day-to-day oversight of open excavations and trenches
- Conducting soil classifications
- Selection of protective systems
- Conducting daily inspections of open excavations and trenches; and
- Providing the Environmental and Safety Supervisor (ESS) with all required documentation on a daily basis.

5.1.2 Line Management

The Project Manager (PM) shall be responsible for:
- Ensuring compliance with this procedure
- Providing the necessary resources for compliance with this procedure; and
- Designating competent personnel in consultation with the Project Environmental, Health and Safety Manager (PESM)

5.1.3 Environmental, Health and Safety Personnel

The ESS shall be responsible for:
- Providing oversight on the implementation of the requirements contained in this procedure
- Conducting periodic reviews of open trenches and excavations
- Consulting with the project manager and competent person on excavation issues; and
- Maintaining required records.
5.2 Designation of Competent Personnel

Prior to the start of any excavation work the project manager shall designate a competent person to fulfill the requirements of this procedure.

5.3 General Requirements

The following section provides general requirements governing activities in and around excavation and trenches, as well as the requirements for the selection and use of protective systems.

- Surfaces surrounding open trenches and excavations shall have all surface hazards removed.
- All utilities shall be located and cleared prior to initiating digging. Public or facility utility groups shall be utilized where possible for this purpose. In the absence of either, the ESS shall specify the procedures to be used to clear utilities in consultation with the project PESM and project manager. When the excavation is open, utilities shall be supported and protected from damage. Clearance and support methods shall be documented on the daily inspection checklist.
- Where structural ramps are used for egress they shall be installed in accordance with 29 CFR 1926.651(c)(1).
- Stairways, ladders, or ramps shall be provided as means of egress in all trenches 4 feet or more in depth. Travel distance shall be no more than 25 feet between means of exit.
- Employees exposed to vehicular traffic shall wear traffic vests.
- No employee shall be permitted under loads being lifted or under loads being unloaded from vehicles.
- When vehicles and machinery are operating adjacent to excavations warning systems such as stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling on employees.
- Excavated and loose materials should be kept at least 3 feet from the edge of excavations, but at a minimum of 2 feet from the edge of the excavation in accordance with OSHA requirements.
- Walkways or bridges with standard railing shall be provided at points employees are to cross over excavations or trenches.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

5.4 Hazardous Atmospheres

Where atmospheres containing less than 19.5 percent oxygen or other types of hazardous atmospheres may exist the following requirements shall be implemented.

- Atmospheric testing shall be done prior to employees entering excavations 4 feet or greater in depth.
- Testing methods shall be listed on the daily inspection checklist and results documented daily in field logs.
- Control measures such as ventilation and personal protective equipment (PPE) shall be used to control employee exposure to hazardous atmospheres below published exposure limits.
- Ventilation shall be used to control flammable and combustible vapors to below 10 percent of their lower explosive limit.
- Testing shall be repeated as often as necessary to ensure safe levels of airborne contaminants.
- Emergency equipment shall be provided and attended when the potential for a hazardous atmosphere exists. This equipment shall include but not be limited to emergency breathing apparatus, harnesses, lifelines, and basket stretchers. Required equipment will be listed on the daily inspection checklist and reviewed daily.

5.5 Protection From Water Hazards
When water has collected or is collected in excavations and trenches the following requirements shall be applied.

- Employees shall not work in excavations in which water has, or is, accumulating without the use of additional protection such as special support systems or water removal.
- Water removal shall be monitored by a competent person.
- Barriers such as ditches and dikes shall be used to divert runoff from excavations and trenches.
- Trenches shall be reinspected prior to re-entry after water accumulation due to heavy rainfall or seepage.

5.6 Stability of Adjacent Structures

When excavating or trenching near an adjacent structure the following practices shall be implemented.

- Support systems such as shoring, bracing, or underpinning shall be provided where the stability of buildings, walls, or other structures is endangered by excavation.
- Excavation bases or footings of foundations shall be prohibited unless support systems are used, the excavation is in stable rock, a professional engineer has determined the structure is sufficiently removed from the site as to not pose a hazard, or the PE determines that the excavation shall not pose a hazard to employees due to the structure.
- Support systems shall be used when it is necessary to undermine sidewalks, pavements, and appurtenant structures.
- Surcharge load sources and adjacent encumbrances shall be listed with their evaluation date on the daily inspection checklist.

5.7 Daily Inspections

Inspections shall be performed daily on all excavations, adjacent areas, and protective systems before personnel enter the trench. The checklist provided in Attachment A or equivalent shall be used.

5.8 Soil Classification

To perform soil classification, the competent person shall use a thumb test, pocket penetrometer, or shear vane to determine the unconfined compressive strength of the soils being excavated. In soils with properties that change (i.e., one soil type mixed with another within a given area) several tests may be necessary. When different soil types are present the overall classification shall be that of the type with the lowest unconfined compressive strength. Classifications shall result in a soil rating of Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR 1926.652, Appendix A. Soil classifications shall be listed on the daily inspection checklist. The soils analysis checklist provided in Attachment B or equivalent shall be used for soil classifications.

5.9 Sloping and Benching

All sloping and benching shall be done in accordance with 29 CFR 1926.652, Appendix B. Selection of the sloping method and evaluation of surface surcharge loads shall be made by a competent person familiar with the requirements contained therein. Sloping and benching methods and specifications shall be listed on the daily inspection checklist.

5.10 Protective Systems

Protective systems are required on all excavations over 5 feet in depth or in excavations less than 5 feet when examination of the ground by a competent person reveals conditions that may result in cave-ins.

Selection and installation of protective systems shall be done in accordance with 29 CFR 1926.652, Appendices C & D, or manufacturers data for shoring and shielding systems. Selection of a protective system shall be made based upon soil classification and job requirements by a competent person. Protective systems and specifications shall be listed on the daily inspection checklist.
5.11 Training

Competent persons shall have an adequate combination of experience and training to classify soil types and select protective systems as outlined in 29 CFR 1926.652. Training and experience pertaining to qualification as a competent person shall be documented and include the following:

- General safety practices related to working in or near open excavations;
- Inspection requirements and techniques;
- Classification of soils in accordance with 29 CFR 1926.652, Appendix A; and
- Uses, limitations, and specifications of protective systems in accordance with 29 CFR 1926.652.

Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

6.0 REFERENCES

Environmental, Health & Safety - Programs Procedure EHS 1-9, Recordkeeping
OSHA (U.S. Department of Labor, Occupational Safety and Health Administration),

7.0 ATTACHMENTS

Attachment A - Daily Excavation Inspection Checklist
Attachment B - Soils Analysis Checklist

EHS 6-3 ATTACHMENT A
DAILY EXCAVATION INSPECTION CHECKLIST

Click the icon below to launch or download.

EHS 6-3Attachment A 04-03-03.doc
Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.

EHS 6-3 ATTACHMENT B
SOILS ANALYSIS CHECKLIST

Click the icon below to launch or download.

EHS 6-3Attachment B.doc
Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.
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Tetra Tech EC, Inc.

Proprietary Information
**Daily Excavation Inspection Checklist**

To be completed by a "Competent Person"

<table>
<thead>
<tr>
<th>Site location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Competent Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Type(s)</th>
<th>Soil Classification(s)</th>
<th>Excavation depth</th>
<th>Excavation width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of protective system used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

- Indicate for each item by circling: Y (Yes), N (No), - Address in Comments, Not Applicable (N/A.)

## I. General Inspection of Job Site

A. Surface encumbrances removed or supported

B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation

C. Hard hats worn by all employees

D. Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation

E. Barriers provided at all remotely located excavations, wells, pits, shafts, etc.

F. Walkways and bridges over excavations 4 feet or more in depth are equipped with standard guardrails

G. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic

H. Warning system established and utilized when mobile equipment is operated near the edge of the excavation

I. Employees prohibited from working on the faces of sloped or benched excavations above other employees

## II. Utilities

A. Utility companies contacted and/or utilities located

B. Exact location of utilities marked when approaching the utilities

C. Underground installations protected, supported or removed when excavation is open

## III. Means of Access and Egress

A. Lateral travel to means of egress no greater than 25 feet in excavations 4 feet or more in depth

B. Ladders used in excavations secured and extended 3 feet above the edge of the trench

C. Structural ramps used by employees designed by a competent person

D. Structural ramps used for equipment designed by a registered professional engineer (RPE)

E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with a no-slip surface

F. Employees protected from cave-ins when entering or exiting the excavation
EHS 6-3 ATTACHMENT A
DAILY EXCAVATION INSPECTION CHECKLIST

IV. Wet Conditions
   A. Precautions taken to protect employees from the accumulation of water Y N N/A
   B. Water removal equipment monitored by a competent person Y N N/A
   C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation Y N N/A
   D. Inspections made after every rainstorm or other hazard increasing occurrence Y N N/A

V. Hazardous Atmospheres
   A. Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard Y N N/A
   B. Ventilation Y N N/A
   C. Testing conducted often to ensure that the atmosphere remains safe Y N N/A
   D. Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmospheres could or do exist Y N N/A
   E. Safety harness and life line used and individually attended when entering deep confined excavations Y N N/A

VI. Support Systems
   A. Materials and/or equipment for support systems selected based on soil analysis, trench depth and expected loads Y N N/A
   B. Materials and equipment used for protective systems inspected and in good condition Y N N/A
   C. Materials and equipment not in good condition have been removed from service Y N N/A
   D. Damaged materials and equipment used for protective systems inspected by a RPE after repairs and before being placed back into service Y N N/A
   E. Protective systems installed without exposing employees to the hazards of cave-ins, collapses or from being struck by materials or equipment Y N N/A
   F. Members of support system securely fastened to prevent failure Y N N/A
   G. Support systems provided to insure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc. Y N N/A
   H. Excavations below the level of the base or footing approved by an RPE Y N N/A
   I. Removal of support systems progresses from the bottom and members are released slowly as to note any indication of possible failure Y N N/A
   J. Backfilling progresses with removal of support system Y N N/A
   K. Excavation of material to a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth Y N N/A
   L. Shield system placed to prevent lateral movement Y N N/A
   M. Employees are prohibited from remaining in shield system during vertical movement Y N N/A

VII. Comments

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Revision Date 04/03/03 2
# SOILS ANALYSIS CHECKLIST

This checklist must be completed when soil analysis is made to determine the soil type(s) present in the excavation. A separate analysis must be performed on each layer of soil in excavation walls. A separate analysis must also be performed if the excavation (trench) is stretched over a distance where soil type may change.

**Site location:**

**Date:**

**Time:**

**Competent Person:**

**Where was the sample taken from?**

**Excavation:** **Depth:**

**Width:**

**Length:**

### VISUAL TEST

<table>
<thead>
<tr>
<th>Particle type</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Grained (cohesive)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course grained (sand or gravel)</td>
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</table>

<table>
<thead>
<tr>
<th>Water conditions</th>
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<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Wet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface water present</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submerged</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Previously disturbed soils?</th>
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</tr>
<tr>
<td>No</td>
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<table>
<thead>
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<th>Underground utilities?</th>
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</tr>
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<table>
<thead>
<tr>
<th>Layered soils?</th>
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<td>Yes</td>
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<tr>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Layered soil dipping into excavation?</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Excavation exposed to vibrations:</th>
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<tbody>
<tr>
<td>Yes</td>
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<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Crack-like openings or spallings observed?</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
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<table>
<thead>
<tr>
<th>Conditions that may create a hazardous atmosphere?</th>
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<tbody>
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<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
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**If yes, identify condition and source:**

<table>
<thead>
<tr>
<th>Surface encumbrances:</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
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</tr>
<tr>
<td>No</td>
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<table>
<thead>
<tr>
<th>Work to be performed near public vehicular traffic?</th>
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<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
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<table>
<thead>
<tr>
<th>Possible confined space exposure?</th>
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<tbody>
<tr>
<td>Yes</td>
<td></td>
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<tr>
<td>No</td>
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### MANUAL TEST

<table>
<thead>
<tr>
<th>Plasticity</th>
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<tbody>
<tr>
<td>Cohesive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cohesive</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Dry Strength</th>
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<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granular (crumbles easily)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesive (broken with difficulty)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTE: The following unconfined compressive strength tests should be performed on undisturbed soils.

THUMB TEST (used to estimate unconfined compressive strength of cohesive soil)
Test performed: ___ Yes  ___ No
___ Type A (soil indented by thumb with very great effort)
___ Type B (soil indented by thumb with some effort)
___ Type C (soil easily penetrated several inches by thumb with little or no effort). If soil is submerged,
seeping water, subjected to surface water, runoff, exposed to wetting.

PENETROMETER OR SHEARVANE (used to estimate unconfined compressive strength of cohesive soils)
Test performed: ___ Yes  ___ No
___ Type A (soil with unconfined compressive strength of 1.5 tsf or greater)
___ Type B (soil with unconfined compressive strength of 0.5 tsf to 1.5 tsf)
___ Type C (soil with unconfined compressive strength of 1.5 tsf or less). If soil is submerged, seeping water,
subjected to surface water, runoff, exposed to wetting.

WET SHAKING TEST (used to determined percentage of granular and cohesive materials). Compare results
to soil textural classification chart to determine soil type.
Test performed: ___ Yes  ___ No
___ Type A (clay, silty clay, sandy clay, clay loam, and in some cases silty clay, loam and sandy clay loam)
___ Type B (angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and in some cases, silty clay
loam and sandy clay loam
___ Type C (granular soil including gravel, sand and loamy sand)
___ % granular ___ % cohesive ___ % silt

NOTE: Type A -- no soil is Type "A" if soil is fissured; subject to vibration; previously disturbed; layered
dipping into the excavation on a slope of 4H:1V.

SOIL CLASSIFICATION
___ Type A
___ Type B
___ Type C

SELECTION OF PROTECTIVE SYSTEM
___ Sloping, Specify angle:
___ Timber Shoring
___ Aluminum Hydraulic Shoring

NOTE: Although OSHA will accept the above tests in most cases, some states will not. Check your state
safety requirements for trenching regulations.
1.0 PURPOSE

The purpose of this program is to establish the minimum requirements and procedures for performing lockout/tagout on machines and equipment in accordance with 29 CFR 1910.147, Control of Hazardous Energy (Lockout/Tagout).
2.0 SCOPE

This program applies to all Tetra Tech EC, Inc. (TiEC) operations, except as follows:

- Work on cord and plug connected electrical equipment where the plug is under the control of the employee performing the work;
- Hot tap operations; and
- Work involving minor changes and adjustments to equipment during routine operations (such as small tooling adjustments).

3.0 MAINTENANCE

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for updating this procedure. Approval authority rests with TiEC's President and Chief Executive Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director Compliance and Corporate Counsel.

4.0 DEFINITIONS

4.1 Affected Employee

An employee whose job requires them to operate or use a machine or equipment on which servicing, maintenance, or other work is performed under lockout/tagout or whose job requires them to work in an area in which equipment is locked out.

4.2 Authorized Employee

A person who locks out or implements a lockout/tagout system procedure on machines or equipment. Authorized and affected employees may be the same person when the authorized employee's duties also include performing work on a machine or equipment upon which lockout/tagout is implemented.

4.3 Energized

Connected to an energy source or containing residual or stored energy.

4.4 Energy Isolating Device

(Isolation Points) - A mechanical device that may be used to physically prevent the transmission, flow, or release of energy, including but not limited to the following:

- electrical circuit breakers;
- slide gate;
- disconnect switches;
- piping flanges;
- control switches; and
- other similar devices.

4.5 Energy Source
4.6 Lockout

The placement of a lockout device and tag on a lockout device ensuring that the energy isolation device and equipment cannot be operated until the device is removed.

4.7 Lockout Device

A device that physically controls the configuration of an energy isolation point. Lockout devices include but are not limited to the following:

- locks
- chains
- valve covers
- circuit breaker hasps
- blind flanges
- slip blinds,
- and multiple lock hasps

4.8 Supervisor Lock

A lock installed by an authorized supervisor for the purpose of maintaining control of a machine or piece of equipment for a period greater than one work shift.

5.0 DISCUSSION

5.1 Responsibilities

5.1.1 Authorized Employees

Authorized employees shall lockout and tag all energy isolation devices which are required to be locked out by this procedure. The employee shall complete all permits and tags in accordance with instructions and shall remove their locks and tags and return them at the end of their shift or the end of the procedure.

5.1.2 Line Management

Supervisors shall ensure proper implementation of the lockout/tagout procedure including approval of permits and maintenance of personal locks and a log of lock assignments. In group lockout procedures the supervisor shall lock and tag all the appropriate energy isolation devices and deposit his/ her key in the lockbox.

5.1.3 Environmental, Health and Safety Personnel

The Environmental and Safety Supervisor (ESS) is responsible for providing the training required in this procedure to supervisors and craft employees, and conducting periodic inspections to ensure this procedure is effectively implemented. The ESS shall also implement lockout/tagout procedures as required.
5.2 General Requirements

Following are the steps to be followed in preparing for, applying, and releasing a machine or piece of equipment from lockout. These steps shall be completed, in order, using the corresponding permit included as Attachment A. While work is being performed under the lockout, a copy of the completed permit shall be posted at the equipment controls or work area as appropriate.

1. Complete the general information in Section A of the permit

2. Identify Isolation Points
   The first step required to isolate a piece of equipment is to identify the sources of hazardous energy present. To identify the sources, the authorized employee shall complete the following steps:
   - Survey the equipment and related schematics, blueprints, or as-builts, if available, for hazardous energy sources;
   - Identify the isolation points and device positions for controlling each source of hazardous energy; and
   - Identify the isolation method to be used on each source.
   The above information shall be documented in Section B of the Lockout/Tagout Permit as each point is identified.

3. Notifications
   Prior to applying a lockout, the authorized employee shall notify affected employees of the equipment to be locked out and sign Section C of the Lockout/Tagout Permit on the "Notifier" line.

4. Equipment Shutdown
   Shut down the equipment or place into the desired configuration using normal operating procedures. The authorized employee shall sign Section C of the Lockout/Tagout Permit on the "Shutdown by" line.

5. Equipment Isolation
   To apply a lockout to a piece of equipment, complete the following steps:
   - Place each energy isolation device into a position that will prevent the transmission of hazardous energy; and
   - The authorized employee shall lockout devices to each isolation point and control the key for each lock at all times. Only one key is permitted per lock.
   Complete Section D of the permit as each device is placed and sign the "Isolator" line in Section C.

   Notes:
   - Any lockout device not containing an integral locking mechanism must be used in conjunction with a keyed lock.
   - Any energy isolation point not capable of being locked out must be controlled physically through such means as removal of handles and disconnecting.

6. Release of Stored Energy
   After the equipment has been locked and tagged as required in Section D all remaining stored energy must be released. Methods for the release of stored energy include, but are not limited to the following:
   - Discharge and grounding of capacitors,
   - Bleeding pressure from vessels and lines, and
   - Releasing mechanical sources of energy to engage blocks.
   If stored energy has the potential to re-accumulate; therefore, verification of isolation shall continue until work is complete. After releasing stored energy complete Section E of the permit.

7. Lockout/Tagout Verification
   After completing the lockout of the desired piece of equipment the effectiveness of the lockout must be verified by the authorized employee by attempting to operate the machine. After attempting to operate the machine, sign Section C of the permit on the "Verifier" line.

8. Performance of Work
   After verifying and receiving the supervisor's approval signature, work may be performed on the equipment which was locked/tagged.

9. Lockout/Tagout Removal
   After work has been completed the following steps shall be followed to release equipment from lockout tagout:
• The area affected by the lockout shall be inspected to ensure that releasing the machine does not present a hazard to people and property,
• Lockout devices and tags shall be removed,
• Isolation devices returned to their operating positions,
• The equipment started, and
• Affected employees shall be notified of the release.

Section F of the permit shall be completed as the equipment is returned to service.

5.3 Testing/Positioning

When necessary to interrupt lockout/tagout for testing or repositioning, the steps contained in Section 5.2 shall be followed.

5.4 Group Lockouts

When multiple people are scheduled to work on a system, the following group lockout procedure should be implemented as follows:
• The Site Supervisor shall place their lock on the energy isolation device(s) using a multilock hasp.
• Authorized employees shall place their individual locks on the multilock hasp.
• When the group has completed their work, the supervisor shall verify all employee locks have been removed before the supervisor removes his/her lock.

5.5 Tagout

The use of tags without locks is prohibited, except in those cases where it is physically impossible to attach a locking device to an isolation point. When it is necessary to use tags without locks the following shall be completed.
• The isolation point shall be placed in the correct position to prevent the flow of energy;
• The device shall be physically disconnected;
• A tag shall be placed on the disconnected device; and
• Employees shall be warned not to tamper with the tag or isolation point.

5.6 Equipment-Specific Lockout/Tagout Procedures

As TiEC does not normally perform lockouts of machinery on a repetitive basis the LO/TO permit contained in Attachment A is designed for initial and one-of-a-kind lockouts. Should it become necessary to repetitively lockout the same piece of equipment, specific procedures and permits for the equipment shall be developed.

Information contained in the equipment-specific procedure and permit should be the same as the information in the Attachment A permit. The procedures shall be generated by trained and knowledgeable project personnel and be reviewed and approved by the Project Environmental and Safety Manager (PESM).

Equipment-specific procedures are not required when all of the following conditions are present:
• The machine has no potential for stored energy or the reaccumulation of energy after shutdown; and
• The equipment has a single, readily identifiable, and isolated source of energy; and
• Isolation and lockout of the source will completely deenergize and deactivate the equipment; and
• The machine is locked out and isolated from that energy source during servicing and maintenance; and
• A single lockout device will achieve a locked-out condition; and
• The servicing or maintenance does not create a hazard to other employees.

5.7 Shift Changes

When necessary to maintain the status of a locked-out machine or device past the end of the shift when the lockout was initially installed the following procedures shall be adhered to:

• The incoming authorized employee shall place their lock hasp on the lockout point and complete a new permit.
• The outgoing employees shall remove their lock(s) after the new lock(s) are applied.
• If multiple shifts are not used, the initial locks may be left in place until the following day or until the equipment is released from lockout/tagout.
• The new shift supervisor shall sign the permit before work is begun on the new shift. The last supervisor whose name is on the lockout/tagout tags permit is responsible for all activities related to the work activity.

5.8 Failure to Clear Locks

If a person should fail to clear a lockout and their lock remains in place, the supervisor will attempt to contact the person who applied the lock and resolve the issue.

If the person cannot be contacted, the supervisor will investigate the situation and determine that removal of the lock will not create a hazard in the work zone. The supervisor will then verify that the work zone is clear, and blocking devices have been removed and the system has been restored to the normal configuration. The supervisor will then cut the lock off and restore energy to the system.

A written incident and investigation report per EHS 1-7, Incident Reporting and Investigating, shall be prepared by the supervisor stating the reason for cutting the lock, why the lock was not removed, and the procedure used to ensure the safety of personnel in the area. The individual whose lock was cut off must be notified ASAP.

5.9 Subcontractors

The supervisor shall be familiar with the nature of any subcontractor work on-site that may involve hazardous energy and assure that they follow work practices that are at least as strict as this procedure.

For any lockout/tagout requirements, the supervisor shall review and approve all subcontractor work set up, apply his locks to the scheme, and sign the appropriate lockout/tagout procedure checklist.

5.10 Periodic Inspections

Periodic inspections pursuant to EHS 3-3, Inspections, shall be completed during the monthly inspections by the ESS, PESM or other qualified personnel to ensure that the lockout tagout program is being effectively implemented. As a minimum the following shall be done:

• Existing lockouts will be reviewed for effectiveness;
• Permits for each existing lockouts shall be reviewed for adequacy;
• Incident reports and past permits shall be reviewed to determine if deficiencies in the program exist;
• Corrections to the system will be made as warranted; and
• Results will be logged in the health and safety logbook.
5.11 Training

Following are the training requirements for various personnel involved with or affected by lockout/tagout.

- Authorized Employees shall receive training in the following prior to being allowed to use lockout/tagout procedures:
  - Recognition of hazardous energy sources;
  - Types and magnitudes of energies available at the site;
  - Methods and means needed for energy isolation and control; and
  - The requirements of this procedure and 29 CFR 1910.147.

- Affected Employees shall be instructed in the following:
  - Purpose of the lockout tagout program;
  - Use and requirements of this procedure and 29 CFR 1910.147;
  - Prohibitions of restarting or tampering with equipment that has been locked out; and
  - Prohibitions of tampering with locks and tags installed on equipment.

Personnel not employed by TtEC shall be briefed in the requirements of this program during site-specific orientations, when applicable.

Training records shall be maintained in accordance with EHS1-9, Recordkeeping.

6.0 REFERENCES

- Environmental, Health & Safety - Programs Procedure EHS 1-7, Incident Reporting and Investigation
- Environmental, Health & Safety - Programs Procedure EHS 1-9, Recordkeeping
- Environmental, Health & Safety - Programs Procedure EHS 3-3, Inspections
- OSHA (U.S. Department of Labor, Occupational Safety and Health Administration)

7.0 ATTACHMENTS

Attachment A - Lockout Tagout Permit

EHS 6-4 ATTACHMENT A
LOCKOUT TAGOUT PERMIT

Click the icon below to download and complete.

EHS 6-4 Attachment A.doc

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.
the most current information. The current version of this document can be found on the TtEC online Corporate Reference Library.

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Tetra Tech EC, Inc.

Proprietary Information
# LOCKOUT/TAGOUT PERMIT

**Project Name:** _____________________________  **Location:** _______________________

## SECTION A

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## SECTION C

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## SECTION B

**ISOLATION INFORMATION**

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## SECTION D

**EQUIPMENT ISOLATION**

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## SECTION F

**LOCKOUT/TAGOUT REMOVAL**

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<th>Applied By</th>
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<th>Date</th>
<th>Time</th>
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**SPECIAL INSTRUCTIONS FOR REMOVAL OR RELEASING STORED ENERGY**

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*Revision Date 04/03/03*
1.0 PURPOSE

The purpose of this procedure is to establish a method to protect personnel from injury (e.g. burns, shocks, asphyxiation) and to prevent fires as a result of welding and hot work.

2.0 SCOPE

This document applies to all welding, cutting, grinding or other spark-producing or open flame activities on Tetra Tech EC, Inc. (TTEC) project sites, including but not limited to brazing, cutting, welding, grinding, soldering, pipe thawing, and thermite welding (cadwelds).

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

3.1.1 Environmental, Health and Safety Personnel

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for this procedure.

The Environmental and Safety Supervisor (ESS) is responsible for providing oversight of hot work and welding activities.

The Project Environmental Safety Manager (PESM) is responsible for providing consultation to the Project, including appropriate protective equipment and worker monitoring.
3.1.2 Permit Authorizing Individual (PAI)

The PAI is designated by in writing by management. The PAI(s) will have the experience and training to understand the risks and mitigation methods of hot work.

For Task Specific areas, the PAI:
- Inspects for flammable materials, hazardous processes and other fire hazards that are, or likely to be present in the work location.
- Ensures the protection of combustibles from ignition by moving the work to a location that is free from combustibles, moving the combustibles away, or covering combustibles with a fire resistant covering.
- Verifies that fire protection and extinguishing equipment are available at the hot work site.
- Determines when Fire Watches are required and verifies that a fire watch is at the Task Specific site.
- Identifies the PPE that is required for the Hot Work Operator (consults with the ESS and PESM as necessary).
- Completes and issues the Hot Work Permits for work in Task-Specific Areas (Attachment A).

(Note: Task-Specific Hot Work Area is for hot work that is performed outside of a Designated Area and for a specific task that is made fire safe by removing or protecting combustibles from ignition sources. Hot Work Permits are required for Task Specific hot work and are valid for one shift only. Fire watches are typically required).

For Designated Areas, the PAI:
- Provides regular inspection of Designated Areas.
- Verifies that unnecessary combustible, flammable materials have not been brought into the Designated Areas (Attachment B - Hot Work Precautions Checklist may be used).

(Note: A Designated (Hot Work) Area is a permanent, specific location designed or approved for hot work operations to be performed regularly (e.g., a maintenance shop or a detached defined outside location that is of noncombustible or fire-resistant construction), that is essentially free of combustible and flammable contents, and is suitably separated from adjacent areas. The Designated Area must be maintained free of combustibles as this area allows hot work at any time. A fire watch or a hot work permit is not typically required. The PAI is responsible for daily inspections when the area is in use).

3.1.3 Hot Work Operator

Hot Work Operators are responsible for:
- The safe operation of equipment in accordance with the manufacturer's instructions.
- Wear/use the proper PPE.
- Awareness of the hazards of hot work and emergency procedures in the event of a fire.
- Having the PAI approval before starting hot work operations.
- Ceasing work if unsafe conditions develop and notifying the PAI.

3.1.4 Fire Watch

Individuals assigned to observe and protect the Hot Work Operator and property. The Fire Watch is responsible for:
- Fire safe actions have been completed in the area prior to the start of hot work (combustibles/flammables removed, openings in wall/floor covered, areas below are free of combustible materials). 10 ABC or larger fire extinguisher immediately available and maintained throughout the performance of work.
- Suspending the work if unsafe conditions develop.
- Quenching or Extinguishing incipient fires and summoning assistance in case of fire.

3.2 Hot Work Operations

3.2.1 Hot Work and Flame/Spark Producing Equipment

The PAI shall examine the Task Specific Area where the work is to be performed and shall ensure that:
- Sprinkles, if provided, are in service and will not be taken out of service until this work has been completed.
- Within 35 feet of the hot work
  - Combustible lint, dust, vapors, liquids, or unpurged tanks or equipment previously containing such materials are removed or protected with fire resistant covers.
  - All floor and wall openings within 35 feet of the hot work will be tightly covered or protected with fire-resistant covers (Note: Some processes such as air carbon arc cutting and plasma cutting may cause sparks to travel in excess of 35 feet requiring the area to be expanded).
- The work will be confined to the area or equipment specified in the permit.
- Floors and surroundings have been swept clean, with combustible floors and construction formwork (if any) dampened.
- A suitable fire extinguisher is available at the hot work site. (an additional water bucket, sprayer, or damp sand may be used for quenching, cooling or covering hot slag or smoldering material)/
- Proper personal protective equipment (PPE) is identified in the hot work permit and is being worn by persons performing or observing the work.
- One or more fire watch persons have been assigned to watch for sparks in the area, as well as on floors above and below, and the fire watch stays in the area for a minimum of 30 minutes after the end of the hot work activity.
- Arrangements have been made for a patrol of the area, including floors above and below, during any lunch or rest period.
- Task Specific Hot work permits are good for one shift only.
- All containers (drums, tanks, piping) are considered unsafe for welding, cutting or heating until it has been made safe, or
### 3.2.2 Ventilation, Gases & Vapors

The PAI will consult with the ESS and PESM to determine the appropriate PPE and the need for monitoring the area and worker(s) when certain metals or other significant toxics are known or suspected. Table 3.2.2-1 identifies the ventilation and respiratory protection that are required. When respiratory protection is to be used, the PESM will assist in the selection of the equipment and ensuring that the elements of a respiratory protection program are in place. Refer to EHS 5-2 and the project planning documents (Health and Safety Plan, IH Monitoring Plan or AHA).

**Table 3.2.2-1 Work Categories and Ventilation/Respiratory Protection (OSHA-based)**

<table>
<thead>
<tr>
<th>Hot Work Type</th>
<th>Type of Ventilation or Respiratory Protection Required*</th>
<th>Comments &amp; Notes</th>
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</thead>
<tbody>
<tr>
<td><strong>In Any Enclosed Space</strong></td>
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<tr>
<td>- Zinc-Bearing, Chrome-bearing base or</td>
<td>General Ventilation and Local exhaust required,</td>
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<tr>
<td>filler metals, or materials coated</td>
<td>sampling demonstrates otherwise OR workers</td>
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<tr>
<td>with chrome bearing materials</td>
<td>protected by supplied air respirators</td>
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<tr>
<td>- Lead based materials,</td>
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<tr>
<td>Cadmium bearing filler materials or</td>
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<tr>
<td>cadmium coated materials</td>
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<td></td>
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<tr>
<td>- Zinc-bearing base or filler</td>
<td></td>
<td></td>
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<tr>
<td>metals or coatings</td>
<td></td>
<td></td>
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<tr>
<td>- Mercury bearing coatings</td>
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<tr>
<td><strong>Confined Spaces</strong></td>
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<tr>
<td>- Any hot work</td>
<td>General Ventilation required.</td>
<td>Respiratory Protection (supplied air) required when</td>
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<td>safe limits are not achieved. PESM involvement</td>
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<td><strong>In Any Location</strong></td>
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<tr>
<td>Beryllium Containing base or filler</td>
<td>General Ventilation and local exhaust required and</td>
<td></td>
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<tr>
<td>metals</td>
<td>workers protected by supplied air respirators.</td>
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<tr>
<td><strong>In Any Location</strong></td>
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<tr>
<td>GMAC welding on Stainless Steels</td>
<td>Local Exhaust OR supplied air respirators</td>
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<tr>
<td><strong>Open Areas (outside) Involving</strong></td>
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<td>- Zinc-Bearing, Chrome-bearing base or</td>
<td>Workers protected by filter type respirators</td>
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<td>filler metals, or materials coated</td>
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<td>with chrome bearing materials</td>
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<td>or cadmium coated materials</td>
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<tr>
<td>- Mercury bearing coatings</td>
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<tr>
<td><strong>General Welding, Cutting &amp; Heating</strong></td>
<td>Ventilation not required unless 29 CFR 1926, Subpart D</td>
<td>Sampling may be required to verify TLV in 29 CFR 1926,</td>
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<td>(not involving metals shown above)</td>
<td>limits are</td>
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*Any other employees exposed to the same atmosphere will be protected in the same manner as the welder or cutter.*

The hot work on surfaces with protective coatings will be evaluated for flammability and if flammable, stripped or removed at least 4 inches from the area of heat application, or the employees involved in the hot work area will be protected by a respirator.

### 3.2.3 Personal Protective Equipment

Workers and observers in hot work areas will have eye protection (safety glasses with side shields or ventilated goggles), face shields, safety toed boots, and hearing protection. Welding operators will have welding helmets with the appropriate shade lenses (auto-darkening preferred) (#11-#13 for SMAW welding, #3 - #5 for cutting). Dependent on the processes and materials, welding helmets with powered air purification systems may be appropriate. Clothing will be fire resistant. Dependent on the process, leather (or equivalent) apron, capes, sleeves, or chaps may be appropriate. If full face respirators are required, they will be equipped with protective lenses. Insulated leather welding gloves (appropriate to the process) will be worn during welding, cutting and heating activities.

Welders and others exposed to Inert-gas metal arc welding must have all skin completely covered to prevent burns and other damage by ultraviolet rays.

Designated Hot Work Areas will be posted with the PPE requirements.

### 3.2.4 Hot Work in Confined Spaces

Any Hot Work within a confined space is a high hazard activity and requires a consultation and approval of the PESM. Job Specific Controls for the work will be developed.

When hot work is being performed in a confined space, welding machines and gas cylinders shall be left outside. Heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement. In addition to a hot work permit, all the requirements of EHS 6-1, Confined Space Entry, shall be followed, including the completion of a confined space entry permit.

### 3.2.5 Welding on Systems that Contain or Have Contained Flammable Liquids

Welding or Hot Work on systems that have, or have contained flammable liquids is a high hazard activity that requires consultation and approval from the PESM before any work is begun. Job specific controls will be developed.

The following precautions shall be taken for hot work on systems that contain or contained flammable liquids.

- The part of the system being worked on must be isolated from other parts of the system containing flammable liquids or vapors. Isolation may be accomplished by plugging (i.e., using approved procedures and equipment), blanking, or removing from the system. Other approaches must be reviewed by the PESM.
- The isolated system must be purged, ventilated, or cleaned before welding, cutting, or brazing may be performed.
- Before purging, written calculations must be done to determine the time required to purge a certain size system with a given flow rate of an inert gas.
- After ventilation or cleaning a system, a lower explosive limit (LEL) reading must be taken at the area to be worked to ensure that there are no residual flammable vapors before welding or other hot work is conducted. A reading of 10% of the LEL is considered acceptable.
- When a part of a system (i.e., a pipe) is worked in place, protection must be accomplished by a combination of blanking-off and purging or blanking-off and cleaning.

### 3.2.6 Recordkeeping

Completed Hot Work Permits shall be returned to the PAI and shall be maintained as part of the project file. When hot work was performed on containers that contained flammable materials, information on the purging and measurements will be retained with the hot work permit.

### 3.2.7 Training

All persons involved in welding/hot work activities shall receive training on the requirements of this procedure. Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

---

[URL: http://info.tteci.net/apps/groups/compliance/corpproc.nsf/d9055562b7654d72852572c0... 6/21/2012]
4.0 GUIDANCE

The following guidance information is not mandatory unless imposed by a client or project documents.

4.1 Definitions

**Designated (Hot Work) Area** – A permanent, specific location designed or approved for hot work operations to be performed regularly (e.g., a maintenance shop or a detached defined outside location that is of noncombustible or fire-resistant construction), that is essentially free of combustible and flammable contents, and is suitably separated from adjacent areas. The Designated Area must be maintained free of combustibles as this area allows hot work at any time. A fire watch is not typically required.

**Fire Watch** – One or more dedicated individuals that observe (direct line of sight) during hot work activities and for a defined period afterwards to protect the Hot Work Operator from injury and to insure that no possibility of fire exists. Fire Watch individuals may have other duties; however the additional duties shall not distract them from their fire watch duties.

**Hot Work** – Hot Work is any temporary or permanent operation involving open flames or producing heat and/or sparks (cutting welding and heating). This includes but is not limited to: brazing, cutting, soldering, grinding, and welding. Hot work can also apply to the use of open flame or other temporary heating devices.

**Hot Work Operator** – An individual who performs hot work who is trained in NFPA 51 B, ANSI Z49.1, requirements, in the use of equipment, and in hot work permit controls.

**Local Exhaust Ventilation** – Local Exhaust Ventilation will consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. The system will be of sufficient capacity and arranged so as to remove fumes and smoke at the source and keep the concentration of them in breathing zone within safe limits.

**Mechanical Ventilation** – Mechanical ventilation consists of either general mechanical ventilation systems or local exhaust systems. General area mechanical ventilation is not generally satisfactory for health hazard control; however it may be helpful when used in addition to Local Exhaust system.

**Natural Ventilation** – Natural Ventilation is acceptable for welding, cutting and related processes where necessary precautions are taken to keep the operators breathing zone away from smoke, fumes and gases and where sampling of the atmosphere shows that the concentration of containates are below the allowable limits (OSHA and in some cases ACGIH recommendations). It includes avoiding fumes and gases by positioning of the work, the head, or by ventilation that captures or directs the fumes away from the face of the operator.

**Permit Authorizing Individual (PAI)** – An individual that has the experience and training to evaluate an activity for hazards designated by management.

**Soldering/Brazing** – Methods of joining metal by use of a filler metal. Soldering is defined as using filler with a liquidus not exceeding 840 degrees F. Brazing is performed at 840 degrees or greater, but both are below the melting temperature of the base metals.

**Task-Specific Hot Work Area** – Hot work that is performed outside of a Designated Area and for a specific task that is made fire safe by removing or protecting combustibles from ignition sources. Hot Work Permits are required for Task Specific hot work and are valid for one shift only. Fire watches are typically required.

**Thermite (Exothermic) Welding** - A process using finely powdered aluminum and iron oxide with other alloys (manganese, carbon, nickel, vanadium, chrome and others) to generate high heats and liquefy metals in a crucible. The liquid metal (iron, copper, etc) is then flowed into place with a form around the joint. Examples of materials typically joined include: copper grounding, railroad rails, reinforcing steel. Preheating of materials to 1000 degrees F is accomplished by use of a gas torch.

4.2 Background

The minimum requirements of this procedure are derived from OSHA 29 CFR 1926, 350 (Subpart J- Welding and Cutting). ANSI Z49.1 and NFPA 51B are often cited contractually. The additional requirements of these standards are contained in Section 4 Guidance. When these standards are imposed, the optional items in guidance become mandatory. When a Hot Work Permit is required, Attachment C (Hot Work Permit Example Form (NFPA 51B Compliant) should be used in these cases.

Hot Work performed in radiological areas or on radiologically contaminated materials will be controlled by the radiological work permits and this procedure.

4.3 Training

Personnel performing hot work under ANSI Z49.1 and/or NFPA 51B will receive training on the content of those standards, along with this procedure.

4.4 Postings

Proper postings for noise, fumes, electrical shock are to be in place (posted at entrances or on equipment or consumables...
4.5 Hazard Analysis & PPE

An Activity Hazard Analysis will be conducted specifically for the welding, cutting or heating operation that will be performed. All required respiratory, eye, face, noise, head, foot, and skin protection equipment will be selected and shown on the AHA. Suitable fire extinguishing equipment of sufficient capacity will be provided in the immediate vicinity of hot work operations and maintained in a state of constant readiness. Material Safety Data Sheets (MSDS) should be available and reviewed as a part of the AHA process.

4.6 Fumes & Ventilation

Fumes and gases from hot work cannot be simply classified. The composition and quantity of fumes and gases are dependent upon the metal being worked, the process and consumables being used, coatings on the work, such as paint, galvanizing, or plating, and contaminates in the atmosphere. In welding and cutting, the composition of the fumes is usually different from the composition of the electrode or consumables. The determination of adequate ventilation is to sample the atmosphere that the workers are exposed to in accordance with the project Industrial Hygiene Plan.

ANSI Z49.1 and USACOE EM-385-1-1 includes materials of toxic significance and requires additional levels of ventilation, air monitoring or respiratory protection as shown in Table 4.6-1.

Table 4.6-1 Categories and Ventilation/Respiratory Protection (EM 385-1-1 & ANSI Z-49.1)*

<table>
<thead>
<tr>
<th>Hot Work Type</th>
<th>Type of Ventilation or Respiratory Protection Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Any Enclosed Space</td>
<td>Local exhaust ventilation</td>
</tr>
</tbody>
</table>

- Antimony, Arsenic, Barium, Cadmium, Chromium, Chromium VI², Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, and Vanadium

Confined Spaces - Hot work involving:
- Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium IV², Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, and Vanadium

Confined Spaces – Hot Work Involving:
- Fluorine gases
- Zinc compounds

Confined Spaces – Hot Work Involving:
- Fluorine gases
- Zinc compounds

Open Areas (Outside) involving:
- Oxygen cutting using iron powder or chemical flux
- Gas Shielded Arc Cutting
- Plasma Cutting

Open Areas (Outside) involving:
- Fluorine gases
- Zinc compounds

General Welding, Cutting & Heating

Respiratory Protection required as well as engineering controls based on results of worker exposure assessment and exposure determination.

Sampling to be performed to determine the need for respiratory protection or local exhaust.

Local mechanical ventilation or other means to remove fumes generated.
* Any other employees exposed to the same atmosphere will be protected in the same manner as the welder or cutter.

1 Workers may be exposed to hazardous concentrations of Chromium (IV) while welding, cutting or performing hot work on stainless steel, high chrome alloys or chrome-coated metal, or during the application and removal of chromate-containing paints and other surface coatings.

2 When gas metal arch welding is performed on stainless steel, chrome alloy steel or chrome plated steel, personnel shall be protected by means of a local exhaust capable of maintaining exposures within permitted limits, or by other work and engineering controls, such as the use of argon-rich (>75% argon) shielding gas for use in gas metal arch welding (GMAW) or flux cored arc welding (FCAW). Whenever engineering and work controls are not sufficient reduce employee exposures, they will be supplemented by use of respiratory protection.

Where concentrations of airborne fume contaminants are to be determined by sampling of the atmosphere, the sampling will conducted inside the welding helmet in the welding operators breathing zone.

4.7 Daily Inspections

Hot work operators and fire watches will inspect their welding, cutting and heating equipment and personal protective equipment daily prior to use. The PAI will inspect Designated and Task Specific Hot Work Areas on a regular basis. Attachment B (Hot Work Precautions Checklist) is provided to assist in these inspections.

4.8 Thermite Welding

Thermite welding work will be controlled with a hot work permit when performed within 35 feet of any combustible materials. A fire watch will be maintained during the preheating and thermite welding for 30 minutes after the weld is completed. In areas without combustibles, the PAI may authorize thermite work as a Designated Area. Thermite powders and igniters will be stored separately and away from the work.

4.9 Soldering/Brazing

Soldering using flame heating devices and brazing will be controlled in accordance with ANSI Z49.1 for personnel protection. A fire watch will be maintained during and for 30 minutes after the completion of the soldering or brazing activity. Solder and brazing filler materials may contain lead, silver, tin, cadmium, and other metals.

5.0 REFERENCES

<table>
<thead>
<tr>
<th>Please Describe Your Reference Here</th>
<th>Place Your Link In This Column</th>
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</thead>
<tbody>
<tr>
<td>3. 29 CFR 1926, 1126 (Subpart Z)</td>
<td><a href="http://www.OSHAgov/">http://www.OSHAgov/</a></td>
</tr>
<tr>
<td>4. EHS 1-9, Recordkeeping</td>
<td></td>
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<tr>
<td>5. EHS 6-1, Confined Space Entry</td>
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<tr>
<td>7. EHS 5-2, Respiratory Protection</td>
<td></td>
</tr>
<tr>
<td>8. NFPA 51B Standard for Fire Prevention During Welding,</td>
<td>Via Engineering Links</td>
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</table>
## 6.0 ATTACHMENTS

<table>
<thead>
<tr>
<th>Please Provide a Description of the Attachment</th>
<th>Place Your Attachments Here</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hot Work Permit Example Form</td>
<td>![Attachment](EHS 6-5 Attachment A · HW Permit 12-9-08.doc)</td>
</tr>
<tr>
<td>B. Hot Work Precautions Checklist</td>
<td>![Attachment](EHS 6-5 Attachment B · HW Precautions Checklist 12-9-08.doc)</td>
</tr>
<tr>
<td>C. Hot Work Permit Example Form (NFPA 51B Compliant)</td>
<td>![Attachment](EHS 6-5 Attachment C · HW PERMIT NFPA Compliant 12-9-08.doc)</td>
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</tbody>
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11. American Conference of Governmental Industrial Hygienists TLV and BEIs

HOT WORK PERMIT

☐ Task Specific Area Permit
☐ Designated Area Permit

Site Name: ____________________________________________________________________________
Site Location: _________________________________________________________________________

Permit No. __________________________

Permit Issue Date: _____________________ Permit Expiration Date: __________________________

Describe work to be performed, location where activity will be performed, and the processes to be used:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

SAFETY ZONE for work established by (check all that apply)
☐ Cones ☐ Caution Tape ☐ Natural Barrier ☐ Welding Screen ☐ Building ☐ Other, explain:

_____________________________________________________________________________________
_____________________________________________________________________________________

SAFETY REQUIREMENTS (check YES or NO)
Fire Extinguisher properly rated ☐ YES ☐ NO Fire watch present ☐ YES ☐ NO
Combustibles covered within 35 ft ☐ YES ☐ NO Work area clean ☐ YES ☐ NO
Cables, hose lines, regulators, cylinders, electric sources checked ☐ YES ☐ NO

SAFETY EQUIPMENT (check all that apply) ☐ respirator ☐ welders mask ☐ burning goggles
☐ face shield, ☐ local exhaust ventilation, and:

_____________________________________________________________________________________

Are SPECIAL FIRE PROTECTION procedures being implemented? (If yes, describe): __________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Refer to the Industrial Hygiene Plan for any air monitoring requirements.

PAI Name: ___________________________ Signature/ Date/Time _____________________________
Hot Work Operator ______________________ Signature/Date/Time ____________________________
Air Monitor Name ________________________ Signature/Date/Time ____________________________
Fire Watch Name _________________________ Signature/Date/Time ____________________________
## Hot Work Precautions Checklist

### General

<table>
<thead>
<tr>
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Before initiating Hot Work, ensure that precautions are in place and an appropriate fire extinguisher is readily available.

Are available sprinklers, hose streams and extinguishers in service and operable?

Is Hot Work Equipment in good repair?

If area is protected by smoke detectors, are they bypassed, covered or removed?

Is a confined space permit required?

Is there adequate ventilation to remove smoke or vapor from the work area?

Is a lockout/Tagout required?

Are noncombustible screens or shields in place to protect other persons in the vicinity from the direct rays of arc welding or cutting, sparks, slag or splatter?

### Within 35 feet of the Work

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Have flammable liquids, dust, lint and oil deposits been removed?

Have sources of explosive atmospheres in the areas been eliminated?

Have the floors been swept clean?

Have combustible floors been wet down, covered with damp sand, or fire resistant sheets?

Have other combustibles been removed where possible or otherwise protected with fire-resistant materials or metal shields?

Are all wall, floor, duct, or tank openings covered or blocked?

Are fire resistant tarps suspended beneath work?

### Work on Walls or Ceilings/Enclosed Equipment

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Is construction noncombustible and without combustible covering or insulation?

Have Combustibles on other side of walls been moved?

Is there a danger from the conduction of heat into another area?

Is enclosed equipment cleaned of all combustibles

Have containers been purged of flammable liquids/vapors?

### Fire Watch/Hot Work Area Monitoring

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
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</table>

Is a fire watch to be provided during and for 30 minutes after work is completed, including any breaks?

Is the fire watch supplied with suitable extinguishers?

Is the Fire Watch trained in the use of the extinguishers and in sounding fire alarm?

Are Fire Watches available for adjoining areas, areas below or above?
**BEFORE INITIATING HOT WORK, ENSURE PRECAUTIONS ARE IN PLACE!**
**MAKE SURE AN APPROPRIATE FIRE EXTINGUISHER IS READILY AVAILABLE!**

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing, and thermite welding.

**INSTRUCTIONS**
- Verify precautions checked at right are in place, or do not proceed with the work.
- Complete and retain a copy of this permit (provide original to the PAI when the permit is closed).

**WORK TYPE:**
- [ ] Cutting
- [ ] Welding
- [ ] Other

**DATE:**

**PERMIT NO.:**

**LOCATION:**

**NATURE OF JOB:**

**NAME OF PERSON DOING HOT WORK:**

**COMPANY NAME:**

I verify the above location has been examined and the precautions checked on the Required Precautions Checklist have been taken to prevent fire.

**RESPONSIBLE SUPERVISOR:**

**NAME**

(Printed)__________________________

**SIGNATURE:**

__________________________

**START TIME:**

**FINISH TIME:**

**ASSIGNED FIRE WATCH:**

**NAME:**

__________________________

**SIGNATURE:**

__________________________

**Permit Authorizing Individual:**

**NAME:**

__________________________

I verify that the location was inspected and determined to be fire safe and that the precautions checked on the Required Precautions Checklist are in place. Permission is authorized to start work.

**SIGNATURE:**

__________________________

**THIS PERMIT IS GOOD FOR ONE DAY OR UNTIL EXPIRATION DATE AS NOTED**

**Fire Watch Completed:**

**DATE:**

**TIME:**

**AM**

**PM**

**REPORT EMERGENCIES BY DIALING 911 ON ANY SITE, COMPANY, OR CELL PHONE**

**Required Personal Protective Equipment (PPE):**

I verify that I conducted an inspection 30 minutes following completion of hot work and the area was in a fire safe condition.

**NAME:**

__________________________

**SIGNATURE:**

__________________________

**Required Precautions Checklist**

(Check appropriate box)

YES NO NA

- Available sprinklers, hose streams, or extinguishers are in service and operable.
- Hot work equipment in good repair.

**Requirements within 35 feet of hot work**

- Flammable liquids, dust, lint, and oil deposits removed?
- Floors swept clean.
- Combustible floors wet down, covered with damp sand or fire-resistant sheets.
- Remove other combustibles where possible. Otherwise protect with fire-resistant tarpaulins or metal shields.
- All wall and floor openings covered.
- Fire-resistant tarpaulins suspended beneath work.
- Vegetation removed or wet down.

**Work on walls or ceilings/enclosed equipment**

- Construction is noncombustible and without combustible covering or insulation.
- Combustibles on other side of walls moved away.
- Danger exists by conduction of heat into another area.
- Enclosed equipment cleaned of all combustibles.
- Containers purged of flammable liquids/vapors.

**Fire watch/hot work area monitoring**

- Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.
- Fire watch is supplied with suitable extinguishers.
- Fire watch is trained in use of this equipment and in sounding alarm.
- Fire watch may be required for adjoining areas, above and below.
- Fire Watch waived (reason) __________________
- Notify the Health and Safety representative after hot work is complete.
APPENDIX D

FIELD INSPECTION FORMS
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# Equipment/Vehicle Inspection Report

<table>
<thead>
<tr>
<th>Date:</th>
<th>Unit Number:</th>
<th>Description:</th>
</tr>
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<tbody>
<tr>
<td>Miles or</td>
<td></td>
<td>MFG:</td>
</tr>
<tr>
<td>Hours:</td>
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</table>

Unit to be taken from: ___________________________ to: ___________________________

<table>
<thead>
<tr>
<th>Item</th>
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<tr>
<td>2. Brakes</td>
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<tr>
<td>3. Steering</td>
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<tr>
<td>4. Undercarriage</td>
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<tr>
<td>5. Suspension</td>
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<tr>
<td>6. Engine</td>
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<tr>
<td>7. Drive Train</td>
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<td>8. Fuel System</td>
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<td>9. Cooling System</td>
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<td>10. Electrical System</td>
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<td>11. Exhaust System</td>
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<td>12. Hydraulic System</td>
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<td>14. Clutch</td>
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<td>15. Body</td>
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<td>16. ROP</td>
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<td>19. Wipers/Review Mirrors</td>
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<td>20. Heater/AC/Defroster</td>
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<tr>
<td>21. Safety Equipment/Belts</td>
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<td>22. Signal Lights</td>
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<td>25. Blade/Bucket</td>
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<td>28. Fire Ext./First Aid Kit</td>
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<td>29. Horn/Backup Alarm</td>
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<td>30. Manufacturer Operating Manual</td>
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<tr>
<td>31. Head/Tail/Brake Lights</td>
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<tr>
<td>32. Cleanliness</td>
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</table>

Note estimated percentage of tread/track usefulness remaining

2 Fire Ext./First Aid Kit and all items in the cab and or bed must be secured

Comments: __________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Inspected By: _______________________________________________________

DISTRIBUTION: (1) Sent with equipment (2) Equipment Supervisor (3) PO File (4) Originator
EQUIPMENT TRANSFER REPORT MUST ACCOMPANY THIS FORM
# DAILY EQUIPMENT INSPECTION

**PROJECT**

**MANUFACTURER TYPE**

**UNIT #**

**MODEL**

**DATE**

**ENGINE HRS/MILEAGE**

**SHIFT**

Check appropriate column and describe correction needed.

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<td>Steering Mechanisms</td>
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<td>Service Brakes</td>
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<td>Emergency Brakes</td>
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<td>Parking Brake</td>
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<td>Exhaust System</td>
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<td>Brake Lights</td>
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<td>Mirrors</td>
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<td>Seat and Seat Belts (w/ ROPS)</td>
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<td>Tires/Tread</td>
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<tr>
<td>Regular Horn</td>
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<tr>
<td>Audible Back-up Alarm</td>
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<td>Steps, Hand-holds</td>
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<td>Fire Extinguisher</td>
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<td>Engine Coolant</td>
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<td>Engine Oil</td>
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<td>Hydraulics &amp; Operating Controls</td>
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<tr>
<td>Fenders/Mudflaps</td>
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<td>Heater/defroster</td>
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<tr>
<td>All items in cab or bed secured</td>
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<tr>
<td>Cleanliness inside and outside</td>
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</table>

**Remarks:**

1. Items required to be operational by OSHA 1926.602 before use.
2. Service brake must be capable of stopping and holding equipment fully loaded.

___________________________           __________________________________
Operator Name (Printed)                                  Operator Signature

Review : Superintendent ___________________

Date Repairs or adjustments completed:_____________________

Equipment Supervisor/Mechanic:____________________________

---

TETRA TECH EC, INC.
Construction Procedure CP-7, Attachment 2
Proprietary Information
Version Date 09/24/2009
Uncontrolled Copy
DAILY BRIEFING SIGN-IN SHEET

Date: ____________________  Project Name/Location: IRP Site 1, Former Marine Corps Air Station, El Toro, CA
Shift/Department: ______________  Person Conducting Briefing: __________________________________________

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. OTHER ISSUES (EHS Plan changes, attendee comments, etc.):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3. ATTENDEES (Print Name):

<p>| | |</p>
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## Project: IRP Site 1, Former Marine Corps Air Station, El Toro

### Report # Date:

### Contract #: N62473-12-D-2006 CTO 0011 Activity/Area

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<th>Weather:</th>
<th>Temperature:</th>
<th>High</th>
<th>Low</th>
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### Inspection Checklist

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<thead>
<tr>
<th>OK</th>
<th>Condition</th>
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<table>
<thead>
<tr>
<th>Inspection Checklist</th>
<th>OK</th>
<th>Condition</th>
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<tbody>
<tr>
<td>Fences &amp; Barricades</td>
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<td>Signs &amp; Posting</td>
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<tr>
<td>PPE Available &amp; Worn</td>
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<td>Vehicle Speeds</td>
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<td>Equipment Calibration</td>
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<td>Seatbelt Use</td>
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<td>Stormwater Controls</td>
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<td>PPE Levels</td>
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<td>Lock/Tag</td>
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<td>Hot Work</td>
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<td>GFCI Usage</td>
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<td>Eye Wash Insp</td>
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<td>SPCC Inspect</td>
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<td>Waste Storage</td>
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### Incident or Other Notable Items:

### Safety & Health Activities

- Safety & Health Activities

- Safety & Health

<table>
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<tr>
<th>Signature</th>
<th>Date</th>
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</table>
FIELD TEAM REVIEW SHEET

Each field team shall sign this section after site-specific training is completed and before being permitted to work on-site.

I have read and understand this Site Safety and Health Plan for Installation Restoration Program Site 1, Former Marine Corps Air Station, El Toro, California.

I will comply with the provisions contained herein.

<table>
<thead>
<tr>
<th>Print Name</th>
<th>Signature</th>
<th>Date</th>
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<td>Unit first aid item</td>
<td>Minimum Size or Volume (metric)</td>
<td>Minimum Size or Volume (US)</td>
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<tr>
<td>Absorbent Compress</td>
<td>206 cm²</td>
<td>32 in²</td>
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<tr>
<td>Adhesive Bandage</td>
<td>2.5 x 7.5 cm</td>
<td>1 x 3 in</td>
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<tr>
<td>Adhesive Tape</td>
<td>2.3 m</td>
<td>2.5 yd (total)</td>
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<tr>
<td>Antiseptic Wipe</td>
<td>2.5 x 2.5 cm</td>
<td>1 x 1 in</td>
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<tr>
<td>Aspirin, Individually Wrapped</td>
<td>325 mg</td>
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<tr>
<td>Bandage Compress (2 in-4 in)</td>
<td>5 x 91 cm</td>
<td>2 x 36 in</td>
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<tr>
<td>Burn Dressing</td>
<td>10 x 10 cm</td>
<td>4 x 4 in</td>
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<tr>
<td>Burn Treatment</td>
<td>0.9</td>
<td>1/32 fl. Oz.</td>
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<tr>
<td>Cold Pack</td>
<td>10 x 12.5 cm</td>
<td>4 x 5 in</td>
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<td>*Combat style Tourniquet with Windlass</td>
<td>95.3 x 3.8</td>
<td>37.5 x 1.5 in. width</td>
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<td>CPR Breathing Barrier</td>
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<td>Eye Covering, with means of attachment</td>
<td>19 cm²</td>
<td>2.9 in²</td>
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<td>Eye/Skin Wash</td>
<td>118 ml (total)</td>
<td>4 fl. oz total</td>
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<td>First Aid Guide</td>
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<td>Gloves, latex free</td>
<td>XL</td>
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<tr>
<td>Hand Sanitizer</td>
<td>0.9 g</td>
<td>1/32 oz.</td>
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<tr>
<td>Occlusive Dressing</td>
<td>10.2 x 10.2</td>
<td>4 x 4</td>
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<tr>
<td>Roller Bandage (2 in.)</td>
<td>5 x 366 cm</td>
<td>2 in. x 4 yd.</td>
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<tr>
<td>Roller Bandage (4 in.)</td>
<td>10 x 366 cm</td>
<td>4 in. x 4 yd.</td>
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<tr>
<td>Sterile pad</td>
<td>7.5 x 7.5 cm</td>
<td>3 x 3 in</td>
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<tr>
<td>Triangular Bandage</td>
<td>101 x 101 x 14 cm</td>
<td>40 x 40 x 56 in.</td>
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* Required when power tools in use.
**EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT**

**Project/Location:**

**Inspector/s:**

**Time/Date:**

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<thead>
<tr>
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<th>OBSERVATIONS</th>
<th>FINDING (Y/N)</th>
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<td><strong>Weather Conditions at time of Inspection</strong></td>
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<tr>
<td><strong>Work Conditions</strong></td>
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<td>2. Walking/Working Surfaces</td>
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<td>3. Aisles and Passageways</td>
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<td>4. Platforms/Scaffolding</td>
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<td>5. Ladders</td>
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<td>6. Stairs, Guardrails, Toe-boards</td>
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<td>7. Exits/Egress</td>
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<td>11. Noise Exposure</td>
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<td>12. Ergonomics (EHS 3-1, Attachment B)</td>
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<td>13. Site Perimeter and Control Zones</td>
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<td><strong>Equipment</strong></td>
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<td>14. Hand/Portable Tool Condition, Storage and Use</td>
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<td>15. Machine, Conditions/Guarding</td>
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<td>16. Mobile/Heavy Equipment</td>
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<td>a. Physical inspection of equipment</td>
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<td>b. Review of daily inspection reports</td>
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<tr>
<td>c. Review of equipment deficiency corrections logs/records</td>
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<td><strong>Material Handling Equipment</strong></td>
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<td>17. Hoisting and Rigging</td>
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<td>18. Lifting Aids Used When Possible</td>
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<td>19. Proper Lifting Techniques Used</td>
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<td><strong>Electrical Safety</strong></td>
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### Inspection Type:
- [ ] Weekly
- [ ] Monthly

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<td></td>
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</tr>
<tr>
<td><strong>Emergency Systems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Emergency phone numbers posted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Evacuation routes, rally points shown on site map</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Fire extinguishers inspected monthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. Eyewashes and showers periodically inspected, units flushed, and fluids periodically changed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. First Aid Kits/Stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Emergency Rescue Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. PPE used, stored, and maintained in accordance with EHS plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Respirator use, storage, and maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hazardous Waste Storage Area (HWSA)/Satellite Accumulation Area (SAA)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. If HWSA are present, they are being inspected and documented weekly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Findings are being corrected.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Wastes stored in designated, secured area with “Hazardous Waste” signage. For SAA, area is marked “SAA”. SAA located at the point of generation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. Containers of hazardous waste marked with the words “hazardous waste”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. Wastes accumulated onsite are within allowed time limits (e.g., &lt; 90 days for large quantity generators) - check accumulation start dates on containers in HWSA and compare to tracking log.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Waste in SAA limited to max of 55 gallons and when full, moved to HWSA within 3 days.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. Hazardous Waste Container Standards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPIC</td>
<td>OBSERVATIONS</td>
<td>FINDING (Y/N)</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>i. DOT-spec. containers (for wastes to go off-site only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Intact/in good condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. Waste compatible with containers (e.g., no evidence of corrosion, softening, bulging)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. Securely closed and stored to prevent rupture/leaking, except when add/remove waste.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. Reactive/ignitable wastes stored at least fifty (50) feet from property.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. Liquid wastes within secondary containment (BMP, check WMP to determine state requirements).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. Incompatible wastes separated by a dike, wall, berm or other device.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48. In HWSA, containers are separated by minimum 36 inch aisle space. Labels and markings are visible and legible on all containers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous Waste Tank Storage Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. Daily written inspection is being conducted and is maintained on site. The inspection requirements in the plan are being documented as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste/Stockpiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50. Refer to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Attachment C – Hazardous Waste Less Than 90 Days For Hazardous Waste Stockpiles;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attachment C – Solid Waste For State Regulated/Non-Hazardous Stockpiles; and/or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Attachment C – PCB for PCB Stockpiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSCA PCB Wastes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51. Inspected every 30 days at a minimum. Refer to Attachment C - PCB Checklist for &lt; 30 day or less than 1 year storage area requirements and general PCB container storage requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPIC</td>
<td>OBSERVATIONS</td>
<td>FINDING (Y/N)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>Spill Prevention and Preparedness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52. Outside of containers or tanks (as applicable) show no signs of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deterioration, leaks, or discharges at seams, gaskets, piping,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pumps, valves, rivets, or bolts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53. Appropriate containment materials are available and accessible,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>which may include: drip pans, dikes, berms, retaining walls,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>curbing, other barriers, spill diversion ponds, retention ponds,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or integrated secondary containment structures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54. Spill control and response materials are available, which may</td>
<td></td>
<td></td>
</tr>
<tr>
<td>include: designated spill response kits, drip pans, sorbent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>materials, oil retention booms (floating or sorbent), sand bags/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>temporary curbing devices, fuel recovery pumps/collection hoses,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fuel recovery tank trucks, and tools.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55. Is there any evidence of a sheen or discoloration on the ground?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are hazardous materials stored properly in a manner that</td>
<td></td>
<td></td>
</tr>
<tr>
<td>minimizes potential for spills?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>56. Emergency Contact Lists are current and posted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>57. People have received training.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58. Does the project have a Spill Response, Control, and Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Countermeasures (SPCC) Plan? If yes, are inspections being</td>
<td></td>
<td></td>
</tr>
<tr>
<td>performed and documented as required in the plan? Has the plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>been updated as required?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stormwater Pollution Prevention and Erosion Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59. Are site activities causing land disturbance being performed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(grading, excavating, clearing and grubbing, demolition and</td>
<td></td>
<td></td>
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<tr>
<td>foundation removal, etc?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPIC</td>
<td>OBSERVATIONS</td>
<td>FINDING (Y/N)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>58. Are there surface waters present on or adjacent to the site that could be impacted by runoff from the site? Is there any evidence of runoff from the project site to these areas?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59. Are there storm drains, catch basins or other conveyances that collect stormwater? Are there activities occurring that could cause oil, contaminants, or sediments to enter these conveyances? If yes, are there measures in place or needed to protect stormwater quality?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60. Are there signs of erosion on recently disturbed soils (channelization, rivulets, siltation runoff, etc.)? Can the erosion lead to sediment or runoff to surface water or conveyances? If yes, are erosion control BMPs necessary or recommended?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61. Are BMPs being implemented per the environmental project plans? For instance, preventative maintenance, good housekeeping practices, proper waste storage and storage of hazardous materials, etc.?</td>
<td></td>
<td></td>
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<tr>
<td>62. Does the project have a total land disturbance = or &gt; 1 acre or is the project part of a larger or common plan of development that could exceed an acre of disturbance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63. Does the project have a Stormwater Pollution Prevention Plan (SWPPP)? If yes, are inspections being performed and documented as required in the plan?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64. Fugitive Dust – Appropriate BMPs are instituted for fugitive dust emissions.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Conditions or Work Practices**

65.

66.

67.

68.
### EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

<table>
<thead>
<tr>
<th>ACTION ITEM</th>
<th>RESPONSIBLE PARTY</th>
<th>SCHEDULE</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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<td>9.</td>
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<tr>
<td>10.</td>
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<tr>
<td>11.</td>
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</tbody>
</table>

Reviewed by:

[Signature]

Date

cc: Project Manager (monthly only)
PESM (monthly only)
APPENDIX E

CONTRACTOR SIGNIFICANT INCIDENT REPORT
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Contractor Significant Incident Report (CSIR)

1. General Information
   Contracting Activity/ROICCC Office:

   Accident Classification:
   - [ ] Injury
   - [ ] Fatality
   - [ ] Environment
   - [ ] Procedural Issues
   - [ ] Lessons Learned
   - [ ] Illness
   - [ ] Property Damage
   - [ ] Other ________________________________

   Involving:
   - [ ] Confined Space
   - [ ] Equip/Mrt Ver/Mat Handling (Heavy Construction Equip.)
   - [ ] Hazardous Material
   - [ ] Crane and Rigging
   - [ ] Equip/Mrt Ver/Mat Handling (Material Handling)
   - [ ] Trenching/Excavation
   - [ ] Diving
   - [ ] Equip/Mrt Ver/Mat Handling (Man-Lift/Elevated Platform)
   - [ ] Waterfront/Marine Operations
   - [ ] Demolition/Renovation
   - [ ] Fall from Ladder
   - [ ] Fall from Scaffold
   - [ ] Other ________________________________
   - [ ] Electrical
   - [ ] Fall from Roof
   - [ ] Fire

2. Personal Information
   Name (Last, First, MI):
   Age:  
   Sex:  

   Job Title/Description:
   Employed By:

   Supervisor Name (Last, First, MI) & Title:
   Was the person trained to perform this activity/task?
   - [ ] Yes
   - [ ] No

   What type of training was received (OJT, classroom, etc.)?
   Date of the most recent formal training and topics discussed?

3. Witness Information
   Witness #1: Name (Last, First, MI):
   Job Title/Description:

   Employed By:

   Supervisor Name (Last, First, MI):

   Witness #2: Name (Last, First, MI):
   Job Title/Description:
**Employed By:**

**Supervisor Name (Last, First, MI):**

**Additional Witnesses:**

*List any additional witnesses on a separate sheet and attach.*

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

---

### 4. Contract Information

**Type of Contract:**

- [ ] A/E
- [ ] BOS
- [ ] CLEAN
- [ ] Construction
- [ ] Design Build
- [ ] FSCC
- [ ] FSSC
- [ ] JOC
- [ ] RAC
- [ ] Service
- [ ] Other

**Contract Number & Title:**

**Industrial Group & Industrial Type:**

**Prime Contractor Name/Address/Phone & Fax No:**

**Subcontractor Name/Address/Phone & Fax No:**

**Safety Manager (Last, First, MI):**

**Safety Manager (Last, First, MI):**

**Insurance Carrier:**

**Insurance Carrier:**

---

### 5. Accident Description

**Date of Accident:**

**Time of Accident:**

**Exact Location of Accident:**

*Describe the accident in detail in your words: (Use the back of page if you need additional space)*

---

**Direct Cause(s) of Accident:**

---
<table>
<thead>
<tr>
<th>Indirect Cause(s) of Accident:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Action(s) taken to prevent re-occurrence or provide on-going corrective actions:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Corrective Action Beginning Date:</th>
<th>Anticipated Completion Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Personal Protective Equipment:</th>
</tr>
</thead>
</table>

- □ Available and used
- □ Available and not used
- □ Not Required
- □ Not related to Mishap
- □ Wrong PPE for job

**List PPE Used:**

<table>
<thead>
<tr>
<th>Type of Construction Equipment (Make, Model, Serial #, VIN#) Involved:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Was Hazardous Material Spilled/Released?</th>
</tr>
</thead>
</table>

- □ Yes
- □ No

**Please List Hazardous Material(s) Involved:**

<table>
<thead>
<tr>
<th>Who provided first aid or cleanup of mishap site?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Any blood-borne pathogen exposure, other than EMTs?</th>
</tr>
</thead>
</table>

- □ Yes
- □ No

**Who?**

<table>
<thead>
<tr>
<th>List OSHA and EM-385-1-1 standards that were violated:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Was site secured and witness statements taken immediately?</th>
</tr>
</thead>
</table>

- □ Yes
- □ No

**By Whom?**
6. Injury Illness/Fatality Information

<table>
<thead>
<tr>
<th>Severity of Injury/Illness:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Fatality</td>
<td>☐ Lost Workday Case Involving Days Away From Work</td>
</tr>
<tr>
<td>☐ Temporary Disability</td>
<td>☐ Recordable Workday Case Involving Restricted Duty</td>
</tr>
<tr>
<td>☐ Permanent Total Disability</td>
<td>☐ Other Recordable Case</td>
</tr>
<tr>
<td>☐ Permanent Partial Disability</td>
<td>☐ Recordable First Aid Case</td>
</tr>
<tr>
<td></td>
<td>☐ Non-Recordable Case</td>
</tr>
<tr>
<td></td>
<td>☐ No Injury</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Days Lost:</th>
<th>Estimated Days Hospitalized:</th>
<th>Estimated Days Restricted Duty:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>List Primary Body Part Affected:</th>
<th>List Other Body Part(s) Affected:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of Injury/Illness for Primary Body Part (Examples: Amputation, Burn, Hernia):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Accident (Examples: Fall same level, Lifting, Bitten, Exerted):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of Accident (Examples: Crane, Carbon Monoxide, Ladder, Welding Equipment):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

7. Causal Factors *(Explain answers on supplementary sheet)*

- Design – Design of facility, workplace, or equipment was a factor?  
  - Yes  
  - No

- Inspection/Maintenance – Inspection & maintenance procedures were a factor?  
  - Yes  
  - No

- Person’s Physical Condition – In your opinion, the physical condition of the person was a factor?  
  - Yes  
  - No

- Operation Procedures – Operating procedures were a factor?  
  - Yes  
  - No

- Job Practices – One or more job safety/health practices not being followed when the accident occurred contributed to the accident?  
  - Yes  
  - No

- Human Factors – One or more human factors, such as a person’s size or strength, contributed to the accident?  
  - Yes  
  - No

- Environmental Factors – Heat, cold, dust, sun, glare, etc. contributed to the accident?  
  - Yes  
  - No

- Chemical and Physical Agent Factors – Exposure to chemical agents, such as dust, fumes, mist, or vapors, or physical agents, such as noise, radiation, etc., contributed to the accident?  
  - Yes  
  - No

- Office Factors – Office setting, such as lifting office furniture, carrying, stooping, contributed to the accident?  
  - Yes  
  - No

- Support Factors – Inappropriate tools/resources were provided to perform the task?  
  - Yes  
  - No

- PPE – Improper selection, use, or maintenance of PPE contributed to the accident?  
  - Yes  
  - No

- Drugs/Alcohol – In your opinion, were drugs or alcohol a factor?  
  - Yes  
  - No

- Job Hazard Analysis – The lack of an adequate *(IAW-EM-385-1-1 Sec 01.A)* activity hazard analysis was a contributing factor?  
  - Yes  
  - No

- Job Hazard Analysis – JHA was not site specific and/or did not address the type of work/operations performed when the mishap occurred?  
  - Yes  
  - No

- Management – A lack of adequate supervision contributed to the accident?  
  - Yes  
  - No

- Management – Inadequate information was provided at pre-con meeting?  
  - Yes  
  - No
### 8. OSHA Information

<table>
<thead>
<tr>
<th>Date OSHA was Notified:</th>
<th>Date(s) of Investigation:</th>
<th>Date of Citation: (Attach Copy)</th>
<th>Dollar amount of Penalties:</th>
</tr>
</thead>
</table>

### 9. Report Preparer

**Name (Last, First, MI):**

Date of Report:

**Title:**

**Employer:**

**Phone #:**

Signature:
CONTRACTOR SIGNIFICANT INCIDENT REPORT (CSIR) INSTRUCTIONS
Complete Sections Appropriate to Incident (Rev. 06/02).

NOTE: THE ATTACHED CSIR FORM IS TO BE USED BY CONTRACTORS TO RECORD THE RESULTS OF THEIR ACCIDENT/INCIDENTS INVESTIGATIONS AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER WITHIN THE REQUIRED TIMEFRAMES.

GENERAL. Complete a separate report for each person who was injured in the accident. A report needs to be completed for all OSHA recordable accidents, property damage in excess of $2000.00 (This amount is for record purposes only. GOV is not required to enter property damage reports into FAIR database if it is less than $10,000.00.), WHE accidents, or near miss/high visibility mishaps. Please type or print legibly. Appropriate items shall be marked with an “X” in box(es), non-applicable sections shall be marked “N/A”. If additional space is needed, provide the information on a separate sheet of paper and attach to the completed form.

Mark the report:
INITIAL – If this form is being used as initial notification of a Fatality or High Visibility Mishap. The initial form is due within 4 hours of a serious accident. A form marked ‘Follow-up’ or ‘Final’ is required within 5 days.
FOLLOW-UP – If you are providing additional information on a report previously submitted.
FINAL – If you are providing a completed report and expect no changes.

SECTION 1 – GENERAL INFORMATION

CONTRACTING ACTIVITY/ROICC OFFICE - Enter the name and address of the Contracting Office administering the contract under which the mishap took place (e.g. ROICC MCBH, ROICC NORFOLK, PWC GUAM, etc.).

ACCIDENT CLASSIFICATION - INJURY/ILLNESS/FATALITY/PROPERTY DAMAGE/-PROCEDURAL ISSUES/-ENVIRONMENTAL/LESSONS LEARNED/OTHER – Mark the appropriate block(s) if the incident resulted in any of these conditions.

INVOLVING - If the mishap involved any of the conditions listed under “Involved” mark the appropriate box(es). Specific questions associated with each of these conditions are available from the Contracting Officer to assist you in your investigation. When these questions are used they shall be attached as part of this report.

SECTION 2 - PERSONAL INFORMATION

NAME - Enter last name, first name, middle initial of person involved.
AGE - Enter age.
SEX - Enter M for Male and F for Female.
JOB TITLE/DESCRIPTION - Enter the job title/description assigned to the injured person (e.g. carpenter, laborer, surveyor, etc.).
EMPLOYED BY - Enter employment company name of the person involved.
SUPERVISOR’S NAME & TITLE - Enter name and title of the immediate supervisor.

WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? - For the purpose of this section “trained” means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

TYPE OF TRAINING - Indicate the specific type of training (classroom or on-the-job) that the injured person received before the accident happened.
DATE OF MOST RECENT FORMAL TRAINING/TOPICS DISCUSSED - Enter the month, day, and year of the last formal training completed that covered the activity/task being performed at the time of the accident. List topics that were discussed at the training identified above.

SECTION 3 - WITNESS INFORMATION

The following applies to Witness #1 and Witness #2:
WITNESS NAME - Enter last name, first name, middle initial of the witness.
JOB DESCRIPTION/TITLE - Enter the job title/description assigned to the witness (e.g. carpenter, laborer, surveyor, etc.).
EMPLOYED BY - Enter the name of the employment company of the witness.
SUPERVISORS NAME - Enter name of immediate supervisor of the witness.
ADDITIONAL WITNESSES - Provide same information, as above, for each witnesses. Use additional pages if necessary.
SECTION 4 - CONTRACTOR INFORMATION

TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

CONTRACT NUMBER/TITLE - Enter complete contract number and tile of prime contract (e.g. N62477-85-C-0100, 184 Pearl City Hsg. Revitalization).

CONSTRUCTION INDUSTRIAL GROUP AND INDUSTRIAL TYPE – This is the type of construction that will be done at this project.

1. First, you must choose the Industrial Group. You have 4 choices to choose from: (NOTE! Review of the Industrial Types below and knowing what the projects scope of work is will assist you in deciding what the Industrial Group should be.)
   a. Buildings
   b. Heavy Industrial
   c. Infrastructure
   d. Light Industrial

2. Once you have chosen the Industrial Group, you now select the Industrial Type. You have multiple choices under each Group, chose the one you feel fits the project most closely because on most projects there won’t be an exact match:
   a. Buildings:
      (1) Communications Ctr.
      (2) Dormitory/Hotel
      (3) High-rise Office
      (4) Hospital
      (5) Housing
      (6) Laboratory
      (7) Low-rise Office
      (8) Maintenance Facility
      (9) Parking Garage
      (10) Physical Fitness Ctr.
      (11) Restaurant/Nightclub
      (12) School
      (13) Warehouse
   b. Heavy Industrial:
      (1) Chemical Mfg.
      (2) Electrical (Generating)
      (3) Environmental
      (4) Metals Refining/Processing
      (5) Mining
      (6) Natural Gas Processing
      (7) Oil Exploration/Production
      (8) Oil Refining
      (9) Pulp and Paper
   c. Infrastructure:
      (1) Airport
      (2) Electrical Distribution
      (3) Flood Control
      (4) Highway
      (5) Marine Facilities
      (6) Navigation
      (7) Rail
      (8) Tunneling
      (9) Water/Wastewater
   d. Light Industrial:
      (1) Automotive Assembly/Mfg.
      (2) Consumer Products Mfg.
      (3) Foods
      (4) Microelectronics Mfg.
      (5) Office Products Mfg.
      (6) Pharmaceuticals Mfg.

CONTRACTOR’S NAME/ADDRESS/PHONE NUMBER
   (1) PRIME - Enter the exact name (title of firm), address, phone and fax numbers of the prime contractor.
   (2) SUBCONTRACTOR - Enter the exact name, address, phone and fax numbers of any subcontractor involved in the accident.

SAFETY MANAGER’S NAME
   (1) PRIME - Enter the name of the prime contractor safety manager.
   (2) SUBCONTRACTOR - Enter the name of the subcontractor’s safety manager.

INSURANCE CARRIER
   (1) PRIME - Enter the exact name/title of the prime’s insurance company. Policy number not required.
   (2) SUBCONTRACTOR - Enter the exact name of the subcontractor’s insurance company. Policy number not required.
SECTION 5 - ACCIDENT DESCRIPTION

DATE OF ACCIDENT - Enter the month, day, and year of accident.
TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 14:30 hrs (not 2:30 p.m.).
EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene (installation/project name, building/room number, street, direction and distance from closest landmark, etc.).
DESCRIBE THE ACCIDENT IN DETAIL. Fully describe the accident in the space provided. If property damage involved, give estimated dollar amount of damage and/or repair costs involved. If additional space is needed continue on a separate sheet and attach to this report. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Ensure questions below regarding direct cause(s), indirect cause(s), and actions taken are answered. NOTE! Review questions in Section 7 below before completing.
DIRECT CAUSE(S) - The direct cause is that single factor which most directly lead to the accident. See examples below.
INDIRECT CAUSE(S) - Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:
1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
   Direct cause: Failure to provide fall protection at elevation
   Indirect causes: Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)
   Direct cause: Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.
   Indirect cause: Failure of employee to pay attention to driving (defensive driving).

ACTION(S) TAKEN TO PREVENT RE-OCCURRENCE OR PROVIDE ON-GOING CORRECTIVE ACTIONS. Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on back or additional sheets of paper if necessary to fully explain and attach to the complete report form.

CORRECTIVE ACTION DATES -
(1) Beginning - Enter the date when the corrective action(s) identified above will begin.
(2) Anticipated Completion - Enter the date when the corrective action(s) identified above will be completed.

PERSONAL PROTECTIVE EQUIPMENT (PPE) - Mark appropriate box(es) and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)

TYPE OF CONTRACTOR EQUIPMENT - Enter the Serial Number, Model Number and specific type of equipment involved in the mishap (e.g. dump truck (off highway), crane (rubber tire), pump truck (concrete), etc.).

WAS HAZARDOUS MATERIAL SPILLED/RELEASED? - Mark appropriate block and list name(s) of any reportable quantities of hazardous materials spilled/released during the mishap.

WHO PROVIDED FIRST AID OR CLEAN-UP OF MISHAP SITE? - List name(s) of individual(s) and employer, if known.

ANY BLOOD-BORNE PATHOGEN EXPOSURE, OTHER THAN EMT? - Mark appropriate block and list name(s) of individual(s) and employer, if known.

LIST OSHA AND/OR EM 385-1-1 STANDARDS THAT WERE VIOLATED. - Self explanatory.

WAS SITE SECURED AND WITNESS STATEMENT TAKEN IMMEDIATELY? - Mark appropriate block and list by whom.

SECTION 6 - INJURY/ILLNESS/FATALITY INFORMATION

SERVERITY OF INJURY/ILLNESS - Mark appropriate box.

ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work. Update when final data is known.

ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized. Update when final data is known.

ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties. Update when final data is known.

BODY PART(S) AFFECTED - Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist; abdomen: single eye; jaw : both elbows: second finger: great toe: collar bone: kidney, etc.).

NATURE OF INJURY/ILLNESS FOR PRIMARY BODY PART - Enter the most appropriate nature of injury/illness (e.g. amputation, back strain, dislocation, laceration, strain, asbestosis, food poisoning, heart conditions, etc.).

TYPE AND SOURCE OF INJURY/ILLNESS - Type and Source Codes are used to describe what caused the incident.

(1) TYPE Code stands for an “Action” (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Type Code: Fell different levels’). Select the most appropriate Type of injury from the list below:

<table>
<thead>
<tr>
<th>TYPE OF INJURY/ILLNESS</th>
<th>CAUGHT ON/IN/BETWEEN</th>
<th>STRUCK BY/AGAINST</th>
</tr>
</thead>
<tbody>
<tr>
<td>FELL, SLIPPED, TRIPPED</td>
<td>EXERTED</td>
<td>CONTACTED</td>
</tr>
<tr>
<td>SAME LEVEL/DIFFERENT LEVEL/NO FALL</td>
<td></td>
<td>WITH (INJURED PERSON MOVING)</td>
</tr>
<tr>
<td></td>
<td>EXHALED/INGESTED/ABSORBED/EXPOSED TO</td>
<td>CONTACTED BY (OBJECT WAS MOVING)</td>
</tr>
<tr>
<td>PUNCTURED, LACERATED</td>
<td>EXPOSED</td>
<td></td>
</tr>
<tr>
<td>PUNCTURED BY/CUT BY/STUNG BY/BITTEN BY</td>
<td></td>
<td>TRAVELING IN</td>
</tr>
</tbody>
</table>

(2) SOURCE Code stands for an “object or substance.” (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Source Code: “Ladder”). Select the most appropriate Source of injury from the list below:
### SOURCE OF INJURY/ILLNESS

<table>
<thead>
<tr>
<th>Building or Working Area</th>
<th>Dust, Vapor, Etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking/Working Area</td>
<td>Dust (Silica, Coat, Etc.)</td>
</tr>
<tr>
<td>Stairs/Steps</td>
<td>Fibers</td>
</tr>
<tr>
<td>Ladder</td>
<td>Asbestos</td>
</tr>
<tr>
<td>Furniture</td>
<td>Gases</td>
</tr>
<tr>
<td>Boiler/Pressure Vessel</td>
<td>Carbon Monoxide</td>
</tr>
<tr>
<td>Equipment Layout</td>
<td>Mist, Steam, Vapor, Fume</td>
</tr>
<tr>
<td>Windows/Doors</td>
<td>Welding Fumes</td>
</tr>
<tr>
<td>Electricity</td>
<td>Particles (Unidentified)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment Condition</th>
<th>Chemical, Plastic, Etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Extreme (Indoor)</td>
<td>Dry Chemical - Corrosive</td>
</tr>
<tr>
<td>Weather (Ice, Rain, Heat, Etc.)</td>
<td>Dry Chemical - Toxic</td>
</tr>
<tr>
<td>Fire, Flame, Smote (Not Tabacco)</td>
<td>Dry Chemical - Explosive</td>
</tr>
<tr>
<td>Noise</td>
<td>Dry Chemical - Flammable</td>
</tr>
<tr>
<td>Radiation</td>
<td>Liquid Chemical - Corrosive</td>
</tr>
<tr>
<td>Light</td>
<td>Liquid Chemical - Toxic</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Liquid Chemical - Explosive</td>
</tr>
<tr>
<td>Tobacco Smoke</td>
<td>Liquid Chemical - Flammable</td>
</tr>
<tr>
<td>Stress (Emotional)</td>
<td>Plastic</td>
</tr>
<tr>
<td>Confined Space</td>
<td>Water</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine or Tool</th>
<th>Inanimate Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Tool (Powered: Saw, Grinder, Etc.)</td>
<td>Box, Barrel, Etc.</td>
</tr>
<tr>
<td>Hand Tool (Non Powered)</td>
<td>Paper</td>
</tr>
<tr>
<td>Mechanical Power Transmission Apparatus</td>
<td>Metal Item, Mineral</td>
</tr>
<tr>
<td>Guard, Shield (Fixed, Moveable, Interlock)</td>
<td>Needle</td>
</tr>
<tr>
<td>Video Display Terminal</td>
<td>Glass</td>
</tr>
<tr>
<td>Pump, Compressor, Air Pressure Tool</td>
<td>Scrap, Trash, Wood</td>
</tr>
<tr>
<td>Heating Equipment</td>
<td>Food</td>
</tr>
<tr>
<td>Welding Equipment</td>
<td>Clothing, Apparel, Shoes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine or Tool</th>
<th>Inanimate Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Tool (Powered: Saw, Grinder, Etc.)</td>
<td>Box, Barrel, Etc.</td>
</tr>
<tr>
<td>Hand Tool (Non Powered)</td>
<td>Paper</td>
</tr>
<tr>
<td>Mechanical Power Transmission Apparatus</td>
<td>Metal Item, Mineral</td>
</tr>
<tr>
<td>Guard, Shield (Fixed, Moveable, Interlock)</td>
<td>Needle</td>
</tr>
<tr>
<td>Video Display Terminal</td>
<td>Glass</td>
</tr>
<tr>
<td>Pump, Compressor, Air Pressure Tool</td>
<td>Scrap, Trash, Wood</td>
</tr>
<tr>
<td>Heating Equipment</td>
<td>Food</td>
</tr>
<tr>
<td>Welding Equipment</td>
<td>Clothing, Apparel, Shoes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Animate Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Driver of Privately Owned, Rental Veh.</td>
<td>Dog</td>
</tr>
<tr>
<td>As Passenger of Privately Owned, Rental Veh.</td>
<td>Other Animal</td>
</tr>
<tr>
<td>Driver of Government Vehicle</td>
<td>Plant</td>
</tr>
<tr>
<td>Passenger of Government Vehicle</td>
<td>Insect</td>
</tr>
<tr>
<td>Common Carrier (Airline, Bus, Etc.)</td>
<td>Human (Violence)</td>
</tr>
<tr>
<td>Aircraft (Not Commercial)</td>
<td>Human (Communicable Disease)</td>
</tr>
<tr>
<td>Boat, Ship, Barge</td>
<td>Bacteria, Virus (Not Human Contact)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Handling Equipment</th>
<th>Personal Protective Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthmover (Tractor, Backhoe, Etc.)</td>
<td>Protective Clothing, Shoes, Glasses, Goggles</td>
</tr>
<tr>
<td>Conveyor (For Material and Equipment)</td>
<td>Respirator, Mask</td>
</tr>
<tr>
<td>Elevator, Escalator, Personnel Hoist</td>
<td>Diving Equipment</td>
</tr>
<tr>
<td>Hoist, Sling Chain, Jack</td>
<td>Safety Belt, Harness</td>
</tr>
<tr>
<td>Crane</td>
<td>Parachute</td>
</tr>
<tr>
<td>Forklift</td>
<td></td>
</tr>
<tr>
<td>Handtruck, Dolly</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 7 - CAUSAL FACTORS

Review thoroughly. Answer each question by marking the appropriate block. NOTE! If any answer is yes, explain in section 5 above.

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc., create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?
(3) PERSONS PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in “good” physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was overexertion a factor?
(4) OPERATION PROCEDURES - Did lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
(5) JOB PRACTICES - Were any of the provision of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?
(6) HUMAN FACTORS - Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person: i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach strengths, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?
(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun temperature changes, wind, tides, floods, currents, terrain; dust, mud, glare, pressure changes, lighting, etc., play a part in the accident?
(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents (either single shift exposure or long-term exposure such as dusts, fibers, (asbestos, etc.), silica, gases (carbon, monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?
(9) OFFICE FACTORS - Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?
(10) SUPPORT FACTORS - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized and adequate to provide proper tools, equipment, personnel, site preparation, etc.
(11) PERSONAL PROTECTIVE EQUIPMENT - Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?
(12) DRUGS/ALCOHOL - Is there any reason to believe the person’s mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced “hangovers”.
(13) JOB/ACTIVITY HAZARD ANALYSIS - Was a written Job/Activity Analysis completed for the task being performed at the time of the accident? If one was made, did it address the hazard adequately or does it need to be updated? If none made, will one be made? These may also need to be addressed in the Corrective Actions Taken section. Mark the appropriate box. If one was made, attach a copy of the analysis to the report.
(14) MANAGEMENT - Did the lack of supervisor or management support play a part in the mishap? Mark the appropriate box.

SECTION - 8 OSHA INFORMATION - Complete this section if applicable

SECTION 9 - REPORT PREPARER

Providing a completed CSIR to the Contracting Officer is the PRIME CONTRACTOR’S RESPONSIBILITY. Enter the name, date of report, title, employer, phone number and signature of person completing the accident report and provide it to the Contracting Officer, or his representative, responsible for oversight of that contractor activity. NOTE! If prepared by other than the Prime Contractor, a person employed by the Prime Contractor must sign that they have reviewed and concur with the report and it’s findings (e.g. company owner, project supervisor/foreman, Safety Officer, etc.).
APPENDIX F

MEDICAL DATA SHEET
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APPENDIX F
MEDICAL DATA SHEET

This Medical Data Sheet is voluntary but recommended to be filled out by on-site personnel and kept in the command post by the SSHO during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required and the injured or affected worker is unable to effectively communicate with emergency medical staff.

Project
Name
Address
Age      Height      Weight
Person to notify in the event of an emergency: Name:         Phone: 
Drug or other Allergies:
Particular Sensitivities:
Do You Wear Contacts?
What medications are you presently using?

Name, Address, and Phone Number of personal physician:

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

HIPAA 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 TTEC to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form will not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that they can accompany an injured party to the hospital.

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

Name (Print clearly) Signature Date
APPENDIX G

HAZARDOUS MATERIALS INVENTORY AND MATERIAL SAFETY DATA SHEETS/SAFETY DATA SHEETS
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APPENDIX G

HAZARDOUS MATERIAL INVENTORY AND
MATERIAL SAFETY DATA SHEETS/SAFETY DATA SHEETS

<table>
<thead>
<tr>
<th>Product or Material Name&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Primary Hazards</th>
<th>Quantity Maintained On Site</th>
<th>Total Quantity Required (estimated)</th>
<th>Operation(s) Material Used For</th>
<th>Container Size and Type</th>
<th>Location Stored&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items will be added during field implementation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TBD</td>
</tr>
</tbody>
</table>

Notes:

<sup>a</sup> SDS will be obtained and added to inventory when the product manufacturer and exact product specifications become known.

<sup>b</sup> Material will only be stored on site during active work tasks. Only the minimum quantity required for immediate use will be stored.

Abbreviations and Acronyms:
SDS – Safety Data Sheet
TBD – to be determined
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ATTACHMENT 1

FINAL

SITE SAFETY AND HEALTH PLAN

December 2016

INSTALLATION RESTORATION PROGRAM SITE 1
FORMER MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA

DCN: UMAC-2006-0011-0012

Prepared by:

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
San Diego, California  92101-8536
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<thead>
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<th>Section</th>
<th>Title</th>
<th>Page</th>
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<td>PURPOSE AND SCOPE ...........................................................................</td>
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<td>APPLICABLE STANDARDS, REGULATIONS AND GUIDANCE DOCUMENTS...............</td>
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<td></td>
<td><strong>3.0</strong> ACTIVITY HAZARD ANALYSIS ...............................................</td>
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<td><strong>4.0</strong> STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES ....</td>
<td>4-1</td>
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<td><strong>5.0</strong> TRAINING ...............................................................................</td>
<td>5-1</td>
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<td><strong>6.0</strong> PERSONAL PROTECTIVE EQUIPMENT ........................................</td>
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<td></td>
<td><strong>7.0</strong> MEDICAL SURVEILLANCE ......................................................</td>
<td>7-1</td>
</tr>
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<td></td>
<td><strong>8.0</strong> EXPOSURE MONITORING/AIR SAMPLING PROGRAM ..........................</td>
<td>8-1</td>
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<tr>
<td></td>
<td><strong>9.0</strong> HEAT AND COLD STRESS ......................................................</td>
<td>9-1</td>
</tr>
<tr>
<td></td>
<td><strong>10.0</strong> STANDARD OPERATING PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES</td>
<td>10-1</td>
</tr>
<tr>
<td>10.1</td>
<td>SITE RULES/PROHIBITIONS ..................................................................</td>
<td>10-1</td>
</tr>
<tr>
<td>10.2</td>
<td>DRUG-FREE WORKPLACE ........................................................................</td>
<td>10-4</td>
</tr>
<tr>
<td>10.3</td>
<td>WORK PERMIT REQUIREMENTS ................................................................</td>
<td>10-5</td>
</tr>
<tr>
<td>10.4</td>
<td>MATERIAL HANDLING PROCEDURES .....................................................</td>
<td>10-5</td>
</tr>
<tr>
<td>10.5</td>
<td>DRUM/CONTAINER/TANK HANDLING PROCEDURES ......................................</td>
<td>10-5</td>
</tr>
<tr>
<td>10.6</td>
<td>COMPREHENSIVE AHA OF TREATMENT TECHNOLOGIES EMPLOYED AT THE SITE</td>
<td>10-5</td>
</tr>
<tr>
<td></td>
<td><strong>11.0</strong> SITE CONTROL MEASURES ....................................................</td>
<td>11-1</td>
</tr>
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<td>AHA</td>
<td>activity hazard analysis</td>
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<td>APP</td>
<td>Accident Prevention Plan</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CP</td>
<td>Competent Person</td>
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<td>CRZ</td>
<td>contamination reduction zone</td>
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<tr>
<td>DFW</td>
<td>definable feature of work</td>
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<tr>
<td>EC</td>
<td>emergency coordinator</td>
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<tr>
<td>EM</td>
<td>Engineer Manual</td>
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<tr>
<td>ESS</td>
<td>Explosives Safety Submission</td>
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<td>EZ</td>
<td>exclusion zone</td>
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<td>HSMP</td>
<td>Heat Stress Monitoring Plan</td>
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<tr>
<td>MDAS</td>
<td>material documented as safe</td>
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<td>MEC</td>
<td>munitions and explosives of concern</td>
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<tr>
<td>NAVFAC SW</td>
<td>Naval Facilities Engineering Command Southwest</td>
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<tr>
<td>PEL</td>
<td>permissible exposure limit</td>
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<tr>
<td>PM</td>
<td>Project Manager</td>
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<tr>
<td>PPE</td>
<td>personal protective equipment</td>
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<tr>
<td>RPM</td>
<td>Remedial Project Manager</td>
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<tr>
<td>SHM</td>
<td>Safety and Health Manager</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<tr>
<td>SSHP</td>
<td>Site Safety and Health Plan</td>
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<td>SUXOS</td>
<td>Site Unexploded Ordnance Supervisor</td>
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<tr>
<td>SSHP</td>
<td>Site Safety and Health Plan</td>
</tr>
<tr>
<td>TtEC</td>
<td>Tetra Tech EC, Inc.</td>
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<tr>
<td>UXOSO</td>
<td>Unexploded Ordnance Site Safety and Health Officer</td>
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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Site Safety and Health Plan (SSHP) contains safety procedures and requirements that will be implemented at Installation Restoration Program Site 1, located at the Former Marine Corps Air Station, El Toro, California.

This SSHP is a companion to the Accident Prevention Plan (APP), which is the primary safety plan document, and applies to all work conducted by Tetra Tech EC, Inc. (TtEC) and its subcontractors. Essentially equivalent or additional health and safety procedures and practices may be approved by TtEC and implemented by its subcontractors where necessary. All subcontractors are required to follow the TtEC health and safety programs and procedures, including the APP and this SSHP. Changes and/or additional subcontractor programs and procedures must be approved by the TtEC Safety and Health Manager (SHM), who is a Certified Industrial Hygienist, and the Contracting Officer. The TtEC SHM will review and provide written approval of the APP, which includes this SSHP as an attachment, and any relevant subcontractor programs and procedures prior to the initiation of fieldwork. The APP/SSHP (including any subsequent changes to the approved plan) will be submitted to the Navy Remedial Project Manager (RPM) and the Naval Facilities Engineering Command Southwest (NAVFAC SW) Safety Officer for acceptance prior to work starting.

Where applicable, this SSHP references the appropriate section of the APP where the required information (and/or supplemental information) can be found, rather than including requirements that are duplicative.

1.2 APPLICABLE STANDARDS, REGULATIONS AND GUIDANCE DOCUMENTS

Adherence to applicable portions of federal, local, national consensus organization, and corporate health and safety standards, regulations, and guidance manuals is required during field activities. These include, but are not necessarily limited to, the following:

- 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health Standards, General Industry
- 29 CFR, Part 1926, Occupational Safety and Health Standards, Construction Industry
- TtEC corporate health and safety procedures and guidelines (available in the Corporate Reference Library)
- TtEC Project Rules Handbook (TtEC 2014)
- American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (most current publication)
2.0 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

Section 2.4 of the APP contains the site description and the site history. Section 9.12.1 of the APP contains information on the contamination at the site, and the potential for exposure to the contaminants to adversely affect the safety and occupational health of workers during the on-site work activities to be performed.
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3.0 ACTIVITY HAZARD ANALYSIS

Section 2.5 of the APP lists the major activities, tasks, and definable features of work (DFW) for each task/operation that will be performed during this project. The activity hazard analysis (AHA) for each DFW, activity, or task accounts for all hazards (classic safety, physical, chemical, biological, environmental, and ionizing radiation [as applicable]) likely to be encountered while performing the work.

Preliminary or “seed” AHAs for these activities (Appendix A in the APP) are submitted with the APP; however, these AHAs are not as activity-specific as they are intended to be, especially if subcontractors have not been identified or specific equipment needs have not yet been fully evaluated. Prior to start of work activities, these preliminary or “seed” AHAs will be further refined by the persons who will perform the work. These revised AHAs will be prepared and internally reviewed and approved by the SHM, then will be submitted to the RPM and NAVFAC SW Safety Officer at preparatory meetings prior to the work being performed.

AHAs will be maintained as ‘live documents’ in the field, and will be modified by field staff as necessary to fit changing work procedures, tasks, equipment, and hazards. Should the AHA risk assessment code be changed to a higher risk than identified in the initial AHA, the AHA will be re-submitted for approval by the SHM, RPM, and the NAVFAC SW Safety Officer. In addition, the Unexploded Ordnance Safety Officer (UXOSO) will consult with the SHM prior to making changes to AHAs if the level of respiratory protection or personal protective equipment (PPE) will be modified, or additional tasks not already addressed in the AHA or APP are identified.

If any unforeseen hazard becomes evident during the performance of work, the UXOSO will bring such hazard information to the attention of the SHM, RPM, and the NAVFAC SW Safety Officer (both verbally and in writing) for resolution as soon as possible, and, in the interim, necessary action will be taken to re-establish and maintain safe working conditions.
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4.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

Section 4.2 of the APP identifies the key contacts and responsibilities for the members of the TtEC organization as they relate to safety on this project, including the SHM, the UXO Operations Manager, the Project Manager (PM), the Senior Unexploded Ordnance Supervisor (SUXOS), and the UXOSO, as well as general site workers, subcontractors, competent persons (CPs), and suppliers/vendors. A project organization chart showing the relationship among the above team members and the client representatives is provided in the APP as Figure 4-1.
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5.0 TRAINING

General and project-specific training requirements for workers on this project are included in Section 6.0 of the APP.
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6.0 PERSONAL PROTECTIVE EQUIPMENT

PPE for site workers is selected and used based on existing and potential hazards, in accordance with 29 CFR Section 1910.120 requirements and the hazard assessment. The following will be provided, used, and maintained in a sanitary and reliable condition: all PPE for eyes, face, head, and extremities; protective clothing; and protective shields and barriers. PPE is required wherever it is necessary based on process or environmental hazards, chemical hazards, or mechanical irritants encountered that can cause injury or impairment to the function of any part of the body through absorption, inhalation, or physical contact. TTEC’s written PPE Program is provided in EHS Procedure 5-01 (Appendix B of the APP).

TTEC is not responsible for providing any PPE, as described herein, to subcontractor employees. Subcontractor employees working on the project must arrive on site with their individually assigned PPE, as required for the project and described in the APP/SSHP and associated AHAs.

The UXOSO is responsible for ensuring that all personnel comply with the PPE requirements identified below. In the event that respiratory protection is required for work activities, based on the results of exposure monitoring or air sampling (described in Section 8.0 below), the PPE ensemble will include the respiratory protection specified in the Respiratory Protection Plan, discussed in Section 9.11 of the APP.

Prior to the work being performed, the SHM will have reviewed the applicable work plans and other available information and will have evaluated each major work activity to determine the appropriate level of PPE needed for the work. This evaluation will include consideration of potential hazards present; work operations to be performed; potential routes of exposure; concentrations of contaminants present or reasonably expected; characteristics, capabilities, and limitations of PPE; and any hazards that the PPE may create or exacerbate (e.g., heat stress). Evaluation findings and recommendations for use of PPE during specific tasks are listed in the AHA matrix.

The initial/basic level of PPE required on the project site (commonly referred to as “Level D”), as identified in 29 CFR 1910.132, includes: 1) a hardhat when overhead hazards are present, such as when working around heavy equipment or if otherwise specified by the client (e.g., facility requirements, 2) safety glasses with side shields (including the appropriate lens tint), 3) safety boots that comply with ASTM International F2413 (workers performing MEC clearance may wear regular work boots while performing the geophysical surveys as steel-toed boots interfere with the instrumentation), 4) leather work gloves (as appropriate per the hazard assessment), 5) standard work clothes (long pants, shirt with ¾-length sleeve, at a minimum), 6) ear plugs when working around power tools and heavy equipment, or other sources of noise, 7) a Class 2 high-visibility vest when working around traffic or heavy equipment, and 8) weather-appropriate clothing.
During soil handling tasks where workers may have hand contact with naphthalene-contaminated soil, workers will wear disposable nitrile gloves under leather work gloves. Workers will wear disposable Kleengard boot covers (or polyvinyl chloride work boots [capable of being decontaminated]) when walking in wet or on contaminated soil. If work activities may result in dust or soil getting onto worker’s clothing, workers will wear Kleengard coveralls.

Reasons to upgrade the level of protection selected for the work activities include:

- Known or suspected presence of dermal hazards
- Occurrence or likely occurrence of gas or vapor emission
- Change in a work task that will increase contact or potential contact with hazardous materials
- A request by the individual performing the task

Reasons to downgrade the level of protection selected for the work activities include:

- New information indicating that the situation is less hazardous than was originally thought
- A change in the site conditions that decreases the hazard
- A change in the work task that reduces contact with hazardous materials

The UXOSO will oversee the implementation of the PPE program on site, will confirm that workers are trained in the use of the specific PPE, and will ensure proper use of the PPE, including proper donning/doffing and disposal of the PPE. Used PPE will be managed based on requirements identified in the project Waste Management Plan, considering the contaminants and concentrations of contaminants that are or may have been in contact with the PPE, and applicable federal and state regulations. Any time PPE is modified from the plan or initial AHA, the SHM must be contacted for additional instruction. Additional tasks not included in the AHA matrix will also be reviewed by the UXOSO and SHM.
7.0 MEDICAL SURVEILLANCE

TtEC requires that site workers involved in certain tasks participate in a medical surveillance program that meets the requirements of 29 CFR Part 1910.120(f) and 29 CFR Part 1926.65(f). The medical surveillance program, managed by the TtEC medical consultant, is certified by the American Board of Preventive Medicine-Occupational Medicine, and will be instituted for the following employees:

- Employees who are, or who may be, exposed to contaminant-related hazards (including hazardous substances or health hazards) at or above the permissible exposure limits (PELs), or, if there is no PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
- Employees who wear a respirator for 30 days or more a year, or as required in 29 CFR Part 1910.134.
- Employees who are injured, become ill, or develop signs or symptoms due to a possible overexposure during an emergency response or hazardous waste operation involving hazardous substances or health hazards.

A certification of employee participation in the medical surveillance program (for both TtEC and subcontractors, as applicable) will be appended to this SSHP prior to beginning work when and as personnel are designated (a placeholder for this certificate is provided in Appendix A). The certification will be maintained up to date by the UXOSO for all personnel required to be under medical surveillance (generally those who will or may be designated to work within the exclusion zone (EZ), as defined in Sections 6.4 and 9.12.1 of the APP, and this certification will be made available to the RPM and NAVFAC SW Safety Officer upon request. The certification will include the employee's name, date of last examination, and the name of the examining physician(s).

Employees who are expected to participate in on-site activities where they are potentially exposed to health or safety hazards will be required to complete a baseline physical examination. Workers who must enter an EZ, and/or who meet the criteria listed above, must provide the UXOSO with a written opinion from a licensed physician attesting to the employee's fitness for duty at a hazardous waste site. A physician's written opinion of the employee's ability to wear a respirator are also required when there is a reasonable possibility that a respirator may be required for site work. The physician's written opinion must be dated within the previous 12-month period, or an alternative time period as determined by the physician, for continued work. The required physician’s written opinion will be made available upon request to the RPM and NAVFAC SW Safety Officer.
TtEC will maintain all medical records in accordance with 29 CFR Part 1910.1020. At no time will the UXOSO maintain the copy of any actual medical records. These records will be maintained by the TtEC medical consultant, WorkCare®, or subcontractor’s equivalent medical consultant.
8.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

The chemical hazards and controls and air monitoring requirements for this project are included in Section 9.12.1 of the APP. Data will be used by the UXOSO, with input by the SHM, to determine if the PPE provide adequate protection and to evaluate worker exposure to site-related contaminants and hazardous substances. The control program is based on a strong dust control procedure and monitoring protocol.

As stated in Section 9.11 of the APP, should unanticipated chemical contamination be discovered during excavation tasks (odor, stained or discolored soil, discovered buried containers, etc.), work will stop and the PM and SHM, as well as the RPM and Adjacent Property Point of Contact (if needed) will be notified as this is a changed condition. In addition, should unanticipated chemical contamination be discovered during excavation tasks, the APP will be updated to include requirements for monitoring, chemical sampling, and any upgrades to PPE and respiratory protection required.
9.0 HEAT AND COLD STRESS

A Heat Stress Monitoring Plan (HSMP) is included in Section 9.19 of the APP. The HSMP complies with Section 06.J of EM 385-1-1. A Cold Stress Monitoring Plan is not applicable to this project.
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10.0 STANDARD OPERATING PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

This section identifies (or provides reference to) the standard operating procedures (SOPs), engineering controls, and work practices that must be followed for this project, as applicable.

The order of precedence regarding the requirements for any project is as follows:

a. All laws and regulations
b. The contract (including EM 385-1-1 and other referenced and contract-required manuals or instructions)
c. The site-specific APP, SSHP, and any referenced SOPs (including those in the Work Plan and the Explosives Safety Submission (ESS))
d. The TtEC Corporate Reference Library documents
e. The Project Orientation, Rules, and Safety Guidelines Handbook© (addressed in abbreviated form in Section 10.1 below)

10.1 SITE RULES/PROHIBITIONS

Where not otherwise addressed specifically in this APP/SSHP and/or referenced SOPs, TtEC employees are directed to follow the applicable requirements identified in the Project Orientation Rules Safety Guidelines Handbook, Volumes I (Project Orientation and Rules) and II (Environmental, Health, and Safety Guidelines) (TtEC 2014). A copy of this handbook can be found in the TtEC Corporate Reference Library under “Manuals,” and/or a copy will be available on site.

In addition to those specified elsewhere, the basic site rules and prohibitions that TtEC expects its employees and subcontractor personnel to follow during this project are specified below.

1. Attend each day's work briefing and other safety training as scheduled.
2. Comply with all work plans and procedures, and inform your supervisor immediately if any changes are made to the work plan.
3. Inform your supervisor if you are taking prescribed medication. The supervisor will review the matter with project safety and management personnel and the safety program medical consultant to determine whether you can safely work on site while taking the medication.
4. Wear the PPE specified in the APP/SSHP and AHAs.
5. If you are required to wear a respirator, remove facial hair (beards, long sideburns, or mustaches) that may interfere with the satisfactory fit of the respirator mask.

6. Become familiar with the on-site hazards, work zones, PPE requirements, and decontamination methods.

7. Immediately report any incident, accident, injury, safety hazard, or symptoms of possible exposure, no matter how minor, to your supervisor or safety representative. If you are unable to obtain resolution at the project level, notify the SHM at the phone number indicated on a project emergency contact list that is found on every project site or call the Compliance Hotline at 1-800-886-2577.

8. Stop work if an imminent danger exists.


10. Enter and exit the EZ and the contamination reduction zone (CRZ) through designated areas.

11. Sign the in/out log and the CRZ/EZ log when used on the project.

12. Do not eat, drink, chew tobacco or gum, smoke, or engage in any other such activity in the EZ or the CRZ that may increase the possibility of personal contamination.

13. Do not use lighters or matches in the EZ and CRZ.

14. Obey all authorized safety signs and demarcations. Do not place or remove these items except as authorized by the project safety lead.

15. Follow lockout/tagout procedures when working on equipment that has moving parts or hazardous energy sources. Install and remove locks and tags only in accordance with procedure and only when authorized.

16. Use the buddy system when performing operations in hazardous areas, when working with hazardous contaminants, when physical capabilities may become stressed (heat stress), or when working in proximity to operating machinery or equipment.

17. Follow the work/rest regimens and other practices required in accordance with the heat stress procedures.

18. Do not operate equipment unless you are properly trained and authorized to do so in a manner consistent with the owner/operator's manual.


20. Use vehicle or equipment seat belts any time the vehicle or equipment is in operation.
21. Use ladders and scaffolds that are solidly constructed and in good working condition and that have been properly secured and inspected by a CP prior to use. Remove defective ladders or scaffolds from service, tag as “Defective—Do Not Use,” and have them repaired or disposed of by CPs.

22. Inspect equipment and hand or portable manual and power tools prior to use. Remove defective tools and equipment from service and either dispose of them or have them properly repaired.

23. Always use ground fault circuit interrupters for cord-and-plug equipment used outdoors or in damp locations. Keep electrical cords out of walkways and out of accumulations of water unless protected and rated for such service. Inspect cords daily. Ground electrical generators while they are in use.

24. Do not improperly use, mishandle, or tamper with health and safety equipment and samples.

25. Do not engage in horseplay of any kind. Do not run or jump from equipment, except as necessary in an emergency.

26. Do not bring, keep, or use alcoholic beverages, controlled substances, or unauthorized weapons on site. The following are prohibited:
   - Illegal drugs (under federal regulations), illegal look-alike drugs, designer drugs, and drug paraphernalia
   - Controlled substances, such as medications, when usage is abused
   - Valid medications, when not kept in marked prescription bottles
   - Alcoholic beverages
   - Unauthorized firearms, weapons, and ammunition
   - Unauthorized explosives
   - Stolen property or contraband
   - Unauthorized cameras or photographic equipment
   - Unauthorized recording devices

27. Do not bring pets on project premises.

28. Become familiar with the Emergency Response Plan or Emergency Action Plan (as applicable) so that you can respond properly in an emergency.

29. Become familiar with the locations and types of emergency equipment, such as fire extinguishers, emergency showers, or air horns.

30. Practice contamination avoidance techniques.
31. Obtain help to lift or move bulky or heavy objects and any object weighing more than 50 pounds.

32. Keep work, storage, and access areas orderly and free of debris.

33. Implement, adhere to, and follow established rules, guidelines, procedures, plans, etc., as specified.

34. Stop work and ask questions of your supervisor when you are uncertain about a procedure or equipment use.

35. Perform all tasks in a safe and approved manner.

36. Participate in the evaluation or investigation of any accident or incident when you are requested to do so.

37. Do not bring visitors or children on project premises without the express written permission of the PM, construction supervisor, or their designee.

All workers have a responsibility to ensure that all project activities proceed efficiently and safely. There will be instances when additional or different health and safety rules or requirements must be followed, or when a situation may arise for which a project rule or requirement may become inappropriate. Should this occur, the project safety lead, after careful evaluation, may authorize a variance to the rule or requirement. Variances will also require the approval of the PM. When a variance is granted, it will be allowed to continue only so long as the conditions for which it was evaluated continues to occur.

10.2 DRUG-FREE WORKPLACE

TtEC has a drug-free workplace program. All TtEC personnel, craft, and subcontractors on this project will be subject to drug and alcohol testing at any time. Supervisors, managers, and the UXOSO are required to determine the fitness of their workers, including assessing whether their workers may be under the influence of any alcohol or drugs, including over-the-counter and prescription medications. During the initial site orientation and training conducted at the beginning of the project, all workers are reminded of the program and policies. The program and policies are also described in the work rules above. Workers are encouraged to confidentially list their medications on a medical information form (see Medical Data Sheet contained in Appendix F of the APP) that is provided to them and retained by the UXOSO. If a worker is injured or involved in an accident, the worker(s) involved may be asked to be tested. If a supervisor observes any worker who appears to be under the influence of drugs or alcohol, he/she may request testing of the worker.
10.3 WORK PERMIT REQUIREMENTS

Work permit requirements (TtEC and client, as appropriate) for specific types of work are addressed within appropriate sections of the APP, as follows:

- Excavation work, including dig permits – Section 9.43 of the APP.
- Hazardous energy control (lockout/tagout) – Section 9.31 of the APP.

10.4 MATERIAL HANDLING PROCEDURES

Procedures for the handling of munitions and explosives of concern (MEC)/material potentially posing an explosive hazard, and material documented as safe (MDAS) are addressed in the Work Plan and ESS (TtEC 2016 a, b).

10.5 DRUM/CONTAINER/TANK HANDLING PROCEDURES

Scrap metal will be stored in roll-off bins and MDAS will be stored in in segregated areas for on-base recycling. Excavated soil will be used as backfill. Used liners and PPE will be stored in roll-off bins for off-site disposal. Additional information regarding waste container management is included in the Waste Management Plan.

10.6 COMPREHENSIVE AHA OF TREATMENT TECHNOLOGIES EMPLOYED AT THE SITE

Procedures for the screening of soil for items that may be MEC are included in the Work Plan and AHA for that task.
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11.0 SITE CONTROL MEASURES

Site control measures (delineation of work zones, including EZs, CRZs, and support zones) are addressed in Section 9.12.2 of the APP. Site control measures will be used during the project in conjunction with engineering controls (Section 9.12 of the APP), and basic or specific decontamination and hygiene procedures (Section 9.12.3 of the APP) to prevent and/or control the potential spread of contaminants by personnel or equipment into previously unaffected areas of the site, break areas, and personal or site vehicles, and to prevent exposures to workers where chemical hazards and other workplace hazards exist.
12.0 PERSONAL HYGIENE AND DECONTAMINATION

Section 9.12.3 of the APP contains personal hygiene and decontamination requirements and equipment decontamination requirements for this project. The Site Supervisor is responsible for ensuring that appropriate equipment and personnel decontamination areas are maintained and ensuring that TtEC employees and subcontractors follow this plan. The UXOSO will assist the SUXOS in ensuring that adequate decontamination procedures are identified for tasks and are followed to prevent contamination of individuals or the environment beyond the EZ. All workers are responsible for following site-specific and task- or area-specific decontamination requirements when leaving the EZ to avoid contamination. Decontamination procedures will involve using engineering controls and prescribed PPE, as specified in the APP/SSHP and AHAs, as well as implementing proper hygiene, such as washing of hands and face, when appropriate, following completion of the decontamination sequence (and prior to eating, smoking, drinking fluids, etc.).
13.0 EMERGENCY EQUIPMENT AND FIRST AID

Information on the emergency equipment required to be present on site for emergencies is addressed in Section 9.2.4 of the APP. A list of emergency equipment and the location of the equipment is contained in Table 9-1 of the APP. Information regarding first aid and cardiopulmonary resuscitation personnel is provided in Section 9.2.8.2 of the APP.
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14.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The following sections describe the emergency response and contingency procedures that will be followed during the project.

14.1 CORRELATION TO THE EMERGENCY PLANS IN THE ACCIDENT PREVENTION PLAN

29 CFR Part 1910.120 defines emergency response or responding to emergencies as a response effort by employees from outside the immediate release area or by other designated responders (mutual aid groups, local fire departments, etc.) to an occurrence that results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel, are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard are not considered to be emergency responses. TtEC Emergency Response Plans, such as those described below, or those that are contained in the APP, constitute an Emergency Action Plan as required by 29 CFR Part 1910.38. Section 9.2 of the APP contains the required Emergency Response Plans for this project, all of which meet the requirements of 29 CFR Part 1910.38 – Emergency Action Plans. These plans include:

- Spill Emergency Plan – Section 9.2.6 of the APP
- Fire Emergency Plan – Section 9.2.7 of the APP
- Medical Emergencies – Section 9.2.8 of the APP, including:
  - Decontamination During Medical Emergencies – Section 9.2.8.1 of the APP
  - First Aid – Section 9.2.8.2 of the APP
  - Medical Data Sheet – Section 9.2.8.3 of the APP
- Inclement Weather – Section 9.2.9 of the APP
- Earthquake – Section 9.2.10 of the APP

14.2 PRE-EMERGENCY PLANNING

The elements of the Emergency Action Plan related to pre-emergency planning are contained in Section 9.2.1 of the APP.

14.3 PERSONNEL AND LINES OF AUTHORITY FOR EMERGENCY SITUATIONS

The elements of the Emergency Action Plan related to personnel and lines of authority for emergency situations are contained in Section 9.2.2 of the APP.
The SUXOS is the primary emergency coordinator (EC) for the project, and the UXOSO is the backup EC. The EC will take charge and determine, direct, and delegate personnel and resources to manage emergencies.

The key responsibilities of the EC are to:

- Initiate evacuation if needed
- Initiate emergency response agency notification
- Evaluate and assess emergency situations to ensure that response activities are commensurate with the level of the emergency, and, as discussed in this plan, are implemented
- Interface and coordinate with outside agencies responding to on-site emergencies

14.4 CRITERIA AND PROCEDURES FOR EMERGENCY RECOGNITION AND SITE EVACUATION

The elements of the Emergency Action Plan related to the criteria and procedures to follow for emergency recognition and site evacuation are included in the APP, as follows:

- Emergency Signal, Assembly, and Evacuation Procedures are contained in Section 9.2.3 of the APP.
- The evacuation areas and routes to evacuation areas are discussed in Section 9.2.3 of the APP and are shown on Figure 9-1 of the APP.

14.5 DECONTAMINATION AND MEDICAL TREATMENT OF INJURED PERSONNEL

The elements of the Emergency Action Plan related to decontamination and medical treatment of injured personnel are contained in Section 9.2.8.1 of the APP.

14.6 ROUTE MAP TO EMERGENCY MEDICAL FACILITIES AND PHONE NUMBERS FOR EMERGENCY RESPONDERS

The elements of the Emergency Action Plan that include the route map to emergency medical facilities and phone numbers for emergency responders are included in the APP, as follows:

- Medical emergencies are addressed in Section 9.2.8 of the APP.
- The route map and directions to the closest emergency medical facility to the project site are shown Figure 9-2 of the APP.
- Phone numbers for emergency responders are included in Table 9-2 in the APP.
14.7 CRITERIA FOR ALERTING LOCAL EMERGENCY RESPONDERS

Section 9.4 of the APP contains the medical support agreement for this project. First aid requirements and capabilities are contained in Section 9.2.8.2 of the APP.
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15.0 REFERENCES


—————. 2016a. Work Plan, Remedial Action/Remedial Design Installation Restoration Program Site 1 and Adjacent Property, Former Marine Corps Air Station El Toro, California

—————. 2016b. Explosives Safety Submission, Remedial Action/Remedial Design Installation Restoration Program Site 1 and Adjacent Property, Former Marine Corps Air Station El Toro, California

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APPENDIX A

CERTIFICATION OF EMPLOYEE PARTICIPATION IN THE MEDICAL SURVEILLANCE PROGRAM
(to be provided during fieldwork)