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FINAL ACCIDENT PREVENTION PLAN FOR TIME CRITICAL REMOVAL ACTION AT SOLID  
WASTE MANAGEMENT UNIT 3 (SWMU 3) PIER 10 SANBLAST YARD JEB LITTLE CREEK

VA  
11/1/2013  
TETRA TECH

**DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC  
REMEDIAL ACTION CONTRACT (RAC)  
CONTRACT NO. N62470-13-D-8007  
CONTRACT TASK ORDER NO. WE01**

**FINAL  
ACCIDENT PREVENTION PLAN**

**TIME CRITICAL REMOVAL ACTION  
AT  
SOLID WASTE MANAGEMENT UNIT 3 – PIER 10 SANDBLAST YARD  
JOINT EXPEDITIONARY BASE LITTLE CREEK, VIRGINIA BEACH, VIRGINIA**

**November 2013**

*Prepared for*



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## ACRONYMS AND ABBREVIATIONS

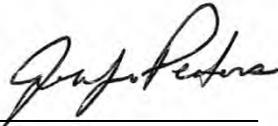
AED	automatic external defibrillator
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
APR	air purifying respirator
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
CIRS	Contractor Incident Reporting System
CPR	cardiopulmonary resuscitation
CSP	Certified Safety Professional
CSIR	Contractor Significant Incident Report
DAN	Diver Alert Network
DCN	Design Change Notice
DOL	Department of Labor
EC	Emergency Coordinator
EHS	Environmental Health and Safety
EM	Engineer Manual
EZ	exclusion zone
°F	degrees Fahrenheit
FCR	Field Change Request
HAZCOM	hazard communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	hazardous, toxic, or radioactive waste
JEB	Joint Expeditionary Base
LEL	lower explosive limit
MSDS	Material Safety Data Sheet
NAVFAC MIDLANT	Mid Atlantic Naval Facilities Engineering Command
Navy	U.S. Navy
NCR	Nonconformance Report
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PM	Project Manager (Tetra Tech)
PPE	personal protective equipment
PQCM	Project Quality Control Manager
QC	quality control
QDC	Quonset Development Corporation
RPM	Remedial Project Manager

RQ	reportable quantity
SHM	Safety and Health Manager
SS	Site Superintendent
SSHO	Site Safety and Health Officer
SWMU	Solid Waste Management Unit
SZ	support zone
Tt	Tetra Tech
TtEC	Tetra Tech EC, Inc.
USACE	U.S. Army Corps of Engineers
VP	Vice President
ZIP	Zero Incident Performance

## 1.0 APPROVALS

By their signatures, the undersigned hereby certify that this Accident Prevention Plan (APP) has been prepared in accordance with the requirements of EM 385 1-1 (current version including revisions) and has been reviewed and approved for use during field operations to perform the Time Critical Removal Action at Solid Waste Management Unit 3, Pier 10 Sandblast Yard, Joint Expeditionary Base Little Creek, Virginia Beach, Virginia.

Prepared by:



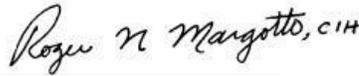
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(215) 702-4099

Concurrence:



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TtEC, Inc. Program Health and Safety Manager  
(619) 471-3503

## **2.0 BACKGROUND INFORMATION**

### **2.1 Contractor**

Contractor: Tetra Tech EC, Inc. (TtEC)

### **2.2 Contract Number**

Contract Number: N62470-13-D-8007, Task Order WE01.

### **2.3 Project Name**

Time Critical Removal Action (TCRA) at Solid Waste Management Unit (SWMU) 3, Pier 10 Sandblast Yard, Joint Expeditionary Base (JEB) Little Creek, Virginia Beach, Virginia.

### **2.4 Description**

JEB Little Creek covers approximately 2,215 acres in the northwest portion of Virginia Beach, Virginia, adjacent to the Chesapeake Bay (Figure 1-1). JEB Little Creek (formerly known as Naval Amphibious Base [NAB] Little Creek) began operations as a permanent base in 1946. Additional site history and project description is included in Section 1 of the Work Plan.

SWMU 3, the Pier 10 Sandblast Yard, is located in a developed area on the west side of Little Creek Harbor. SWMU 3 was used for sandblasting activities between 1962 and 1995. Boats, anchors, and chains were sandblasted on a concrete pad located on the western side of Building 1263 between 1962 and 1995. In 1995, the concrete pad was removed and a new sandblasting area was constructed in the northwestern corner of the site. The use of this new area was discontinued in 1996 when sandblasting activities were moved to an indoor facility. Little Creek Harbor is located east of the SWMU 3 historic sandblasting areas. A marina for base personnel is located south of SWMU 3 and Little Creek Channel, leading to the Chesapeake Bay, is located east of Little Creek Harbor. Little Creek Channel has been regularly dredged since 1928, and in 1995 approximately 2 to 5 feet of sediment were removed from the area around Pier 10. Historical releases at SWMU 3 likely occurred from accumulation of sandblast residue laying directly on the ground surface. Prior to 1993, runoff from sandblasting operations occurred as sheet flow to Little Creek Harbor. In 1993, a catch basin was constructed that transported surface water drainage to a permitted outfall. Soil and sediments are known to be contaminated with lead, copper, nickel, tin, and zinc above the site preliminary remediation goals (PRGs).

The TCRA will be performed in accordance with the Comprehensive Environmental Restoration, Conservation, and Liability Act (CERCLA); Executive Order 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

There are two areas that the TCRA will cover at this location – the Rip-Rap Shoreline Area (upland and shoreline areas) and the Bulkhead Area and Marina Areas (in water areas), which will consist of the following activities:

#### 2.4.1 Rip-Rap Shoreline Area

Although no potentially unacceptable risk from exposure to site soil has been identified, the Navy is proactively addressing areas of elevated lead concentrations (lead at concentrations >400 mg/kg) to further eliminate the potential for any future exposure. Based on soil sample data collected to date, soil lead concentrations (from surface to 12-inches below ground surface (bgs)) range from 43.5 to 3,410 mg/kg with one hot spot that is at 12,000 mg/kg. Soil lead concentrations from 12 to 24-inches bgs range from 49.2 to 3,360 mg/kg. Soil lead concentrations from 24 to 36-inches bgs range from 10.6 to 2,920 mg/kg. Soil lead concentrations from 36 to 48-inches in one location are at 1,180 mg/kg. During the TCRA, localized areas of elevated lead concentrations in soil will be excavated (shallow excavations to an approximate depth of two to no more than four feet) and staged in a material handling area where it will be dewatered, characterized for disposal, and disposed of offsite. Following excavation of soil and confirmation samples (sampling to be performed by others), the removal areas will be backfilled with clean fill and topsoil to match the surrounding grade. A shallow stormwater retention feature will be installed at this time to capture sheet flow from the dry dock maintenance area and the bank will be stabilized with rip-rap.

Sediment in this area will also be excavated from the shore and staged in a material handling area where it will be dewatered, characterized for disposal, and disposed of offsite. Prior to the sediment excavation, the shoreline removal area will be dewatered using a temporary cofferdam system called a PortaDam™. The PortaDam will be utilized to isolate the excavation area from the previously dredged area of the port. After the water between the shoreline and the PortaDam is removed, excavation will be performed from shore using a long-reach excavator. The site will be restored after the removal by placement of clean sand followed by removal of the PortaDam™ structure.

For dewatering, soil and sediments will be placed into lined and bermed dewatering pads (soil and sediment pads will be separate from one another) designed to allow collection of water on one end. Water collected in these berms will be pumped into onsite tanks where the water will then be sampled and characterized for offsite disposal.

#### 2.4.2 Bulkhead Area and Marina Areas

In these areas (in-water areas), a reactive amendment and sequestration agent called AquaBlok® AquaGate+PAC (which consists of activated carbon and clay (bentonite)/aggregate composite particle material) [hereinafter called “agent”] will be placed over the existing sediments in grid areas identified in the Work Plan to address potential ecological risks associated with metal contaminants in the sediment. The agent functions by reducing the bioavailability of the metal contaminants in pore water. The agent will be placed in a layer of sufficient depth from a barge platform using a barge-mounted crane in areas that are accessible to the barge and placed with the support of divers in areas that are not barge accessible (e.g., underneath existing small boats and docks in the marina that cannot be re-located). Following placement of the agent, core sampling will be done to determine that the layer of agent has been distributed in a uniform layer

and is of sufficient thickness. The soft sediments may affect the uniform layer of the agent at the surface.

The elements of this APP comply with the informational requirements of the following regulations and guidance:

- Occupational Safety and Health Administration (OSHA)
  - 29 CFR 1926.65[b][4][ii]
- U.S. Army Corps of Engineers (USACE)
  - USACE Safety and Health Requirements Manual, Engineer Manual (EM) 385-1-1, Section 28B (Sep 2008 consolidated August 2011)

Based on the current scope of work, this project does not currently require implementation of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, including worker training and medical surveillance requirements cited in this standard.

## **2.5 Phases of Work Requiring Activity Hazard Analyses (AHAs)**

The TCRA elements above will consist of the following primary work tasks, each of which is addressed in an Activity Hazard Analysis (AHA) (see Appendix A) of this APP. AHAs will be updated or developed accordingly when a process changes, new information is obtained, or when new tasks will be performed.

- AHA 1. Mobilization and site setup
- AHA 2. Placement and removal of PortaDam® and dewatering, including crane operations and shelter removal
- AHA 3. Excavation
- AHA 4. Removal and processing of shoreline rip-rap
- AHA 5. Dewatering and processing of liquids from soil and sediment at dewatering pad
- AHA 6. Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction
- AHA 7. Boating activities
- AHA 8. Barge placement of Aquablok™ agent and core sampling
- AHA 9. Tank cleaning
- AHA 10. Demobilization and waste disposal
- AHA 11. Hoisting and Rigging
- AHA 12. Diving operations, includes crane support of diving operations (this AHA is included in the Dive Operations Plan which is Attachment 1 of this APP.
- AHA 13. Fence Removal and Installation
- AHA 14. Temporary Service
- AHA 15. Tree Removal
- AHA 16. Pavilion Demolition

These activities present hazards to workers. Mitigations for the hazards associated with the work are presented in this APP. All personnel involved in the tasks listed above are required to review and be familiar with the requirements of the APP and specifically, to review and sign the AHA for the task elements they will be involved with during the fieldwork.

### **3.0 STATEMENT OF SAFETY AND HEALTH POLICY**

TtEC is committed to providing our employees with 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® (ZIP) 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 Site Superintendent (SS) 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, 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 presents safety statistics for TtEC for the last 3 calendar years, as compared to the national averages for our industry. This comparison uses data collected by the U.S. Department of Labor, Bureau of Labor Statistics (BLS) for different types of employers, segregated by North American Industry Classification System (NAICS) codes.

This data comparison illustrates that TtEC's performance is very good and that our rates are significantly lower than the most recent national averages for heavy construction other than highway industry.

TtEC's Experience Modification Rates are as follows:

(Policy Year October 1–September 30):

2010–2011:0.76

2011–2012:0.78

2012-2013: 0.76

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

### **4.1 Statement of Responsibility**

TtEC is ultimately responsible for the implementation of its Environmental Health and Safety (EHS) program. 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 personnel and subcontractors, who are conducting field activities during the TCRA at SWMU 3- Pier 10 Sandblast Yard.

#### **4.2.1 Project Management**

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

- 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 environmental, safety, and health laws and regulations, as well as 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 that 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.
- 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 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 – Stavros Patselas

With respect to the EHS program, it is the responsibility of the PM to:

- Ensure implementation of this APP through coordination with the SS and SHM
- Conduct quarterly inspections (when required) jointly with the SHM
- Participate in the incident investigations
- Ensure the APP has the required approvals before any site work is conducted
- Ensure the SHM and SS are informed of project scope changes that require modifications of 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)

#### 4.2.3 Corporate SHM – Roger Margotto, CIH, CSP

The SHM 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. The SHM will advise the SSO and SS 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 SHMs responsibility to:

- Provide for the development and approval of the APP
- 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 SSHO responsibilities
- Approve the SSHO to fulfill other project roles
- Approve any revisions of this APP
- Approve upgrading or downgrading of PPE
- Assist in the investigation of incidents

#### 4.2.4 Diving Safety Manager – Stephen Neill

The Diving Safety Manager is responsible for overseeing diving- related and boating related safety and health programs and approving of the Dive Plan that is included as Attachment 1 to this APP. In addition, the Diving Safety Manager will:

- Verify diver and boater training, certification and experience, medical surveillance, and other requirements.
- Advise the SHM and PM regarding any concerns and other safety related issues, as needed.
- Review subcontractor health and safety plans and submittals related to diving safety.
- Have discretionary authority to shut down diver or boating related field operations.
- Projects may not start until the SHM, Diving Safety Supervisor and the U.S. Navy (Navy) Contracting Officer or other designated personnel have approved the project plans.

#### 4.2.5 Site Superintendent – Jon Cary

It is the SS responsibility to:

- Ensure site personnel comply with the APP
- Coordinate with the SSHO 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 team member's performance, including 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 personal protective equipment (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 SSHO.
- 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 environmental, health, and safety requirements, including corporate policies, programs, and procedures; OSHA construction management requirements; EM 385-1-1 requirements; and any client-specific requirements included in this plan.
- Ensure that adequate site security, appropriate for the activities being performed, is maintained.
- Implement material control requirements in accordance with Government Property Control Procedures.
- 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 Navy Technical Representative (NTR) and PM.

#### 4.2.6 Site Safety and Health Officer – Louie McTall

The SSHO will fulfill the duties and responsibilities as defined in corporate procedures. The SSHO will have completed the 30-hour OSHA construction safety class or equivalent. The SSHO has 5 years of construction experience and has had 24 hours of formal health and safety training in the last 4 years. The SSHO reports to the SHM and assists with the on-site implementation of TtEC Environmental Health and Safety (EHS) programs and procedures (presented in Appendix C). The SSHO helps to ensure that operations are performed in compliance with applicable client- and site-specific requirements and government regulations. The SSHO will be responsible for the following:

- Ensure that TtEC employees and subcontractors understand the requirements of the TtEC EHS program and procedures through training and communications.
- Assist the SS 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.
- 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 SS 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 Tt site personnel have received required EHS regulatory and program training, in accordance with corporate procedure training.
- Support the PM and SS 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 monitoring to determine appropriate levels and use of personal protective equipment (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 SS is not immediately available.
- 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 (TtEC, craft, and subcontractors)

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. It is the responsibility of field crew personnel to:

- Report any unsafe or potentially hazardous conditions to the SS
- 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 Report 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 SS, who will notify the NTR for guidance.)
- Perform daily inspections of tools and equipment, including PPE, prior to use
- Conduct daily operations check of electronic equipment and annotate in the team's logbook
- Assist the SS with implementation and compliance with the APP

#### 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

Competent person(s) for anticipated health and safety-related issues that may arise on the project will be designated by the PM or SS and stated by name in the AHA or section of this APP where a competent person is specifically required by task. If the name of the competent person is not known after the APP and AHAs are finalized, the name of the competent person will be added to the plan by FCR when the person is designated. Subcontractor personnel will provide competent persons when these tasks require them (e.g., crane operation and related hoisting and rigging, barge and boating operations, and diver related functions). The subcontractor competent persons must also be designated by name.

#### 4.2.10 Pretask Safety and Health Analysis

This plan requires the preparation of an AHA for each task. This plan also requires that these task analyses are reviewed with all workers and that workers acknowledge their review of safety and health requirements for each task. Where subcontractors are used to perform certain work activities, the SS will ask the subcontractor to provide an AHA for review or the SSSH will work with the subcontractor in the preparation of the AHA. The AHA must be reviewed by the Contracting Officer and the SHM. The Diving Safety Manager, Stephen Neill will also review and approve of the diving related AHAs with review of the Dive Operations Plan. As new activities are identified or the work environment of the task changes, new or revised AHAs are prepared by TtEC. These revisions or new AHAs will be submitted to the SHM, Diving Safety Manager (as appropriate) and the Contracting Officer.

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.

### **4.3 Lines of Authority**

An organizational 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 2009), 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 SSHO will immediately report to the PM and SHM, and Diving Safety Officer (as required), 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.”

## **5.0 SUBCONTRACTORS AND SUPPLIERS/VENDORS**

### **5.1 Identification of Subcontractors and Suppliers/Vendors**

Subcontractors working on this project include:

- Mobile crane subcontractor for PortaDam® placement - TBD
- Commercial diving subcontractor – Precon Marine, Inc.
- Barge and barge crane subcontractor for material placement (may be same as diving subcontractor) – Precon Marine, Inc.
- Transportation and disposal subcontractor(s) - TBD

### **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. Subcontractors are responsible for assigning specific tasks to their employees; ensuring that their employees are properly trained and are in compliance with applicable regulations; and allocating sufficient time, materials, PPE, and equipment to safely complete activities in accordance with this APP, and their individual EHS plans. Subcontractors’ EHS plans are reviewed by the SSHO or the SHM and as required, the Diving Safety Manager.

### **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 subcontractors will be under the direct supervision of the SS.

Subcontractors are responsible for complying with this APP and other applicable regulations. Subcontractor personnel must receive a briefing from the SSHO prior to accessing the project work site. They must fulfill the requirements established by 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 by the plan, however it is the ultimate responsibility of the SS to ensure the Safety Plan 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 SS. 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 SSHO of these hazards and assist in the development and/or revision of AHAs.

## **6.0 TRAINING**

The following training is required on all projects under this contract.

### **6.1 New Hire Training**

No new hires are anticipated for this project. All employees will be briefed on the APP requirements and specific work tasks they will be performing and supervised with on the job training.

### **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 remain current with respect to 30-hour Construction Safety training, the SSHO will receive 24 hours of formal health and safety training every 4 years. As mentioned, 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.

### **6.4 Hazard Communication Training**

In accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200 and 29 CFR 1926.59), copies of material safety data sheets (MSDS) for hazardous chemical materials that are used during site operations or that may be present on site will be available from the on-site SSHO. The SSHO will conduct hazard communication (HAZCOM) training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59, Engineer Manual (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.

### **6.5 Site-Specific Training**

Prior to commencement of field activities, the SSHO 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 (see Section 6.3); 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 SSHO 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: 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.

In addition, workers who enter or attend to workers who enter any structure or opening that meets the requirements of a confined space (e.g., tanks, rolloffs or waste disposal bins) will have received confined space training to fulfill their assigned duties.

### **6.6 First Aid and Cardiopulmonary Resuscitation**

The SSHO will identify those individuals who have current first aid, automatic external defibrillator (AED), and cardiopulmonary resuscitation (CPR) training. At a minimum, two people (including the SSHO) will have current CPR/first aid certification. In addition, all divers

are required to be CPR and first aid trained as well as additional training. 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.

A first-aid kit meeting the requirements of OSHA and EM 385-1-1, Section 03.B.01, will be readily available at each work site by having the kit visible and ready for use. The location of each first-aid kit will be clearly marked, and kits will be protected from the weather and maintained clean. The kit must contain all the items listed in Table 3-1 of the EM 385-1-1 manual and include one pocket mouthpiece or CPR barrier and latex gloves. The kit will be inspected weekly, and items will be replaced as they are used.

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

### **6.8 Diver Training and Qualification**

All divers who perform diving operations to place or verify placement of the AquaBlok® agent will be qualified commercial divers who have received their training from a commercial diving school, military school, federal school, an Association of Commercial Diving Educators (ACDE) accredited school, or an in-house training program that meets the requirements contained in ANSI/ACDE-01, or in the Association of Diving Contractors International Consensus Standards.

In addition to the certification or qualification documentation, each dive team member shall have training and experience consistent with the performance requirements of this scope of work and shall have at least one year of commercial experience and have at least four working dives with similar decompression techniques using the particular diving techniques and equipment to be used on this project. At least one of the four qualification dives must be within the last six months prior to contract award date.

In addition, all divers have current First aid/CPR training and the use of emergency oxygen systems, and if provided at the dive site, AED training.

### **6.9 Vessel Operation Training and Qualification**

All boat operators, at a minimum, will have completed a boating safety course meeting the criteria of the U.S. Coast Guard (USCG) Auxiliary, National Association of Safe Boating Law Administrators or equivalent, and motorboat handling training, based on the type of boats they will operate. Some boats, including tugboats will require additional USCG licensing. Subcontractors operating these vessels will have appropriate USCG licensing for the vessels they operate and the barges they tow.

All boat occupants will have completed a safety briefing on boat operations and boat safety and emergency equipment, man overboard and abandon ship procedures as well as training in the tasks they will perform onboard.

#### **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 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 is given during site orientation.

#### **6.12 On-Site Health and Safety Briefings**

Project personnel and visitors will participate in daily on-site health and safety briefings conducted by the SS, SSHO, or designee to assist site personnel in safely conducting their work activities. Health and safety briefings will be conducted at the start of new work activities using AHAs, which are provided in Appendix A of this APP. The briefings will include information on new operations, changes in work practices, or changes in the site's environmental conditions. 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 release, 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.

#### **6.13 Training Certificates**

Copies of the required training certificates and licenses (as applicable) will be maintained on site and will be made available for government inspection upon request. Subcontractors will provide TtEC with copies upon request.

#### **6.14 APP Acceptance Form**

The form below is the APP Acceptance Form to be signed by all workers entering the project site to document site specific training. Each AHA has a signature page as well.



inspected using the Boater Inspection Checklist or equivalent. Weekly site inspections will be completed by the SSHO and/or SS. Subcontractor personnel may be asked to participate in inspections. Daily inspections on the day(s) of scheduled field activities will be performed by the SS and SSHO and will be noted in the site activity logbook and TtEC Field Inspection Forms referenced above are included as Appendix D of this APP. If any deficiencies are identified during the inspections, they will be noted on a deficiencies log as required by EM 385-1-1, Section 01.A.12d and corrected. Deficiencies to safety devices or equipment will be corrected before use or 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 are reviewed and action items are followed-up. The SHM, or his or her designee (e.g., the Diving Safety Manager), may conduct an unannounced inspection of the project.

### **7.1 Specific Assignment of Responsibility for a Minimum Daily Job Site Safety and Health Inspection During Periods of Work Activity**

Daily site safety inspections will be conducted by the SSHO during this field effort to ensure safe work areas and compliance with the APP, OSHA regulations, and EM 385-1-1 requirements.

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

The SS and the SSHO meet the training and experience criteria listed in Section 4.2.9 and serves as the competent person unless otherwise specifically designated otherwise in this APP and AHAs. The SSHO has also completed the 30-hour OSHA Construction Safety Training and meets the requirements of EM 385 1-1 Section 01.A.17 in the role of Site Safety and Health Officer and has 5 years of experience. Other inspectors such as boat operators and the Dive Supervisor are competent in performing inspections required for their tasks and the SSHO will verify that these are being performed and documented as required.

#### **7.2.1 Documentation Procedures**

The SSHO will record any deficiencies in the on-site field logbook.

#### **7.2.2 Deficiency Tracking System**

Deficiencies will be logged as required by EM 385-1-1, Section 01.A.12d. The items noted during field audits will be communicated to the TtEC EHS managers who maintain 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.

## **8.0 ACCIDENT REPORTING**

When an incident occurs, the SS will orally notify the PM, NTR, and the SSHO immediately. The PM will notify the RPM. The SSHO will notify the SHM and Diving Safety Manager (where required). If the incident is an injury requiring more than first aid or government property damages exceeding \$2,000, the PM will immediately notify the COR.

### **8.1 Exposure Data**

The SSHO calculates exposure data on a weekly basis. Labor-hours worked are obtained from hours charged to a project for payroll purposes. The SSHO also collects the number of subcontractor labor-hours worked by reviewing daily project production reports and recording the hours on those reports. The SSHO will forward the labor-hours along with the Weekly Safety Report to the SHM, who will compile the monthly total and report that to the Contracting Officer.

### **8.2 Accident Investigations, Reports, and Logs**

After the oral report, the SS or SSHO must complete a written-event report form within 24 hours. This form can be either prepared manually using the form found in the corporate procedure 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 SSHO. All reports will be reviewed by the PM and the SHM and/or Diving Safety Manager 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. In addition, the PM or the SSHO will complete, within 48 hours, a Contractor Significant Incident Report (CSIR), as required for any injury beyond first aid or for any government property damages \$2,000 or greater. The SS or the SSHO will ensure that a report is prepared and the forms are completed as requested by the NTR and RPM and/or the PM and SHM or Diving Safety Manager. In addition, all recordable injuries, near-miss incidents, high loss potential incidents, property damage incidents costing more than \$500, first aid cases, and environmental spills (greater than reportable quantity) will be entered on the Tetra Tech program incident safety database (Total). This database summarizes the accident/incident history of the program from the start of the contract and on a year-to-date basis.

### **8.3 Immediate Notification of Major Accidents**

Immediate reporting of incidents is required within TtEC. In addition, the Contracting Officer will be immediately notified by the PM (or a designee) of an accident (see list below) that is required to be reported by EM 385-1-1. An accident that must be reported immediately to Mid Atlantic Naval Facilities Engineering Command (NAVFAC MIDLANT) is any injury requiring more than first aid or any government property damage in excess of \$2,000. For each reportable mishap described above, a verbal report will be made to the NTR or RPM as soon as possible,

followed by submission of a NAVFAC MIDLANT Mishap Heads-Up Initial Notification form (see Appendix E) to the NTR within 48 hours. The form will contain as much information as is currently available and the name and e-mail address of the PM. For diver related accidents, the NAVFAC MIDLANT Designated Dive Coordinator (see Dive Operations Plan) will also be notified.

The NTR will enter the information provided in the Mishap Heads-Up Initial Notification form into the Contractor Incident Reporting System (CIRS). The CIRS will send a link and a password to the PM via e-mail. The PM will be required to access the CIRS and complete the report with all available information and resubmit the updated report online to NAVFAC MIDLANT within 24 hours of receiving the link.

List of accidents or events to be immediately reported:

- a. Fatal injury/illness
- b. Permanent totally disabling injury/illness
- c. Permanent partial disabling injury/illness
- d. Three or more persons hospitalized as inpatients as a result of a single occurrence; Note: it is TtEC practice to inform our clients of any accident requiring hospitalization of our employees or subcontractors
- e. \$200,000 or greater accidental property damage or damage in an amount specified by USACE in current accident reporting regulations (currently we report government property damage \$2,000 or greater)
- f. Arc Flash Incident/Accident
- g. Three or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site.

## **9.0 PLANS (PROGRAMS, PROCEDURES) REQUIRED BY 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. Additional information for diver related emergencies is included in the Dive Operations Plan in Attachment A.

### **9.1 Layout Plans**

Approval to stage materials and equipment and set up work areas and access to these areas, including but not limited to employee and contractor vehicle parking, office space and laydown areas, will be through the NTR and coordinated with the JEB Little Creek Port Operations and Little Creek Harbor Operations. Erosion controls and dust control measures will be established in construction areas as necessary and maintained throughout the project as required to minimize erosion and runoff.

The adjacent parking lots (exact location to be determined) will be used for the laydown areas, including temporary stockpiles and material dewatering pads and for placement of the construction trailer and portable toilet facilities.

Utilities for the site trailer will be obtained and permitted (as required) by the local public utilities district. All hookups will be by a qualified and licensed electrician. TtEC will install any required temporary facilities such as telephone and internet service and will have accessible and regularly serviced portable toilet and hand washing stations set up for the project.

Security of the facility is provided by the base and access onto base property where the work will be performed requires a RapidGATE pass. The work sites, equipment, and field office will be secured appropriately to minimize potential unauthorized access and tampering or theft. An Access and Haul Road Plan (Section 9.5) will be put into place to control the site during working hours and to comply with base security requirements and facility operation plans. TtEC personnel and any subcontractors will become familiar with and obey base, port and marina requirements including safety, fire, traffic, and security procedures. TtEC and subcontractor personnel will keep within the limits of the established work area and avenues of ingress and egress and will not enter any restricted areas (if any) unless required to do so and unless cleared for such entry. TtEC will conspicuously mark any equipment and materials in possession for identification.

## **9.2 Emergency Response Plans**

Emergency situations that may be encountered during site activities will normally be recognized by visual observation. Emergencies involving physical hazards, including fires and explosions are generally readily apparent visually. Injuries and medical emergencies, including exposure to hazardous materials may not always be so 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. The SS and/or the SSHO will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Survey findings are documented by the SS and/or the SSHO in the site health and safety logbook. Site personnel are responsible for reporting situations they perceive as hazardous.

The above actions will provide early recognition for potential emergency situations, and allow TtEC to instigate necessary control measures. However, if the SS and the SSHO 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.

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 and notify the SS and SSHO and render the appropriate level of response and support as is included in these plans.

Local city or county emergency services are capable of providing the most effective response to site emergencies in the event of a fire or explosion, injury or medical emergency occurs. The PM, SHM (or Diving Safety Manager (as appropriate) as well as the RPM and Contracting Officer or Contracting Officer's Representative (COR) will be notified if these response agencies are contacted.

TtEC personnel will provide insipient emergency prevention activities such as:

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

### 9.2.1 Procedures and Tests

#### 9.2.1.1 *Pre Emergency Planning*

Based on the nature of the planned activities, emergencies resulting from physical or chemical hazards, diving or boating-related emergencies, fires, or explosions could result. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following (which are the responsibility of the SS and/or SSHO with participation by subcontractor personnel):

- Coordinating with the local emergency response personnel and local hospitals prior to the commencement of work to ensure that TtEC emergency action activities are compatible with existing emergency response procedures
- Establishing and maintaining information at the project staging areas (support zone [SZ]) for easy access in the event of an emergency
- Creating and maintaining documents on site that can be important in the event of an emergency situation, including:
  - A chemical inventory of hazardous chemicals on site
  - Corresponding MSDS
  - Completed medical data sheets (Appendix F) for on-site personnel
  - A entry/exit log identifying personnel on site each day
  - Hospital route maps with directions (Figure 9-2)
  - Emergency notification - phone numbers (Table 9-2)

At the beginning of the field work, the Emergency Coordinator (EC) will hold an emergency evacuation drill. More than one drill is required for this project due to the differing nature of land-based vs. water-based operations being performed. It will be prudent to test the effectiveness of a response for both types of operations.

The drill requires evacuations of the site to the assembly area and to the evacuation area. At the evacuation area, the SSHO will brief the crew on the routes to reach the hospital. The SSHO and

SS will, after the drill, conduct a written debrief meeting with all participants. The SSHO will prepare a short report with recommendations for improvement of the evacuation plan.

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

The SS will serve as the EC until emergency response personnel arrive on site and take command. If the SS is not present or is involved in the incident, the SSHO is the alternate EC. If neither the SS nor SSHO are immediately present, the area or task supervisor (e.g., Dive Supervisor) is the immediate EC and will take all necessary precautions and measures to initiate the emergency response, including notification of emergency personnel and the SS and SSHO. In the event of an emergency, personnel will evacuate and the EC will be in charge until emergency responders arrive and take command. TtEC will not provide emergency response support beyond their on-site capabilities and their training.

#### *9.2.1.3 Emergency Signal, Assembly and Evacuation Procedures*

In the event of an emergency situation such as fire or explosion, the SSHO (or a supervisor) will activate an air horn (or boat horn, vehicle horn if available) 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 weather conditions, fire or explosion, abandon ship situation, evidence of acute personnel overexposure to a chemical, discovery of unanticipated waste materials that are unknown, and could also occur due to activities of other contractors 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 support zone (SZ), or other safe area as identified by the SS or SSHO (or immediate supervisor of that operation) where accountability of personnel will be performed. Personnel will then proceed to the designated evacuation area. The TtEC field office has been designated as the primary evacuation area for land-based work activities, however if the field office is not considered to be safe, an alternate evacuation area and route may be required. For on or in-water work activities, the support boat will be the assembly area, where, if safe to do so, workers will dock after assembly and proceed to the office trailer.

The location of assembly and evacuation areas will be upwind of the site as determined by the wind direction whenever possible. Prior to the start of site activities, and as required thereafter, the SSHO will establish and verify safe egress routes from the site to the assembly and designated evacuation areas and will coordinate this procedure with the subcontractor personnel as required. The SSHO will prepare a drawing or a map that diagrams these safe egress routes and location of assembly areas to keep this plan current. All site personnel will be briefed of the assembly and evacuation locations and routes (including alternate locations for each work location and will be updated whenever these change.

Figure 9-1 has been included to show the site layout and location of primary evacuation area (field office). The SSHO will use this same map to diagram egress routes from work areas to the evacuation area and to the facility exit. From this point, the map showing the route to the nearest emergency hospital (Figure 9-2), Sentara Leigh Hospital, in Norfolk, Virginia will be used if emergency medical services are required (See Section 9.2.6 below).

For efficient and safe site evacuation and assessment of the emergency situation, the SS is the designated EC and will have the authority to initiate proper action if outside services are required. If the SS is not immediately available or is involved in the emergency, the SSHO is designated as the EC. If neither SS nor SSHO are immediately available, the subcontractor supervisor in charge will be the EC and initiate proper emergency response. Under no circumstances will incoming personnel or visitors be allowed to proceed into the 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 the 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 SS or SSHO 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 (emergency dive signals and other procedures for dive activities and emergencies are included in the Dive Plan):

- Declare the evacuation via radio communications, cellular telephones, hand signals, voice commands, line of site communication, or vehicle horns.
- The following signals shall be used when communication via vehicle horn, boat horn, or air horn is necessary:
  - **Steady long beeps will be used to indicate emergency situations**
- Report to the designated refuge point.
- Once nonessential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe incident precipitating the evacuation to the SS with pertinent incident details.

#### *9.2.1.4 Emergency Equipment*

The following emergency equipment listed in Table 9-1 will be strategically placed and maintained on site in accessible locations where active work is taking place:

- Fire extinguishers will be maintained on site and shall be immediately available for use in the event of an emergency.
- If fuel will be transferred from portable fuel cans, they will be UL approved safety cans properly labeled. If greater than 25 gallons is stored on site, a 5A:60BC fire extinguisher will be mounted within 50 feet of the fueling location.

Fire extinguishers will be inspected monthly to ensure:

- Sufficient charge
- No physical damage
- Tamper indicators are in place
- Up-to-date inspection tag

Site personnel will be trained in the use of the fire extinguisher as part of site-specific training.

### 9.2.2 Spill Plans

In addition to training, the following procedures are required to prevent and minimize releases of hazardous (or potentially hazardous) materials:

- All containers 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 get the immediate task performed.
- Material Safety Data Sheets (MSDSs) for hazardous materials used on-site will be kept in a binder at the field office.
- All containers will be constructed with closeable lids, which will be kept closed except when in direct use.
- Fuel containers will be metal, UL-listed, OSHA-approved, and in good condition.
- Preventative maintenance will be performed on construction equipment and vehicles minimize chances for hose and other equipment failure.
- 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 operations 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.
- Prelaunch checks will be performed before boats are launched and include checking the engine oil and/or fuel mixtures in the tanks.
- Refueling of equipment will be done by the operator who is in constant supervision of that task. Overfill prevention during refueling will be verified visually by the operator.
- Refueling of support boats with inboard engines will be accomplished off-site at a marina with marine fueling capability (e.g., local marina). Overfill prevention during refueling will be verified visually by the boat captain or operator.
- Tanks will be filled only to their listed capacity (not overfilled) to allow for expansion.
- Project wastes will be kept in designated areas in closed containers, separated as required based on compatibility and managed in accordance with the Waste Management Plan.
- Personnel handling waste and hazardous materials, including selection of proper

packaging, will be properly trained as required in the Waste Management Plan.

- Hazardous materials operations will not be conducted when the weather could cause significant risk to surrounding area if a spill should occur.
- Perform the transfer of any hazardous materials in a well-ventilated area.

In the event of a spill:

- The SS or SSHO will notify the PM and NTR.
- The PM will notify the RPM and Contracting Officer
- The SSHO will notify the SHM.
- Any spill quantity is reportable the NTR, RPM as well as to the PM and SHM.
- TtEC will assist the RPM with any required notification to regulatory agencies if the spill is reportable.
- In no case will TtEC report a spill to a regulatory agency without the RPM and/or Contracting Officer concurrence.
- An investigation and incident report will be prepared and corrective actions identified.

The following information addresses both Federal - National Responses Center (NRC) spill reporting requirements. In Virginia, the federal rules are followed regarding reporting of oil spills unless the spill originates from an above-ground storage tank or an underground storage tank. For this project, anticipated spills will not originate from either above-ground or underground storage tanks, therefore, the following federal rules will be observed for reporting oil and hazardous substance spills should they occur during the TCRA.

Spills that will be reported to the NRC include:

- Oil spills that reach surface water (including any sheen, discoloration, or film or emulsion on or under the surface of the water)
- Spills of hazardous substances if spill is a reportable quantity

The 24 hour NRC number is **1-800-424-8802**.

### 9.2.3 Firefighting Plan

Workers will not fight any fires other than 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 located on boats and in each piece of mobile construction equipment and in the crew pickup trucks. The fire extinguishers are intended to fight only small fires that have recently occurred and can be reasonably extinguished immediately (incipient stage fires). In no case will workers attempt to fight any fire that cannot be reasonably extinguished within 30 seconds to 1 minute.

If a fire breaks out onsite, 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 the fire cannot be extinguished.

In case of a fire on board a boat, the operator or designee will, if safe to do so (safe means of egress, incipient stage fire), attempt to put the fire out using the onboard fire extinguisher system. Concurrently, the crew will assemble in a location away from the fire and prepare to assist for emergency evacuation off the boat and will assist in calling 911 and/or USCG and notification of the EC (follow the abandon ship procedures in Section 9.2.5 if warranted).

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 SSHO initially 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. If fire extinguishers and other hazardous materials will be sent by a carrier, TtEC will ensure that the proper hazardous material declarations are prepared by a qualified individual for ground shipment only.

#### 9.2.4 Posting of Emergency Telephone Numbers

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

#### 9.2.5 Man Overboard/Abandon Ship

Prior to the start of field activities, the boat operator will give a detailed health and safety briefing on the location and use of all vessel safety equipment and the procedures for addressing on-board emergencies (i.e., fire or explosion onboard, mechanical failure, man overboard situation, abandon ship, etc.) and a man overboard/abandon ship drill will be rehearsed. The buddy system is to be used onboard boats so that man overboard retrieval can be performed expediently in the event a person goes into the water.

General boating requirements and boater safety are discussed in Section 9.35.9.

In the event that a man overboard or an abandon ship order is given, the situation will be treated as an emergency. In the event of a man overboard, the following will occur:

- The person who observes the man overboard will shout out “man overboard” and what side of the boat (port [left] or starboard [right]).
- The person who goes overboard should shout out to those on the boat if it is not noticed that they are in the water or use the whistle on the PFD.
- At no time shall a person enter the water to rescue another person. Throw a life ring over

the side as near as possible to the person in the water.

- Notify the boat operator as quickly as possible and make sure to keep track of the person in the water so they are not lost from sight.
- Direct the boat operator to the direction of the person so that recovery can be made. If the vessel (including barge) is not able to be maneuvered to retrieve the person, the support vessel will be contacted to retrieve the person.
- A portable or fixed ladder will be available on boats that are not readily accessible from the water, to ease re-entry back onto the boat.
- Once the person is retrieved, the person will be brought onto the vessel cabin (or back to the dock and site office if boat does not have a cabin) where they will don dry clothing and blankets and be assessed for potential hypothermia due to cold water immersion.
- Notify the SS, SSHO, PM, SHM and Diving Safety Manager about the event. The PM will notify the Navy. An incident investigation and report will follow.
- In the event the need arises to abandon ship, the following will occur:
- Follow the direction of the boat operator; who will direct personnel to the appropriate station onboard the vessel.
- Ensure PFD is securely fastened.
- Note the location of and distance to the nearest land and stay with your group until instructed to abandon ship.
- Deploy rescue raft (if equipped) on windward side of the boat and await orders to board.
- Boat operator or designated person will activate the ships emergency communication devices (marine distress call via radio, air horn, etc.) as capable based on the nature of the emergency and will grab survival kit as applicable.
- Enter the water by the safest means. If ladder is present, use ladder to get into the water before jumping overboard.
- If the boat is on fire or there is risk of explosion, stay at least 200 yards from the boat.
- If raft is equipped, stay in raft and try to flag down a rescue boat and paddle toward shore. If the current tries to take you away from shore, try to paddle perpendicular to the current, toward areas where more land is visible or more boaters may be present.
- As a group, or if personnel are separated and in the water, remain calm. To conserve energy and reduce risk of hypothermia, float on your back with your knees bent toward your chest. If together as a group, huddle together until retrieved.
- Notify the SS, SSHO, PM, SHM and Diving Safety Manager about the event. The PM will notify the Navy. An incident investigation and report will follow.

## 9.2.6 Medical Support

### 9.2.6.1 *First Aid*

TtEC will ensure that a minimum of two people have current certifications in CPR, AED, first aid, and bloodborne pathogens. In addition, all divers have current CPR and first aid training, including emergency oxygen administration during diving emergencies training. 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 may include stabilization and transport (e.g., in TtEC site vehicle) to an urgent care or occupational medicine clinic. The SSHO will evaluate the location of the nearest occupational medicine provider by contacting WorkCare® during mobilization for these non-emergency injuries or illnesses. 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.

#### *9.2.6.2 Medical Emergency*

In the event of a medical emergency, first aid and CPR assistance will be provided by CPR, first aid, and, if an AED is onsite, AED trained individuals. Oxygen may also be administered by qualified divers in the event of a diver related emergency. 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 may become compromised, the person will be moved to the nearest 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.

Medical emergencies, should they occur on the project site, will typically rely on emergency responders (e.g., ambulance service) for patient stabilization and transport to the hospital. For diver related emergencies, transport to a hyperbaric chamber may be required depending upon the nature of the emergency. In the event of a medical emergency in which actual or suspected serious injury occurs, the following procedures will be implemented:

- Survey the scene and evaluate whether the area is safe for entry.
- Render first aid, CPR, and AED (if available) as necessary. If it is a diver related emergency, administer oxygen as per training guidelines.
- 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 location by address (or nearest cross-street intersection), request medical assistance, and provide a name and telephone number.
- If it is a diver related emergency, let the emergency personnel know so that the injured party can be transported to appropriate care facility.
- 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 until the hazard control issues are resolved.
- Notify the PM and SHM and Diving Safety Manager. The PM and SHM will notify the RPM and COR.

The nearest emergency hospital to SWMU 3 is the Sentara Leigh Hospital, located at 830 Kempsville Road, Norfolk, Virginia.

The location of and directions to this hospital are included in Figure 9-2, and contact numbers for both the hospitals and ambulance services, occupational medicine clinic, and WorkCare® are provided in Table 9-1 above. The SSHO is instructed to drive by the emergency hospital to ensure that it is accessible and available and that the most efficient routes (primary and alternate) are identified during mobilization.

The Dive Plan also includes information and location of the nearest hyperbaric chamber and additional emergency requirements for diver related emergencies.

#### *9.2.6.3 Fatal Injury*

If a fatal injury occurs, the following additional steps will be followed:

- Notify the SSHO immediately.
- Notify the SHM, who will initiate contact with OSHA and other appropriate agencies.
- The work activities on the project must be stopped for 24 hours.
- Assist the SHM and OSHA, as directed.

#### *9.2.6.4 Medical Data Sheet*

Each field team member, including visitors and subcontractors, will be asked to complete and submit a copy of the Medical Data Sheet (see Appendix F). This sheet will be provided to the SSHO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention. Any pertinent information regarding allergies to medications or other special conditions should be documented. This data sheet will be maintained confidential by the SSHO and information shared only to the extent necessary to support medical care of the individual.

#### *9.2.6.5 Medical Surveillance*

Employees with the potential for exposure to inorganic lead who will be working within the exclusion zone at this site during soil handling activities will undergo inorganic blood lead level and zinc protoporphyrin testing prior to project start as a baseline. Following completion of the work, employees will be re-tested for blood lead level. The testing will be performed at a clinic and reviewed by TtECs WorkCare® medical provider physician.

### **9.3 Plan for Prevention of Alcohol and Drug Abuse**

TtEC has a Drug-Free Workplace Program. All contractors and subcontractors on this project are subject to drug and alcohol testing at any time. Supervisors, managers, and the SSHO are 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. Workers are encouraged to confidentially list their medications on a medical information form that is provided to them and retained by the SSHO. 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.

#### **9.4 Site Sanitation Plan**

TtEC will provide portable toilet and hand washing facilities at the project worksite. These facilities will be serviced on and as needed, but not to exceed a weekly basis, maintained in good condition, and located in an accessible location to work activities.

If boats are equipped with onboard washrooms and toilets, they will be a USCG-certified marine sanitation device, preferably a Type III holding tank, which are maintained in clean working order and discharged only to an authorized marine pump-out facility.

Workers will discard all food debris and other detritus in a designated refuse container. Project wastes generated from the field activities will be packaged and disposed of as specified in the Waste Management Plan following applicable federal, state, and local laws and regulations and Navy instruction after characterization.

Potable water will be provided for washing hands and face, for showers for divers, and for any drinking water provided to employees. Sanitation for divers is addressed further in the Dive Plan.

#### **9.5 Access and Haul Road Plan**

Not Applicable. No access or haul roads will be built during this project.

#### **9.6 Respiratory Protection Plan and PPE**

This section outlines the respiratory protection and PPE to be used on this project as well as reasons for downgrade or upgrade.

##### **9.6.1 Respiratory Protection Plan**

The need for respiratory protection for this project is possible. The potential exists for workers to be exposed to lead by inhalation and/or ingestion should dusts (which can contain lead) be generated during soil handling operations. Lead levels in soil are present at levels above 120 mg/kg up to 12,000 mg/kg (see Section 9.7.1 for more information on lead hazards and controls) making it extremely important to focus on good dust control as the primary engineering control during all soil handling activities. Occupational exposure to site contaminants, namely lead,

through inhalation or ingestion or dermal contact are not anticipated to exceed the OSHA PEL as long as engineering controls (such as effective dust control that results in no visible dusts being generated), good decontamination practices, and good hygiene practices (such as hand washing) are properly implemented and the required PPE is used as specified in this plan.

Should visible dusts be generated during soil excavation, soil loading, or other soil handling activities, this situation presents a potential exposure issue for workers and the SSHO will have workers who could be exposed to dusts wear full face air purifying respirators (APR) with P-100 cartridges.

The SSHO, with input from the SHM, will implement TtECs Corporate Respiratory Protection Procedure, EHS 5-2 and this Respiratory Protection Plan. This plan will be updated as necessary by the SSHO or SHM. All personnel who wear a respirator will work within the requirements of this Respiratory Protection Plan, under the direct supervision of the SSHO.

All employees who wear a respirator will be trained and be fit tested. 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 SSHO 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; and
- The general requirements of the OSHA respirator standard at 29 CFR 1910.134.

Employees assigned to use PPE, including 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 on the 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 (if APR is used) schedule will be developed in consultation with the SHM based on duration of exposures, relevant safety factors applied, and manufacturer guidelines. The SSHO will maintain the change-out schedule for workers. Workers will be informed to notify the SSHO should any signs of breakthrough be encountered.

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 SSHO 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 onsite by the SSHO and made available upon request.

### 9.6.2 Personal Protective Equipment

The SHM has reviewed the applicable work plans and other available information and has evaluated each major work activity to determine the appropriate level of PPE needed for the work. This evaluation included a 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 are listed in the AHA matrix and include the date the evaluation was conducted, the activity evaluated, PPE recommendations, and the name of the person(s) performing the assessment.

The initial and basic level of PPE selection, as required by 29 CFR 1910.132, on the project site includes a hardhat when overhead hazards are present, safety glasses, safety boots that comply with ASTM F2412 and ASTM F2413 (except during geophysical mapping operations), leather work gloves, work clothes, ear plugs when around power tools and heavy equipment, and weather-appropriate clothing.

Reasons to upgrade level of protection:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas or vapor emission.
- Change in work task that will increase contact or potential contact with hazardous materials.
- Request of the individual performing the task.
- Reasons to downgrade level of protection
- New information indicating that the situation is less hazardous than was originally thought.
- Change in site condition that decreases the hazard.
- Change in work task that will reduce contact with hazardous materials.

When working with potentially contaminated soils or sediments where workers could come into contact with the soil or sediments, additional levels of PPE are required (as specified in the AHAs) to keep dermal contact exposures to a minimum and may include:

- Nitrile gloves will be worn under leather work gloves when there is a potential for hands to contact contaminated media (soil, sediment, water), tools, or equipment.
- Disposable boot covers (or PVC work boots [able to be decontaminated]) will be worn when walking in or on soil or sediments;
- Durafab, Kleenguard, or Tyvek coveralls will be worn when potential for contact with workers clothing exists.

When handling liquids during activities where the liquids could splash the worker (e.g., pumping liquids or cleaning tanks):

- Workers will wear splash goggles and a face shield.

Personnel working from boats, barges, or skiffs, on structures or equipment extending over or next to the water (except where guard rails or personal fall protection systems are provided), or whenever there is a drowning hazard, will wear an inherently buoyant Type II personal flotation device (PFD) or higher (capable of turning its wearer in a vertical or slightly backward position in the water) unless the SHM approves Type III PFD based on conditions.

PPE for diving operations is discussed in the Dive Plan.

The SSHO will oversee the implementation of the PPE program onsite and will observe workers to ensure proper implementation, including proper donning/doffing and disposal. Used PPE will be managed in accordance with the Waste Management Plan. Any time PPE is modified from the plan the SHM must be contacted. Additional tasks not included in the AHA matrix will be reviewed by the SSHO and SHM. Any additional PPE requirements will be incorporated into the APP by completing a field change request (FCR) form. The FCR forms and PPE selection will require approval by the SHM.

## **9.7 Health Hazard Control Program**

The primary health hazards associated with this project are physical hazards associated with heavy equipment, including excavator and crane use, fall hazards (along shoreline), and handling of debris and materials, as well as chemical hazards associated with lead contaminated soil and sediments. Hazards associated with boating present situations that include potential for falls overboard, being struck by other boats, drowning, and cold stress. Diving poses numerous potential hazards for the divers, including potential for drowning, entanglement in debris, hypothermia, and dive-related medical emergencies such as decompression sickness (the bends or arterial gas embolism). Biological hazards may be present onsite as well and include bloodborne pathogens (e.g., if first aid or CPR are required) and the potential for contact with poisonous plants and snakes and bites or stings by insects. Hazards to divers are discussed in more detail in the Diving Operations Plan.

TtEC will create systems and procedures to prevent and control physical, chemical, biological, and environmental hazards identified through the risk analysis. The hierarchy of controls is

engineering, administrative, work practice, and PPE. Whenever feasible, engineering, administrative, or work practice controls will be instituted even if they do not eliminate the hazard or reduce exposure. Use of such controls in conjunction with PPE will help reduce the hazard or exposure to the lowest practical level. Where no standard exists, creative problem-solving will be used to create effective controls. The basic formula for controlling workplace hazards, in order of preference, includes:

- 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 it, but they know how to use it correctly

Section 9.35 of this APP identifies and describes physical hazards and mitigation measures to reduce those hazards where otherwise not already included.

Section 9.7.1 addresses chemical hazards and mitigation measures to reduce those hazards.

Section 9.7.2 addresses biological hazards (e.g., animals, poisonous plants, insects, snakes).

#### 9.7.1 Chemical Hazards

The TCRA will be performed to remove, characterize, and dispose of contaminated soil and sediments and restore the rip-rap in the shoreline areas of the site and place a reactive amendment over existing sediments within the bulkhead and marina areas. Site contaminants in sediments include heavy metals such as lead, copper, nickel, tin, and zinc at various levels above the PRGs. The levels of these contaminants in site sediments also present an ecological risk to site receptors. Lead in soil presents a hazard to workers during the TCRA. Based on soil sample data collected to date, soil lead concentrations (from surface to 12-inches below ground surface (bgs)) range from 43.5 to 3,410 mg/kg with one hot spot that is at 12,000 mg/kg. Soil lead concentrations from 12 to 24-inches bgs range from 49.2 to 3,360 mg/kg. Soil lead concentrations from 24 to 36-inches bgs range from 10.6 to 2,920 mg/kg. Soil lead concentrations from 36 to 48-inches in one location are at 1,180 mg/kg.

The potential exists for workers to be exposed to lead by inhalation and/or ingestion should dusts (which can contain lead) be generated during soil handling operations, including excavation and loading/unloading of soil, cleaning and other tasks where dusts could be generated. On this project it is extremely important to focus on good dust control as the primary engineering control during all soil handling activities. Occupational exposure to site contaminants, namely lead, through inhalation or ingestion or dermal contact are not anticipated to exceed the OSHA PEL for any particular contaminant as long as engineering controls (such as effective dust control that results in no visible dusts being generated during soil handling tasks), good decontamination

practices, and good hygiene practices (such as hand washing) and are properly implemented and the required PPE is worn as specified in this plan.

A variety of engineering controls will be implemented during the work tasks to maintain effective dust control and to minimize the potential for the spread of contaminants to adjacent areas as follows:

- During soil and sediment handling activities, including excavation, loading, transport, or dumping activities, site dust control measures will be implemented to the extent required to prevent visible dust generation. Soil will be sprayed/misted with water prior to and during these tasks (as required), especially on dry days or when soil is dry.
- If dust controls cannot be effectively maintained (e.g., on windy dry days) and fugitive dusts are being generated migrate out of the immediate work area (area of contaminated soil work), the SS and SSHO will consider the need to shut down work operations until effective dust control can be maintained.
- Whenever possible, workers will position and stage upwind of excavation and soil or sediment handling operations.
- Tarps or other covers will be placed on soil or sediment pads as necessary to control dusts that could be generated and migrate off site on windy days.
- All soil and sediment loads will be covered for transportation offsite.
- Excavator or loader buckets placing soil in piles or trucks will lower the bucket as close as possible to the receiving surface so as to minimize potential dispersion of dusts.
- Contaminated soil and sediment loading or movement activities will be performed in a manner that prohibits spillage of the material onto uncontaminated areas. Means and methods will be under the supervision of the SS. Spills of soil or sediment material, should they occur, will be cleaned up promptly.
- Workers will have access to and will be informed of the requirement to use hand washing stations to wash hands before taking breaks, eating, drinking, or smoking (and will do so in designated areas).
- Workers will doff and stow any soiled PPE in a designated location under direction of the SSHO and will not wear or bring or wear any contaminated clothing or work boots beyond the contamination reduction zone unless properly decontaminated and in no instance will they bring such items into break areas, office areas, or into the cab of site vehicles. A reusable PPE station will be established as required.
- Appropriate level of decontamination (see below) of equipment and personnel will be performed when leaving contaminated areas as specified by the SSHO for these work tasks to ensure contaminants are not tracked out of controlled work areas.

Unanticipated wastes may be unearthed during excavation tasks which are not anticipated on this project. The following situations will warrant stopping work in the excavation and notification of the NTR and RPM as well as the PM and SHM:

- Suspected munitions – though not anticipated to be present on this project, the site is a former military installation and discovery of munitions or munitions related items is

possible.

- Buried containers or compressed gas cylinders – compressed gas cylinders and buried containers present additional hazards to workers that are not currently addressed in this APP and require special precautions for handling, transport, and disposal.
- Any waste that exhibits unusual behavior such as release of fumes or other signs of potential chemical reactivity.

Site control measures are discussed in Section 9.7.2 and personal hygiene and decontamination procedures are included in Section 9.7.3 below.

### 9.7.2 Site Control Measures

This section outlines the means by which TtEC will delineate work zones and use these work zones in conjunction with basic decontamination procedures (Section 9.7.3) and other engineering controls (Section 9.7.1 above) to prevent the potential spread of contaminants into previously unaffected areas of the site and help minimize the potential for exposures. A three-zone approach will be used during work at this site when there is a potential for coming into contact with or spreading of site contaminants (all soil and sediment handling operations, soil pad operations, and tank-related operations). This approach will be comprised of an exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone (SZ). The degree of control and the requirements for establishment and management of these zones will be at direction of the SSHO based on site conditions and activities being performed.

Where there is no potential for contact with contaminants, the three zone approach is not required and rather, work areas will be established around hazardous work activities (including excavations, heavy equipment operations, crane operations, etc. to protect workers from physical hazards and maintain safe distances.

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, project personnel will:

- Schedule operations that use minimum numbers of personnel.
- Establish and mark site work zones around each worksite location as appropriate.
- Control who enters any exclusion zone and ensure they are trained.
- Implement appropriate decontamination procedures and other engineering controls as appropriate when workers leave the exclusion zone.
- Keep the client and other affected contractors informed of changing work zones and requirements.

#### 9.7.2.1 *Exclusion Zone*

EZs will be formed around active excavation work sites, soil and/or sediment loading and unloading operations, in around soil and sediment dewatering pads, and around tank cleaning or contaminated water processing activities. Barricades or cones, along with caution tape, will

delineate the EZ. Workers in this zone will be responsible for implementing proper engineering controls for the work being performed as well as wearing the prescribed PPE. Workers will place contaminated tools and equipment on plastic sheeting in the EZ to prevent contamination of the surrounding area and berms as required until the tools are appropriately decontaminated and removed from use.

#### *9.7.2.2 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 workers will decontaminate the equipment and themselves (e.g., boot wash, doffing or contaminated PPE, etc.) in this area before moving to the next work area. The appropriate level of decontamination will depend upon the work task and whether the tools and/or personnel were in contact with the contaminated soil and whether any soil adheres to the worker's PPE or tools.

#### *9.7.2.3 Support Zone*

The SZ will be arranged considering accessibility, utility availability, wind direction, and line-of-sight to work. Typically, the SZ is located in an upwind direction from the work areas. This is where equipment such as a fire extinguisher, first aid kit, spill kit, hand washing facility and any other appropriate support is located.

### 9.7.3 Personal Hygiene and Decontamination

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

#### *9.7.3.1 Responsibilities*

The SSHO is responsible for establishing and maintaining appropriate equipment and personnel decontamination areas. The SSHO also ensures that adequate decontamination procedures are identified and followed to prevent contamination of individuals or the environment beyond the EZ.

#### *9.7.3.2 Contamination Avoidance*

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

- Know the limitations of the protective equipment being used.
- Set up the soil and sediment handling areas prior to placement of soils and sediments to help limit the need for workers to make contact with contaminants when possible, including having designated paths and staging areas.
- 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.

#### *9.7.3.3 Decontamination*

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

#### *9.7.3.4 Personnel Decontamination*

It is anticipated that in most instances, PPE will not be contaminated and can be doffed and stowed for reuse without wet decontamination. However there may be a need to use a boot wash or other minor wet decontamination if workers walk in contaminated soils or sediments and have mud adhering to PPE, boots, or coveralls. Personnel decontamination, if wet methods are used will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, raingear, etc.) if they become contaminated with soil or mud and will be reused rather than discarded. This determination for level of decontamination required will be made by the SSHO. This function will take place in an area adjacent to the site activities that is established as the CRZ within a secondary containment where water, if generated, can be collected and containerized for proper disposal in accordance with the Waste Management Plan.

A receptacle for used disposable PPE will be provided in the CRZ for workers to dispose of the PPE after doffing. A location will likewise be established for workers to stow re-usable PPE after decontamination for further reuse. The location will not be in any office or break room where food and/or drink are consumed.

A hand washing station will be available in or near to the SZ 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.

In general, personnel decontamination will consist of:

- Removing residual materials regardless of their source before taking breaks or engaging in hand-to-mouth activities.
- Proper physical decontamination methods will be followed when leaving an EZ.
- Employing soap and water wash and rinse for hands and face. Hygiene wipes may also be used but are not a substitute to hand washing with soap and water.
- Keeping break areas clean. No potentially contaminated PPE or equipment will be permitted in these locations, offices, or site or personal vehicles.

### 9.7.3.5 *Equipment Decontamination*

It is anticipated that heavy equipment, such as excavator 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.

Wet decontamination methods are not anticipated to be required for equipment at this time; however, at SSHO or SS discretion, should gross decontamination methods leave visible contamination on the surface, buckets and other equipment, including tracks or tires (if they become contaminated by contact) will be decontaminated over secondary containment using a mild soap solution and wiping down by rags and/or brushes until visible soil/mud is gone. Excavator tracks and truck tires are not anticipated to come into contact with contaminated soil. Tracked vehicles will not be operated onto roadways.

The SS 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. Equipment will only be authorized access or exit with this authorization. Evaluation will consist of a visual inspection to ensure that visible contamination has been effectively removed.

### 9.7.4 Biological Hazards

Biological hazards may be encountered on site. Workers should anticipate the likelihood of encountering these hazards, especially in undeveloped outdoor areas. 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 SSHO will identify personnel with a known reaction to bites and stings at the pre-job safety orientation meeting.

Personnel will not attempt to capture or feed any wild or semi-wild animals such as cats, rats, or ground squirrels due to the possibility of a bite or parasitic infestation. 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.

#### 9.7.4.1 *Insects*

Insects, including bees, wasps, hornets, spiders, ticks, may be present at this site making the chance of a bite or sting possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition; any individuals who have been bitten or stung by an insect will notify the SSHO. Field personnel who may have insect allergies will provide this information to the SSHO prior to commencing work, and will have allergy medication on site. The following is a list of preventive measures:

- Apply insect repellent prior to fieldwork and as often as needed throughout the work shift. Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips), and apply the permethrin repellent spray to field clothing. Note: Allow the permethrin to dry before using the treated clothing.
- Wear proper protective clothing (work boots, socks and pants).
- When walking in vegetated areas, avoid contact with bushes, tall grass, or brush as much as possible.

Mild insect stings or bites should be treated by applying a baking soda paste or ice wrapped in a wet cloth. Bee stingers should be gently scraped off the skin, working from the side of the stinger. The suction device in commercially available snake bite kits can also be used to remove the stinger. If insect bites become red or inflamed or symptoms such as nausea, dizziness, shortness of breath, etc., appear, medical care will be sought immediately. Immediate medical care is essential for persons who are allergic to insect bites/stings. If an allergic person receives 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; however, there are no dangerous spiders of particular concern in the area.

#### *9.7.4.2 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 by 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. Humans and horses are known as dead end hosts, because once a human or horse is infected, the virus is no longer transmitted.

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, although neurological effects may be permanent.

Control measures to prevent contacting WNV include:

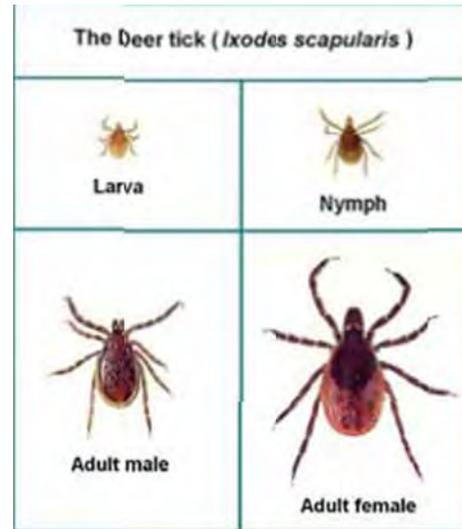
- Mosquitoes are most active at dawn and dusk. Limit outdoor activities at those times, when possible.

- Wear long-sleeved shirts and long pants.
- Spray DEET on your skin and permethrin on clothing and work boots.

### 9.7.4.3 Lyme Disease

Lyme disease is caused by an infection from the bite of a deer tick, which is about the size of the head of a pin. During the painless tick bite and following the blood meal, a microorganism (spirochete) may be transmitted into the bloodstream that may lead to Lyme disease. A 24- to 48-hour period is necessary for the tick to feed and become engorged. During this time period, it is unlikely that the tick has regurgitated its stomach contents into the host and therefore, infection is unlikely.

Lyme disease may cause a variety of medical conditions including arthritis, which can be treated successfully if the symptoms are recognized early and medical attention is received. Treatment with antibiotics has been successful in preventing more serious symptoms from developing. The effects of the disease vary from person to person, which often makes it difficult to diagnose. Typically, the incubation period ranges from two days to two weeks. Early signs may include a flu-like illness, an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as a disabling type of arthritis.



Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue and joint pain. This flu-like illness is out of season, commonly happening between May and October, when ticks are most active. A large expanding skin rash usually develops around the area of the bite. More than one rash may occur. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. It's easy to miss the rash and the connection between the rash and a tick bite. The rash develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash. Joint or muscle pain may be an early sign of Lyme disease. These aches and pains may be easy to confuse with the pain that comes with other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

Lyme disease can affect the nervous system. Symptoms include stiff neck, severe headache, and fatigue usually linked to meningitis. Symptoms may also include pain and drooping of the muscles on the face, called Bell's palsy. Lyme disease may also mimic symptoms of multiple sclerosis or other types of paralysis. Lyme disease can also cause serious but reversible heart problems, such as irregular heartbeat. Finally, Lyme disease can result in a disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Often, the effects of Lyme disease may be confused with other medical problems.

Control measures to prevent contracting Lyme disease include:

- Avoid dense or high brush, when possible.
- Wear light colored clothing.
- Spray DEET on your skin and permethrin on clothing and work boots.
- Tuck pant legs into socks and shirts into gloves, if possible.
- Self/buddy check neck, hairline, groin, and body after working in areas that may contain deer ticks. Shower immediately after returning home from the job site.

If a tick is found biting an individual, the SSHO will be contacted immediately. The tick can be removed by grasping the tick with tweezers as close to the skin as possible, and pulling gently or using a tick removal system (e.g., Pro-Tick, [www.scs-mall.com/store/](http://www.scs-mall.com/store/)). The affected area should then be disinfected with alcohol or similar antiseptic. If personnel feel sick or have signs similar to those above, they will notify the SSHO immediately. Additionally, employees finding engorged ticks on their body will be given a medical examination. The removed tick should be saved in small bottle and labeled with the date and location of origin. The tick can then be tested for Lyme pathogens.

#### *9.7.4.4 Poisonous Plants*

Poison ivy, oak, or sumac may present in Virginia, though is not known to be present or widespread and is not as likely in developed or maintained areas of the site. The potential for contact with poisonous plants (i.e., poison ivy, poison oak, and poison sumac) exists when performing fieldwork in undeveloped and vegetated areas. 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 red or yellow foliage in the fall of the year. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety “down.” Poison sumac has white, hairy berry clusters.

Contact with poison ivy 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 Zanafel, taking care not to touch face or other body parts.

Avoidance of plant/sap contact is the only effective means of preventing the poisoning. A person experiencing symptoms of poisoning should remove contaminated clothing; wash the exposed areas thoroughly with Dawn soap and cool water, taking care not to touch face or other body parts. Apply Technu or Zanafel, calamine or other poison ivy lotion 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 and Technu can be used to decontaminate skin and reusable clothing to prevent exposure to poison ivy. Gloves should be worn when removing and decontaminating clothing potentially exposed to poison ivy.

#### 9.7.4.5 Snakes

Several species of snakes in Virginia, including the Virginia Beach area are known to be venomous. These snakes include the Eastern cottonmouth, Northern copperhead, and the Timber rattlesnake. Numerous 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 SSOH 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.

If the snake is determined not to be venomous, apply first aid to avoid infections and contact WorkCare® for medical follow up and recommendation to prevent infection.

## 9.8 Hazard Communication Program

Specific hazardous materials or chemicals that will be brought onto the project site are anticipated to be minimal (e.g., fuel, oil, lubricants necessary to perform routine maintenance of or operation of equipment and boats). However, larger quantities of AquaBlok™ agent will be on-hand which will be placed by barge or divers over the sediments in the marina area. This material may also present some hazard to workers handling it and the MSDS will be reviewed with all affected personnel. When any material or chemical is brought onto the site, a Material Safety Data Sheet (MSDS) must be provided to the SSOH. This includes all hazardous materials brought onsite by the subcontractors for their operations.

The SSHO will file the MSDSs in a notebook that will be available in the field office. The SSHO will review the MSDSs 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 SSHO when any new material is brought onto the site.

All containers will be labeled specifying the content and hazards of the material in the container. An inventory will be maintained citing the location and quantities held.

### **9.9 Process Safety Management Plan**

Not applicable.

### **9.10 Lead Abatement Plan**

Not applicable.

### **9.11 Asbestos Abatement Plan**

Not applicable.

### **9.12 Radiation Safety Program**

Not applicable.

### **9.13 Abrasive Blasting**

Not applicable.

### **9.14 Heat/Cold Stress Monitoring Plan**

There is a potential for heat stress and cold stress or related injuries during the performance of the planned activities at SWMU 3 from exposure to ambient temperatures and season in which the work is conducted, effects of wind chill, level of work activity, and level of PPE worn during work tasks and other factors, which can add significant heat stress to otherwise routine tasks. TtEC Procedure EHS 4-6 – Temperature Extremes will be followed during work activities.

Heat stress-related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke.

- 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.
- Monitor temperature with a wet bulb globe thermometer (WBGT).
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day, if possible, or at night if adequate lighting can be provided.
- Perform physiological monitoring.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- 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 liters) of water must be ingested for approximately every 8 ounces (0.23 kilograms [kg]) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat.
- 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 degrees Fahrenheit (°F) (10°-16.6 degrees Celsius [°C]).
- Provide small disposable cups that hold about 4 ounces (0.1 liter).
- Have workers drink 16 ounces (0.5 liters) 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.
- Cooling vests when impermeable clothing is worn.

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. Daily fluids intake must approximately equal the amount of water lost in sweat, e.g., 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kilograms) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat.

Cold weather in Virginia could present the potential for cold stress during spring, fall, and especially winter months and temperatures may drop below freezing. In addition, working on and in the water presents an increased exposure hazard to cold temperatures, especially to divers working in the water, as immersion. As a result of the potential for freezing rain, snow, sleet and wet weather, with the added potential for wind chill, cold stress will be discussed as follows:

- Exposure to low temperatures presents a risk to employee safety and health through the direct effect of the low temperature on the body and collateral effects such as slipping on ice, decreased dexterity, and reduced dependability of equipment.
- Work conducted in the winter months can become a hazard for field personnel due to cold exposure. The personnel must exercise increased care when working in cold environments to prevent accidents that may result from the cold. The effects of cold exposure include frostbite and hypothermia. Wind increases the impact of cold on a person's body. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illnesses will be discussed during the health and safety briefing conducted prior to the onset of site activities.

- Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing particularly when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F. As hypothermia progresses, depression of the central nervous system becomes increasingly more severe (Table 9-2). This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness.

Frostbite is both the general and medical term given to areas of cold injury. Unlike hypothermia, frostbite rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F. Frostbite could be a concern in Virginia during this field effort if the fieldwork is conducted in the winter months. Frostbite injuries occur most commonly on the distal parts of the body (nose, earlobes, hands, and feet) that are subject to intense vasoconstriction. The three general categories of frostbite are:

- Frostnip – a whitened area of the skin which is slightly burning or painful.
- Superficial frostbite – waxy, white skin with a firm sensation but with some resiliency. Symptomatically feels “warm” to the victim with a notable cessation of pain.
- Deep frostbite – tissue damage deeper than the skin, at times, down to the bone. The skin is cold, numb, and hard.

In preventing cold stress, the SSHO must consider factors relating both to the worker and the environment. Training, medical screening, establishment of administrative controls, selecting proper work clothing, and wind-chill monitoring contribute to the prevention of hypothermia and frostbite. Recognizing the early signs and symptoms of cold stress can help prevent serious injury. Thus, workers will be trained to recognize the symptoms of hypothermia and frostbite and have appropriate first aid instruction. When the air temperature is below 50°F, the SSHO will inform workers of the proper clothing requirements and any work practices that are in effect to reduce cold exposure.

- Cold injuries and illnesses recognition and prevention measures will be emphasized during daily safety briefings when the potential for cold injuries and illnesses exists.
- Work will cease under unusually hazardous conditions.
- Phenothiazine (a sedative) and beta blocker drug use will be prohibited.
- A heated area will be available on site.
- Temperature will be recorded daily on site.
- Warm beverages will be available on site.

The SSHO will establish a work/rest schedule based upon worker monitoring. At the first sign of uncontrollable shivering, the worker will be rested in a heated shelter. Work will be stopped when the air temperature reaches 0°F.

Workers will be encouraged to layer clothing when air temperature is below 50°F. Clothing that has a high insulation value will be worn under protective garments. Insulated gloves will be worn

when the wind chill index is below 32°F (i.e., air temp 50°F and wind speed > 20 miles per hour [mph] or air temp 40°F and wind speed > 5 mph). Insulating dry clothes will be available.

### **9.15 Crystalline Silica Monitoring Plan (Assessment)**

Not applicable.

### **9.16 Night Operations Lighting Plan**

Night operations are not anticipated to be required during the TCRA. All work will be performed during daylight hours. Should this change, this section of the plan will be updated to include the requirements for performing night operations, including proper illumination.

If any boat is either underway at night or is on anchor, the required running or mooring lighting schemes will be followed per USCG regulations and the boat will be equipped with sufficient navigation equipment. The boats will also be equipped with adequate lighting in the cabin.

### **9.17 Fire Prevention Plan**

Fire prevention and protection measures require preplanning. At least one 2A:10BC fire extinguisher will be located at each work area and within each site vehicle and each piece of heavy equipment. In refueling areas, at least one 40-BC fire extinguisher will be staged. Boats will be equipped with the proper fire extinguishers and other fire prevention equipment as specified in EM 385 1-1 as follows:

- Boats less than 26 feet in length - one 1-A:10:BC extinguisher
- Boats greater than 26 feet in length - two 1-A:10:BC extinguishers
- A flame arrestor is required on gasoline engine boats manufactured after April 25, 1940

Employees will follow safe work practices, including proper storage of flammable and combustible liquids, and the following rules:

- Smoking is permitted only in those areas designated specifically by the PM, SS, or SSO in accordance with base, port, or marina instruction.
- Personnel will follow hot-work procedures (not currently anticipated) to ensure that work is performed in a safe environment.
- Refueling will be performed only in a designated area.
- Equipment must be refueled with the equipment turned off (except under special circumstances as required by an operator's manual).
- No refueling will be performed unattended.
- Latching on fueling hoses is prohibited. Smoking is prohibited in any area where refueling is performed.
- Compressed gases, if present, will be secured only in an upright position. Flammable gases will be stored separately from oxygen gas cylinders. Any flammable cylinder storage areas (if any) will be posted as "FLAMMABLE, NO SMOKING."
- All other flammable liquids will be stored in an approved storage cabinet, unless they are

for immediate use.

- 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.
- Proper housekeeping will be conducted on board vessels to keep combustible materials away from heaters or vents, manifolds, or other potential ignition sources onboard.
- Any small spills onboard boats will be promptly cleaned up and sorbent materials will be placed in a closed metal container for disposal.
- There will be no smoking allowed on boats at any time.
- Gasoline powered vessels (internal combustion) will have proper ventilation systems to evacuate potentially flammable vapors, proper shutoff valves, monitors, alarms, and properly rated fire suppression systems on board as required by the USCG.
- All gasoline engines, except outboard motors, installed in a boat must have an approved flame arrestor (backfire preventer) fitted to the carburetor.

Hot work is not planned, but, if required (for instance if grinding or cutting of rebar or other materials will create sparks), no hot work is 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. The TtEC Hot Work Procedure and permit system will be implemented if any work is considered to be hot work, including fire watch.

In the event of a fire or explosion, contact the appropriate emergency authorities by calling 911 as specified in Table 9-1 – Emergency Contact Information. Any fire must also be reported to the NTR and RPM and the SHM. The person reporting the fire is required to provide the following information to 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

The RPM and COR, in coordination with the SS, will manage notifications as required.

### **9.18 Wild Land Fire Management Plan**

Not applicable.

### **9.19 Hazardous Energy Control Plan**

Not applicable.

## 9.20 Critical Lift Plan

A 120 ton mobile crane will be used on the project to place and to remove the PortaDam™ structure. The lifts for this task are not anticipated to be critical lifts. A barge with a crane equipped with a clamshell bucket will be brought in to place the AquaBlok™ agent in the marine areas that are accessible to barge and crane. These types of lifts are also not considered to be critical lifts.

The barge crane will be used in support of diving operations. The AquaBlok™ agent will be transferred on the barge from the supersacks into a hopper that is attached to the side of the barge. Two divers will work in the water using surface supplied breathing air. The divers will use a six inch handheld dredge to move the material from the hopper to the placement site. C

In addition to crane use for these specific tasks, hoisting operations (lifting of equipment [not personnel]) by means of mechanical equipment such as an excavator) may occasionally be required for loading and unloading of equipment and materials. Hoisting and rigging by mechanical means is not a critical lift activity as critical lifts only apply to lifting by crane. This section addresses hoisting and rigging performed by the crane subcontractor as well as hoisting and rigging activities by construction equipment that may be performed on this project.

### 9.20.1 General Requirements

Hoisting and crane operations will be suspended during excessive inclement weather at the discretion of the Competent Person (SS is Competent Person for TtEC, subcontractor to provide and designate a Competent Person). Equipment manufacturer's recommendations will be followed to determine ability to perform safe hoisting operations based on wind calculations.

All rigging used in hoisting operations will be inspected by the competent person each day before use. Defective equipment or equipment showing excessive wear will be taken out of service. Rigging equipment will be used in accordance with the equipment manufacturer's instructions and will not be used for loads in excess of rated capacity. Rigging will be properly stored and maintained when not in use. Only positive latching devices will be used to secure the load and rigging. Design, testing, and capacities of fabricated lifting devices will be maintained on site.

All hoisting equipment documentation, including inspection, training, certification records, and load data will be maintained on site. If any unsafe conditions or faulty equipment are detected, the equipment will not be used until the problem is resolved and satisfactory inspections have been completed. Daily pre-use inspections will be performed each day hoisting operations are to be performed. Inspections will include all functioning parts and systems, mechanical structures, and site conditions associated with hoisting operations.

Hazards during hoisting operations include being struck by loads during movement, being crushed underneath loads during placement, and being cut or pinched while handling loads or its rigging. Other hazards could include equipment rollover or boom collapse due to side loading of the boom. Controls that will be used to mitigate hazards will include the following:

- Implementation of the above requirements for equipment and personnel performing hoisting operations.
- Crane load charts will be used to plan picks based on crane and boom configuration.
- Only authorized and qualified persons will be involved in hoisting and rigging operations. Personnel involved in hoisting will use standard signal systems for communication during operations. The crane or equipment operator and rigger will have the authority to stop or suspend work if there is a safety concern related to the hoisting operation. A signal person will be used during all hoisting operations and is the only person directly communicating with the crane or equipment operator.
- Personnel will not be allowed to enter the swing radius of the crane or heavy equipment while equipment is in motion. When rigging and unrigging a load, whenever possible, all heavy equipment and rigging devices will be grounded. If grounding is not possible, all loads including the rigging devices will be lowered to the extent possible, all motion will be stopped, and eye contact will be made between the rigger and operator before attempting to unsecure the rigging.
- A guide rope will be attached to the load to allow positioning without requiring personnel in the vicinity of the placement location.
- Leather work gloves will be worn while handling the load, the guide rope, and the rigging, to protect against rope burns, cuts, scrapes, and pinch points.
- Prior to performing hoisting operations, the work area will be inspected and evaluated for hazards and unstable surface conditions. Hoisting operations will only be performed if adequate space is available for maneuvering and on stable ground surfaces.

### 9.20.2 Crane Activities

A specialty subcontractor will be used to perform the lift and placement as well as removal of the PortaDam™ structure components and for placement of the AquaBlok™ agent into place. Each crane operation will require development of a Lift Plan, which will be developed by the specialty subcontractor specifically for this task as a separate deliverable. If the lift is a critical lift as in the case of the diver assisted crane use, the plan will be developed in accordance with TtEC Corporate Procedure CP-13 – Critical Lifts and will be a Critical Lift Plan.

This Lift Plan will meet include all the required elements and provide details on the specific crane configuration and capacity as well as hoisting and rigging and personnel who will be used to accomplish the task. The lift plan(s) will be submitted through the NTR to the Navy's Crane Safety Department as part of a Crane Package. Names of the competent persons (crane operator, rigger[s]), certifications and inspection packages for the crane and rigging/hoisting equipment, and other required information will be included in the package. An on-site crane inspection will be performed by a Navy representative with the subcontractor prior to approval of the crane package and Lift Plan. Crane and hoisting operations and equipment, operators and rigging specialists, and inspections and certifications will meet the requirements in Section 16 of EM 385-1-1 as well as any OSHA and any Virginia Department of Labor requirements, whichever are more stringent. EM 385-1-1, Section 16L has specific requirements for cranes mounted on

barges and other naval craft such as floating platforms. The selected subcontractor will review this section of the manual and will document that they and their equipment comply with requirements. Equipment specifications and procedures will be reviewed by a TtEC Competent Person.

Operational testing will be performed on the crane used for hoisting operations prior to initial use and after servicing major equipment components. An operational test will be performed to demonstrate that the test load and rigging can be safely lifted, maneuvered, controlled, stopped, and landed. The operational test will be performed in a manner that represents all the aspects of the operation including rigging equipment, configuration, positioning, and all necessary ranges of motion and travel. Operational testing will be performed using a load that is equivalent to the maximum anticipated load to be lifted by each piece of equipment during the course of the project. Details of the testing and results will be documented. An AHA has been included specifically for the crane use for each task in which cranes will be used.

### 9.20.3 Hoisting and Rigging by Mechanical Equipment

Hoisting operations performed using on-site hydraulic excavators or loaders will only be by equipment and operators meeting the requirements of this section will be used for hoisting operations. If manufacturer procedures for lifting and transport of hoisted loads are unavailable, the equipment will not be used for hoisting. Because hoisting and rigging using mechanical equipment is may be performed on this project, an AHA has been prepared and will be followed when hoisting and rigging is used. The requirements of EM 385 1-1 (USACE 2011), Section 16.S –Hydraulic Excavators, Wheel/Track/Backhoe Loaders Used to Transport or Hoist Loads with Rigging, have been incorporated into the AHA in accordance with Section 16.S.03.a. The AHA includes the following:

- Written proof of qualifications of equipment operators, riggers, and others involved in the operations
- Operational testing performed as per EM 385 1-1 Section 16.S.03.b
- Proper operating procedures in accordance with the equipment manufacturer’s operating manual
- Proper use and on-site availability of manufacturer’s load rating capacities or charts
- Proper use of rigging, including positive latching devices to secure the load and rigging
- Inspection of rigging
- Use of tag lines to control the load
- Adequate communications
- Establishment of a sufficient swing radius (equipment, rigging, and load)
- Stability of surfaces beneath the hydraulic excavating equipment

Heavy equipment used for hoisting will be certified for the application by the equipment manufacturer and will be selected based on capacity to meet the load requirements of the project. Before heavy equipment intended to be used for hoisting operations is used, it will be inspected, tested, and certified by a competent person (in this case, the SS) to be in accordance with the

manufacturer's recommendations for use. An operational test with the selected hydraulic excavating equipment will be performed in the presence of the government-designated authority (if present). Heavy equipment used for hoisting operations will be supplied and operated in accordance with equipment operations manuals, guides, procedures/instructions, and load charts. Operational testing will be performed using a load equivalent to the maximum anticipated load to be lifted by each piece of equipment during the course to the project. Details of the testing and results will be documented.

## 9.21 Contingency Plan for Severe Weather

The potential for severe weather is possible as the site is located near Chesapeake Bay and the Atlantic seaboard where storms can occasionally be severe, including hurricane force winds on occasion. In addition, thunderstorms are possible. The SSHO will monitor the weather forecast daily. In preparation for an approaching storm, all equipment will be secured, and all doors and windows of the equipment and offices will be closed. All 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.

If particularly ominous weather conditions are predicted, the SSHO will monitor radio broadcasts or National Weather Service reports regularly. Nearby thunderstorms could have lightning associated with them. Whenever a thunderstorm arises, the SSHO will determine if lightning is within 10 miles of the site. If lightning is close to the site, work will stop until no lightning activity is observed for a minimum of 30 minutes and workers will seek shelter in a full enclosed vehicle cab or other fully enclosed structure. A lightning meter will be available on-site as an indicator of approaching storms. A Hurricane Preparedness Plan has been prepared and is included as Section 9.21.1 below.

The SS and the SSHO will assess what work procedures can be safely performed when wind conditions exceed 25 mph and for on water work, diving work, or crane activities, lesser wind speeds may require consideration of work suspension. They will also give consideration to fugitive dust and odor emissions, the safety of equipment in high winds, and protection of workers from flying debris and dust in windy conditions.

### 9.21.1 Hurricane Preparedness Plan

Hurricane season starts June 1 and ends November 30. The following information is from [www.nhc.noaa.gov/prepare/wwa.php](http://www.nhc.noaa.gov/prepare/wwa.php):

- **Tropical Storm Watch:** An announcement that tropical-storm conditions are possible within the specified area.
- **Hurricane Watch:** An announcement that hurricane conditions are possible within the specified area.

Because outside preparedness activities become difficult once winds reach tropical storm force, ***watches are issued 48 hours in advance of the anticipated onset of tropical-storm-force winds.***

*Action:* During a watch, prepare and review your plan for evacuation in case a Hurricane or Tropical Storm Warning is issued. Listen closely to instructions from local officials.

- **Tropical Storm Warning:** An announcement that tropical-storm conditions are expected within the specified area.
- **Hurricane Warning:** An announcement that hurricane conditions are expected within the specified area.

Because outside preparedness activities become difficult once winds reach tropical storm force, ***warnings are issued 36 hours in advance of the anticipated onset of tropical-storm-force winds.***

*Action:* During a warning, complete storm preparations and immediately leave the threatened area if directed by local officials.

- **Extreme Wind Warning** - Extreme sustained winds of a major hurricane (115 mph or greater), usually associated with the eyewall, are expected to begin within an hour.

*Action:* Take immediate shelter in the interior portion of a well-built structure.

When a warning of gale force winds is issued, the SS will have supervisors and workers take precautions to minimize danger to persons, and protect the work and nearby TtEC and Government property. These precautions include, but are not limited to: closing openings; removing loose materials, tools and equipment from exposed locations; and securing temporary work. Close openings in the work areas (e.g., windows, doors, bins, equipment cabs, etc.) when storms of lesser intensity pose a threat to the work or any nearby TtEC or Government property.

It is advised that before an emergency, each contractor secure emergency disaster kit with non-perishable food, potable water (at least one gallon per person for each day) and other supplies (e.g., flashlights, first aid kit, emergency NOAA weather radio, blankets, toiletries, etc.) in sufficient quantity for their personnel to last for at least 72 hours. In addition, persons should, if time allows, have their prescription medicines with them when they seek shelter and let the PM know the location where sheltering will occur.

There are four hurricane conditions of hurricane readiness. Unless directed otherwise, the SS and SSHO will comply with the following directives and direct contractor and subcontractor personnel as follows:

- a. **Condition FOUR** (Sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles

or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards.

- b. **Condition THREE** (Sustained winds of 50 knots or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact Contracting Officer for weather and COR updates and completion of required actions.
- c. **Condition TWO** (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and Condition of Readiness (COR) updates and completion of required actions.
- d. **Condition ONE.** (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

Personnel will leave the site upon a notice to leave Government premises and each supervisor will ensure their personnel and families (as applicable) are instructed to gather together offsite in a safe place of refuge such as a storm shelter. The TtEC SS will notify the PM as to the status of the crew and evacuation notice. Stay away from windows and doors during a hurricane and stay indoors. Await official word from emergency personnel if a hurricane does occur before leaving safety of shelter or driving on any roads. Prior to returning to work after a hurricane, the TtEC SS and SSHO will (with Government permission) conduct an evaluation of any worksite damages and precautions that may be required prior to allowing workers to return to work and will report damages to the PM, SHM, and Contracting Officer.

## **9.22 Float Plan**

Not applicable. All work will be performed within a fairly well protected harbor and there will not be anticipated boat travel to and from the worksite to accomplish the tasks.

## **9.23 Site-Specific Fall Protection and Prevention Plan**

Not applicable. There is currently no work currently anticipated that will expose workers to a fall of six feet or greater on the project and the need for fall protection planning is not currently anticipated.

## 9.24 Demolition Plan

Not applicable.

## 9.25 Excavation/Trenching Plan

All anticipated soil excavations will be at depths of less than four feet, with the anticipated depth being two feet. At the present time, there is no anticipated need for a formal excavation and trenching plan or need for shoring devices to be designed and installed. However this section is being used to address shallow excavations as well as the work along the shoreline where there are slopes and banks that need to be considered for worker protection during rip-rap removal and/or placement.

Should conditions change and any excavation will be greater than four feet in depth, the excavation is considered to be a confined space and the confined space procedures would need to be implemented if workers enter these excavations (not anticipated). If any excavation is greater than 5 feet in depth (also not anticipated), 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 Excavation and Trenching Procedure, EHS 6-3. In addition, if an excavation is 6 feet or greater in depth, field personnel must be at least 6 feet from the edge of the excavation unless fall protection systems are use (guardrails or personal fall arrest system). If any of these conditions are met, the APP and AHAs will be updated to include the additional requirements.

Workers will not be present below any equipment or near any equipment or work on any potentially unstable slopes or be downslope when excavation activities are being performed. Workers will not walk on slopes that are greater than 45 degrees.

The following are additional considerations for conducting excavations, including working along shoreline banks:

- Excavation areas will be identified on site drawings. The location will be evaluated for presence of underground and overhead utilities and a utility search will be conducted in accordance with TtEC Corporate Procedure EHS 3-15 to verify and mark underground utilities. Overhead power lines or other overhead hazards that the excavator bucket or boom could contact or come within 15 feet of, will be disconnected through contact with the utility provider. There are two power poles that are known to be onsite that may require this to be done. The SS will verify power disconnects.
- Air lances, shovels, or other non-intrusive methods may be used to dig an excavation to ensure underlying utilities are not damaged. Utility lines that traverse an excavation may be shielded and/or supported as necessary.
- The competent person, TBD, will have a background in soil mechanics or previous construction experience involving excavations. The PM and SHM will ensure that the competent person has the ability to recognize hazards associated with conducting excavations, and is fully authorized to take immediate corrective actions to ensure the safety of personnel and property.

**9.26 Emergency Rescue (Tunneling)**

Not applicable.

**9.27 Underground Construction Fire Prevention and Protection Plan**

Not applicable.

**9.28 Compressed Air Plan**

Not applicable.

**9.29 Formwork and Shoring Erection and Removal Plans**

Not applicable.

**9.30 Precast Concrete Plan**

Not applicable.

**9.31 Lift Slab Plans**

Not applicable.

**9.32 Steel Erection Plan**

Not applicable.

**9.33 Site Safety and Health Plan for HTRW Work**

Not applicable for this task order, however elements of Section 28 of EM 385-1-1 have been included within this APP.

**9.34 Blasting Safety Plan**

Not applicable.

**9.35 Diving Plan**

The hazards associated with diving work include drowning, hypothermia, decompression sickness, entrapment, disorientation, various medical conditions created or exacerbated by hyperbaric environments, striking objects at or near the surface (e.g., boats moored in the marina) and being struck by surface vessels. If the water column is highly turbid from suspended sediments, visibility could be decreased making disorientation, entrapment, and object strikes more common.

These hazards and more will be addressed by ensuring that only experienced, certified commercial divers with appropriate medical clearance are used for the work and that all diving operations are conducted in conformance with standard safe diving practices, TtEC Corporate Dive Safe Practice Manual, OSHA (see 29 CFR 1910 Subpart T), and EM 385-1-1, Section 30 and Appendix O.

To ensure compliance with these requirements, a site-specific Dive Operations Plan has been developed to cover the diving activities. The site-specific Dive Operations Plan is included as Attachment A to this APP. The site-specific Dive Operations Plan will be reviewed and approved by the TtEC Diving Safety Manager, Stephen Neill, after the selected diving subcontractor has been selected and updates the plan accordingly. The Dive Operations Plan will also be approved by the NAVFAC MIDLANT Designated Dive Coordinator and will be reviewed by and adhered to by the diving subcontractor performing the work. Each diver that will be used on the project will submit their qualifications and experience and medical clearance for review and approval by the TtEC Diving Safety Manager. The diving subcontractor will provide the name and qualifications of the designated Dive Supervisor who will oversee and direct all diving activities. The site-specific Dive Operations Plan will be reviewed by all dive personnel prior to the start of work.

### **9.36 Confined Spaces**

A confined space is any enclosed area having a limited means of egress where ventilation is not adequate to remove a toxic or flammable atmosphere or oxygen deficiency that may exist. Examples of confined spaces include, but are not limited to tanks, boilers, vessels, bins, manholes, tunnels, pipelines, underground utility vaults, and any open-top spaces more than 4 feet in depth such as pits, excavations, tubes, trenches, and vessels.

TtEC EHS 6-1 outlines confined space procedures in detail. No confined space entry is currently allowed per this plan. Prior to the start and during the conduct of work at each site, the SSHO and the SS will identify confined spaces or confined spaces created by the nature of the work (e.g., excavations, tanks, rolloff containers, etc.). The SSHO will not allow entry into these spaces. If a confined space requires entry, by any part of the body, after this plan has been approved but was not part of the original plan, this section will be modified and approved per the amendment procedure described in this APP and an AHA will be developed for the task. The SHM will review all confined space entry plans and completed checklists and/or permits prior to entry.

All site workers are provided confined space awareness training as part of the project orientation training. As part of this awareness training, workers are instructed on how to identify confined spaces, what entry requirements there are, and who to contact if they believe a confined space exists. The awareness class is not the required training class if entry into a confined space is required. Workers will require a formal training course in confined spaces, including rescue if entry is required. There are no known existing confined spaces onsite; however, the SSHO will evaluate work areas to identify potential confined spaces so they can be appropriately posted. Excavations or trenches that are deeper than 4 feet are also considered to be confined spaces.

There will be no entry into any confined space to achieve any of the work activities, including entry into any excavation that is deeper than four feet (not anticipated) or entry into tanks.

Confined spaces that may be present on this project include any frac tanks or waste storage containers (e.g., rolloff containers) brought onsite and may also include some spaces on barges or vessels. Confined spaces will be posted with warning signs. Based on planned work activities, upland excavations will generally be approximately 2 to 4 feet deep at the most. Excavations that are greater than 4 feet in depth are also considered confined spaces. If any excavation that is considered to be a confined space and be entered (not currently anticipated) or any tank or rolloff container will be entered to perform work of any kind, the work must be done in accordance with confined space entry procedures. If there is a potential for the confined space to contain a hazardous atmosphere, entry will be conducted in accordance with OSHA's Permit-Required Confined Space regulation (29 CFR 1910.146) and Section 34 of EM 385 1-1.

TtEC's Confined Space Procedure EHS 6-1 includes the confined space permit. The confined space competent person for this project is TBD. All employees who enter confined spaces or who attend or supervised confined space entry work must be trained to understand the confined space program and their roles and responsibilities.

Generally speaking, these regulations require that the confined spaces be isolated by blocking, blinding, and/or disconnecting of all conveyances leading into the space, and the locking/tagging out, disconnection, or removal of all electrical circuits and mechanical devices servicing the spaces (as applicable). At the present time, it is not anticipated that excavations or frac tanks will contain electrical circuits or mechanical devices that would require control of hazardous energies, including lockout/tagout procedures.

Atmospheres within these spaces also must be tested for oxygen deficiency ( $\leq 19.5$  percent oxygen) or oxygen enrichment ( $> 22$  percent oxygen), flammability ( $\geq 10$  percent LEL), and toxicity (if there is a potential for toxic atmospheres to be present – for instance, carbon monoxide  $> 10$  ppm) prior to entry and during the confined space work. Forced air ventilation and respiratory protection may be necessary if hazardous atmospheres are detected. All test results and controls applied to the space must be noted on a permit entry form that is posted at the entrance to the space. Employees working in these spaces must be trained in confined space hazards and safe work practices as per the above-mentioned OSHA standard.

A properly calibrated meter equipped with oxygen and lower explosive limit (LEL) sensors will be used to monitor potentially hazardous atmospheres. If field instrumentation indicates that concentrations of flammable vapors equal to or exceeding 10 percent of the LEL, work will stop and the area will be ventilated until levels are below 10 percent of the LEL. If oxygen levels are below 20.8 percent or greater than 23.5 percent, workers will not enter the space. If the potential for carbon monoxide exists (e.g., outside use of fuel-powered generator or pump which could emit exhaust near the space), a carbon monoxide detector will be used to ensure carbon monoxide levels in the space are below 10 parts per million (ppm).

Calibration and maintenance of monitoring equipment will be in compliance with the manufacturer's specifications and will be performed and documented prior to daily monitoring. Calibration records will be kept in the project health and safety files.

All direct reading air sampling results from the previous day will be discussed with the site crews at the morning tailgate safety meeting.

On-site rescue capability will be developed and implemented onsite. Off-site rescue capability will also be evaluated.

### **9.37 Physical Hazards and Controls**

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

#### **9.37.1 Noise**

Site activities will involve the use of equipment exceeding occupational noise exposure limit action levels. Exposure to noise equal to or exceeding the OSHA 8-hour time-weighted average (TWA) sound level [85 decibels adjusted (dBA)] could result in hearing loss. To minimize this hazard, the SSHO will ensure the following measures are employed:

- Noise monitoring and worker education on hearing conservation principles
- Effective use of hearing protection by all personnel working near excessive occupational noise sources
- The use of engineering and/or administrative controls to reduce employee exposures to noise, where possible

Sound level monitoring may be conducted on site using a noise survey meter. Personnel with a standard threshold shift will be restricted from high noise exposure, or will be required to wear hearing protection. Workers on site will be instructed to observe the “noise rule of thumb” on this project, described as follows:

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

#### **9.37.2 Motor Vehicles and Heavy Equipment**

The project will use an excavator, front-end loader, and crane to perform materials and soils handling tasks. In addition, dump trucks and other large and smaller trucks may be used for deliveries or to haul waste and materials on and off site. This equipment poses unique and immediate hazards that, if uncontrolled, can result in severe injury or fatality. Other traffic may be present at the site from other tenants and contractors and this traffic can also present a hazard to workers. Injuries can result from malfunctioning equipment, improper operation, or personnel

placing themselves in operator “blind spots” or between pieces of the 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.
- Examination of hydraulic lines will emphasize those lines in close proximity to the operator.
- 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 gloved or bare hands for this inspection is prohibited.
- Large equipment will not be backed up unless equipped with a reverse signal alarm, audible above the surrounding noise level, and backup warning lights, or unless the vehicle is backed up only when an observer 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.
- During periods of rain, fog, or other adverse weather conditions, the use of headlights is mandatory.
- All posted traffic signs and directions from flagmen will be observed.
- Personnel will be prohibited from placing themselves between operating equipment and immovable objects.
- Personnel will wear 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.

Personal responsibility will be invoked as a safety precaution. 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.

Heavy equipment, if brought on site (e.g., excavator or backhoe, etc.) will be controlled via the following measures:

- Ensuring that only appropriately qualified/experienced personnel are permitted to operate the devices.
- Initial and periodic inspections of heavy equipment to provide safe operation will be documented by using the Equipment Inspection Checklist found in Appendix C.
- 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 SSHO. The SSHO will be responsible for ensuring that these requirements are implemented on site.

TtEC personnel will follow local traffic rules. Other contractor and/or base operations may be ongoing simultaneously with TtEC activities in some areas. Coordination with other contractors and the port will be done as required to ensure traffic safety and the delineation of controlled work zones. Site vehicles will yield to pedestrians, if present. Personnel working in areas subject to vehicular traffic (streets, parking lots, and so forth) will wear high-visibility safety vests. Flashing light or reflectorized barricades will be used for roads that are blocked due to equipment or excavation. Fences may be used to delineate controlled work zones when necessary to keep unauthorized personnel out of the work area and to secure the area during not work hours. The SSHO will refer to Section 25 of EM 385-1-1 for various levels of protection dependent on the location of an open excavation.

### 9.37.3 Electrical Hazards

In order to prevent accidents caused by electric shock, the SSHO will inspect any electrical connections on a daily basis. The SSHO 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 power, these generators will contain GFCIs.

Requirements for electrical safety include:

- Electrical wiring and equipment will be listed by an OSHA-recognized testing laboratory. The usual recognized testing laboratories are Underwriters Laboratory (UL), Canadian Standards Association (US), and Factory Mutual.
- Live parts of wiring and equipment will be guarded to protect persons or objects from harm. Un-insulated 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 un-insulated live wires are anticipated.)

- Transformer banks and high-voltage equipment will be protected from unauthorized access.
- A qualified electrician will perform the work on electrical power supplies and lines.
- 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 pass through doors or windows, or to be placed on the ground where they are subject to being run over by vehicles. If flexible cords must pass through walls, the cords will be protected by bushings or fittings.
- Flexible cords must be inspected on each day of use. No splices or fraying are 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.)
- 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.
- At least a 30-inch clearance 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. A 36-inch clearance is required for higher voltages. TtEC requires a 36-inch clearance of the breaker boxes, and so forth.
- Circuit breaker boxes that are locked, or kept in locked rooms, must have a key readily available in the event of an emergency.

#### *9.37.3.1 Portable Generators*

Portable generators, if used, must meet the requirements for grounding as specified in the NEC National Fire Protection Association 70. NEC 250-6 has 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.

#### *9.37.3.2 Overhead Electrical Hazards*

Overhead power lines may present a hazard to equipment and personnel. 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. Based on site information, there are two power poles with lines that may require disconnect through the utility provider prior to starting some activities.

### 9.37.3.3 *Underground Utilities*

A high-loss-potential hazard includes excavation activities with its associated potential for contact with underground utilities. When conducting intrusive activities such as excavation and grading, 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 of excavation; having utilities located using a private locating service; and performing a geophysical survey to clear utilities in the area of the intrusive operations.

### 9.37.4 Slips, Trips, and Falls

Planned activities associated with hazardous waste operations/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 excavation or cultural debris
- Working at or near the shoreline where rip-rap is being removed or placed.
- Workplace clutter, including on shore and on vessels such as boats or barges.
- Wet or slippery surfaces
- Open excavation leading edges

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.

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 and open excavations.
- Proper selection and use of portable ladders (as required).

The SSHO will evaluate all walking/working surfaces to ensure these comply with the objectives stipulated in 29 CFR 1926 Subparts C – General Safety and Health; G – Signs, Signals and Barricades; Subpart L – Scaffolds; Subpart M – Fall Protection; 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.

### 9.37.5 Head and Back Injuries

At a minimum, workers will don hard hats if they have an overhead hazard or heavy equipment; safety boots; and safety glasses prior to performing any site construction or investigation

activities. This will prevent minor injuries caused by bumping one's head while working around the site. Personnel are instructed in proper lifting techniques and will not lift heavy items without assistance. Each worker will not lift more than 50 pounds. Objects heavier than 50 pounds, and those with uneven weight distribution, may require assistance from another person. Supervisors will use mechanical lifting equipment whenever possible to minimize worker exposure to lifting hazards.

#### 9.37.6 Falling Objects

Raised items will be slowly lowered to the ground using a grapple and/or skip bucket. 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.

#### 9.37.7 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 get a lifting aid (such as a dolly or mechanical hoist), get help from others, or both.
- Move as close to the load as possible, and ensure that good hand holds are obtainable. Wear gloves where necessary to improve hand holds.
- Lift with your legs, not your back; bend your knees and avoid turning and twisting when lifting, carrying, or depositing loads.
- Break lifts into steps if the vertical distance from the starting point to the placement of the lift is excessive.
- Periods of high-frequency lifts or extended-duration lifts should include sufficient breaks to guard against fatigue and injury.

Other considerations associated with lifting injuries and muscle strains include the following:

- Assess the area available to maneuver the lift.

Rearrange the area, remove clutter, and minimize the necessity of twisting and turning.

- 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 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.

#### 9.37.8 Portable Power Hand Tools

Any portable power tools (e.g., saws, drills, pressure washers, etc.) 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 National Electric Code (NEC) requirements for explosive areas. Employees operating the equipment should be aware of sparks and/or metal fragments when using this equipment.
- At no time will electrical power equipment be operated without proper grounding. All electrical cords and cables, including extension cords, must include a third wire ground.
- All electrical power tools will be listed by a nationally recognized laboratory 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 they are to be replaced.

- Do not use conductive (i.e., metal) tools around energized electrical sources. Test insulated
- Select the correct size and type of wrench for each job. Wrench handles will not be extended with a pipe or “cheater” bar.
- Repair mushroomed punch, drift, and chisel heads or take the tool out of service and replace. 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).
- All hand tools and power tools will be inspected 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.

#### 9.37.9 Boating Safety

The risk of a boating accident can be reduced by ensuring that boat operators are experienced and qualified; operating the vessel in compliance with USCG rules and regulations; maintaining the vessel in good mechanical order; avoiding bad weather and dangerous seas; and ensuring emergency equipment is available on board (life vests, life rings, life boats, fire extinguishers, communication equipment, etc.).

Boats will be operated by experienced crewmembers that have successfully completed a boating safety course meeting the criteria of the U.S. Coast Guard Auxiliary, National Association of Safe Boating Law Administrators or equivalent, and motorboat handling training, based on the type of boats they will operate, provided by qualified instructors. Additional USCG licensing and qualification may be required for working boats such as tugboats and for performing towing operations with a barge. Operators of such equipment will have appropriate USCG licensing when required.

All boats will meet USCG license and registration requirements and be equipped to safely support maximum rated crew and passenger sizes. The maximum number of passengers and weight shall be conspicuously posted on each vessel. The number of passengers shall not exceed the number of personal flotation devices (PFDs) onboard. Each boat shall have sufficient room, freeboard, and stability to safely carry cargo and the number of persons allowed with consideration given to the weather and water conditions in which it will be operated. Boats shall be equipped with kill switches and shall meet 33 CFR 183 requiring level floatation after flooding or swamping.

The boating checklist in TtEC Corporate Procedure EHS 6-6 – Boating (or subcontractor equivalent), will be used by the boat operator before boat launching to ensure proper safety devices and equipment is are onboard and functioning and that equipment are of the proper type and quantity. The boating checklist is included in Attachment E. The SSHO will verify that the inspections are being performed and action items are identified and corrected, as required. The

boat operator is responsible for the safety of all personnel on the boat and for the integrity of the vessel and its safety equipment.

Before the start of field activities, the boat operator will give a detailed health and safety briefing on the location and use of all vessel safety equipment and the procedures for addressing on-board emergencies (i.e., fire, mechanical failure, man overboard situation, etc.). Persons performing deckhand duties will have the appropriate level of training in the routine duties of this position. Other boat traffic in and around the marina and cove may be present during in-water work tasks. The boat operator will adhere to USCG vessel operating requirements during travel, including rights of way for vessel traffic. Active dive sites will be delineated and controlled as per the Dive Plan.

Personnel working from boats, barges, or skiffs, on structures or equipment extending over or next to the water (except where guard rails or personal fall protection systems are provided), or whenever there is a drowning hazard, will wear an inherently buoyant Type II or higher PFD (capable of turning its wearer in a vertical or slightly backward position in the water) unless the SHM approves Type III PFD based on conditions. PFDs shall have an attached whistle or other suitable device in the event of a man overboard. PFDs will be of an international orange (or orange/red) or American National Standards Institute ANSI 107 yellow-green color.

Each boat up to 26 feet in length shall be equipped with at least one Type IV PFD, ring buoy, 24 inches in diameter with 90 feet of buoyant line attached, designed to be thrown to a person in the water and grasped and held by the user until rescued. Larger boats require tow Type IV PFDs to be onboard. In addition, the barge will have a Type IV PFD (life ring with 90 feet of line) onboard. A buoyant boat cushion equipped with straps or float rings are two common examples of additional types of life rings that can qualify as a Type IV PFD and help in a rescue.

In addition, each boat less than 26 feet in length will have at least one sound signaling device (air horn), USCG compliant navigation lights, visual distress signals (pyrotechnic and non-pyrotechnic) a 1-A:10-B:C fire extinguisher, and at least one vessel-mounted or hand-held radio to communicate with shore-based support facilities and other vessels operating nearby.

Boats less than 16 feet will have one electric distress light or three combination (day/night) red flares when operating between sunset and sunrise.

Boats greater than 16 feet but less than 40 feet will have one orange distress flag and one electric distress light, or three hand-held or floating orange smoke signals and one electric distress light, or three combination (day/night) red flares: hand-held, meteor or parachute type.

Other equipment required to be onboard boats includes:

- A tool kit sufficient for the boat operator to troubleshoot common mechanical problems.
- Appropriate spare parts such as a propeller, spark plugs, shear pins, patch kits, air pumps, etc.).

- (If travel is required) A survival kit containing some additional first aid equipment, high energy food, drinking water, blankets, heat source, signaling devices, waterproof matches, and other items necessary to ensure survival for a minimum of 24 hours for the entire crew.
- (If travel is required) Boat operators shall utilize the "one-third rule" in boating fuel management. Use one-third of the fuel to get to the destination, one-third to return, and keep one-third in reserve.

## **10.0 RISK MANAGEMENT PROCESSES**

AHAs for the planned activities are included in Appendix A of this APP and listed in Table 10-1. If any new tasks are identified, or if planned activities vary from the written AHAs, the SSHO (with the assistance of the workers or subcontractors, etc.) will develop or alter the existing AHAs to address the specific activities. The AHAs listed will be reviewed by the SHM and will be submitted to the Contracting Officer for review and approval.

## **11.0 REFERENCES**

TtEC. 2009. Project Orientation, Rules and Safety Guidelines Handbook. July.

USACE. 2008. Safety and Health Requirements. Engineer Manual (EM) 385-1-1, Sep 2008 Consolidated. August 2011.

U.S. Department of Labor, Occupational Health and Safety Administration; 1910 – Occupational Safety and Health Standards, General Industry. Code 29 of Federal Regulations (CFR). Parts 1910.95, 1910.120, 1910.132, 1910.134, and 1910.147.

U.S. Department of Labor, Occupational Health and Safety Administration; 1926 – Occupational Safety and Health Standards, Construction Industry. Code 29 of Federal Regulations (CFR). Parts 1926.59, 1926.601, and 1926.602.

## **TABLES**

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**Table 3-1. Comparison of TtEC and 2011 BLS Data for NAICS Code 237990 (TRIR and DART Rates)**

	<b>NAICS 237990 Heavy Construction Other than Highways 2011</b>	<b>TtEC 2010</b>	<b>TtEC 2011</b>	<b>TtEC 2012</b>
<b>Total Recordable Incident Rate (TRIR)</b>	3.5	1.32	0.92	0.30
<b>Days Away/Restricted Duty/Transfer Rate (DART)</b>	2.0	0.24	0.35	0.15

**Table 9-1. Type and Location of Emergency Equipment**

<b>Equipment</b>	<b>Location</b>
Industrial First Aid Kit with Bloodborne Pathogens Kit	Each boat, SZ for active work locations
Fire Extinguisher, one 10-A:20-BC	SZ for active work locations
Fire Extinguisher, one 1-A:10-BC	Each boat less than 26 feet length
Fire Extinguisher, two 1-A:10-BC	Each boat over 26 feet length
Fire Extinguisher, one 10-BC	Site vehicles and heavy equipment
Fire Extinguisher, one 40-BC	Refueling areas
Type IV throwable ring buoy with 90 feet buoyant line 2	Each boat > 16 feet; dock areas, barge deck
Personal flotation device (PFD), proper type and quantity for each occupant	Each boat when on deck and on barge deck, and in other areas and tasks as required in the APP and AHAs
SKED stretcher/litter or floating backboard with straps	Dive support area
One electric distress light or three combination (day/night) red flares when operating between sunset and sunrise	Onboard boats less than 16 feet in length
One orange distress flag and one electric distress light, or three hand-held or floating orange smoke signals and one electric distress light, or three combination (day/night) red flares: hand-held, meteor or parachute type.	Onboard boats > 16 and less than 40 feet in length
Flame arrestor	Required on gasoline engine boats manufactured after April 25, 1940
Navigation Lights	On boats and displayed sunset to sunrise.
Portable eye wash (15-minute/0/4 gallon per minute)	Active work zones where soil or sediment or dry AquaBlok™ agent are handled.
Air Horn (if not equipped with boat or vehicle horn)	Active work location, each boat, barge.
Spill Kit (appropriately stocked with sorbent pads, gloves, and bags)	Barge; heavy equipment, including crane operations; each boat, each active working area onshore, and refueling areas.
Cellular Telephones (waterproof for boat operations)	Minimum of SS, SSHO, and field supervisor, and boat captain, Dive Supervisor (others as required for safety and communication purposes)
Underwater communications device	As per Dive Operations Plan

**Table 9-2. Emergency Contact List**

Ambulance/Fire/Police (cellular or land line)	<b>911</b>
Medical <b>Hospital: Sentara Leigh Hospital</b> <b>830 Kempsville Road, Norfolk, VA</b> <b>(See Figure 9-2)</b>	<b>911</b> (757) 395-8000 (Emergency Services)
Diver     Sentara Leigh Hospital 830 Kempsville Road, Norfolk, VA (recompression chamber)	(757) 261-4325
Rescue     USCG Hampton Roads Sector	757-688-5555 (Option 2) Marine Radio channel 16 Emergency or Rescue in water
WorkCare <sup>®</sup> Case Intervention	1-800-455-6155 1-888-449-7787
Poison Control	1-800-222-1222
Diver Alert Network (for members)	1-919-684-9111
Navy NTR, Pete Fovargue	(757) 462-1019
Navy ET, Mike Welch	(757) 462-1024
Navy RPM, Bryan Peed	(757) 341-0480
Navy Contracting Officer, Zane Parry	(757) 322-4777
TtEC PM, Stavros Patselas	(215) 702-4099 (office phone) (267) 688-9967 (cellular phone)
TtEC SHM, Roger Margotto, CIH	(619) 471-3503 (office phone) (619) 988-0520 (cellular phone)
TtEC Dive Safety Manager, Stephen Neill	(770) 330-7068
TtEC SS, Jon Cary	(757) 581-0023 (cellular phone)
TtEC SSHO, Louie McTall	(757) 581-0023
Precon Marine Dive Supervisor	(757) 545-4400
Dive Operations Manager, Martin Kane	(757) 513-1807
Dive Superintendent, Allen Cutler	(757) 449-8405
Assistant Dive Superintendent, Martin Smith	(757) 531-5583
Director of Environmental Health and Safety, M. Scott Rupe	(757) 754-0769

*Abbreviations and Acronyms:*

- CIH – Certified Industrial Hygienist
- ET – Engineering Technician
- NTR – Navy Technical Representative
- PM – Project Manager
- RPM – Remedial Project Manager   SS – Site Superintendent
- SSHO – Site Safety and Health Officer
- SHM – Safety and Health Manager
- TtEC – Tetra Tech EC, Inc.

**Table 9-3. Progressive Clinical Symptoms of Hypothermia**

<b>Core Temperature</b>	<b>Clinical</b>
95°	Maximum shivering.
87°-	Consciousness clouded; blood pressure becomes difficult to obtain;
84°-	Progressive loss of consciousness; muscular rigidity; respiratory
79°	Victim rarely conscious.
70°-	Maximum risk of ventricular fibrillation.

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

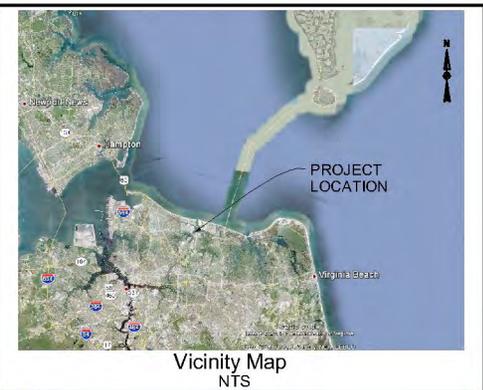
<b>AHA</b>	<b>TASK</b>
1	Mobilization and site setup
2	Placement and removal of PortaDam® and dewatering, including crane operations and shelter removal
3	Excavation
4	Removal and processing of shoreline rip-rap
5	Dewatering and processing of liquids from soil and sediment at dewatering pad
6	Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction
7	Boating activities
8	Barge placement of Aquablok™ agent and core sampling
9	Tank cleaning
10	Demobilization and waste disposal
11	Hoisting and Rigging
12	Diving operations, includes crane support of diving operations (this is included in the Dive Operations Plan which is Attachment 1 of this APP
13	Fence Removal and Installation
14	Temporary Service
15	Tree Removal
16	Pavilion Demolition

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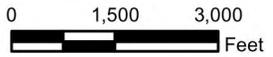
## **FIGURES**

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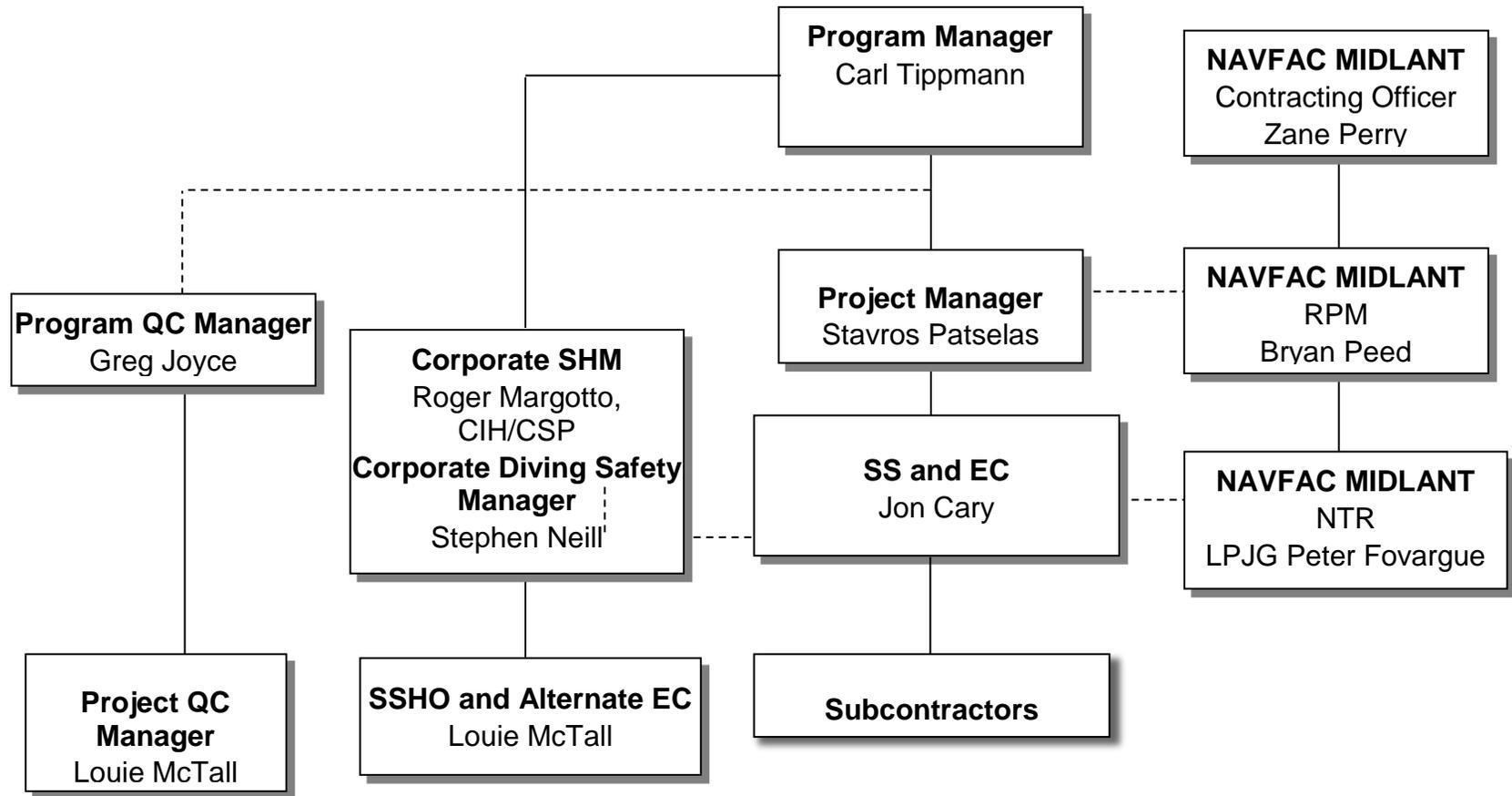


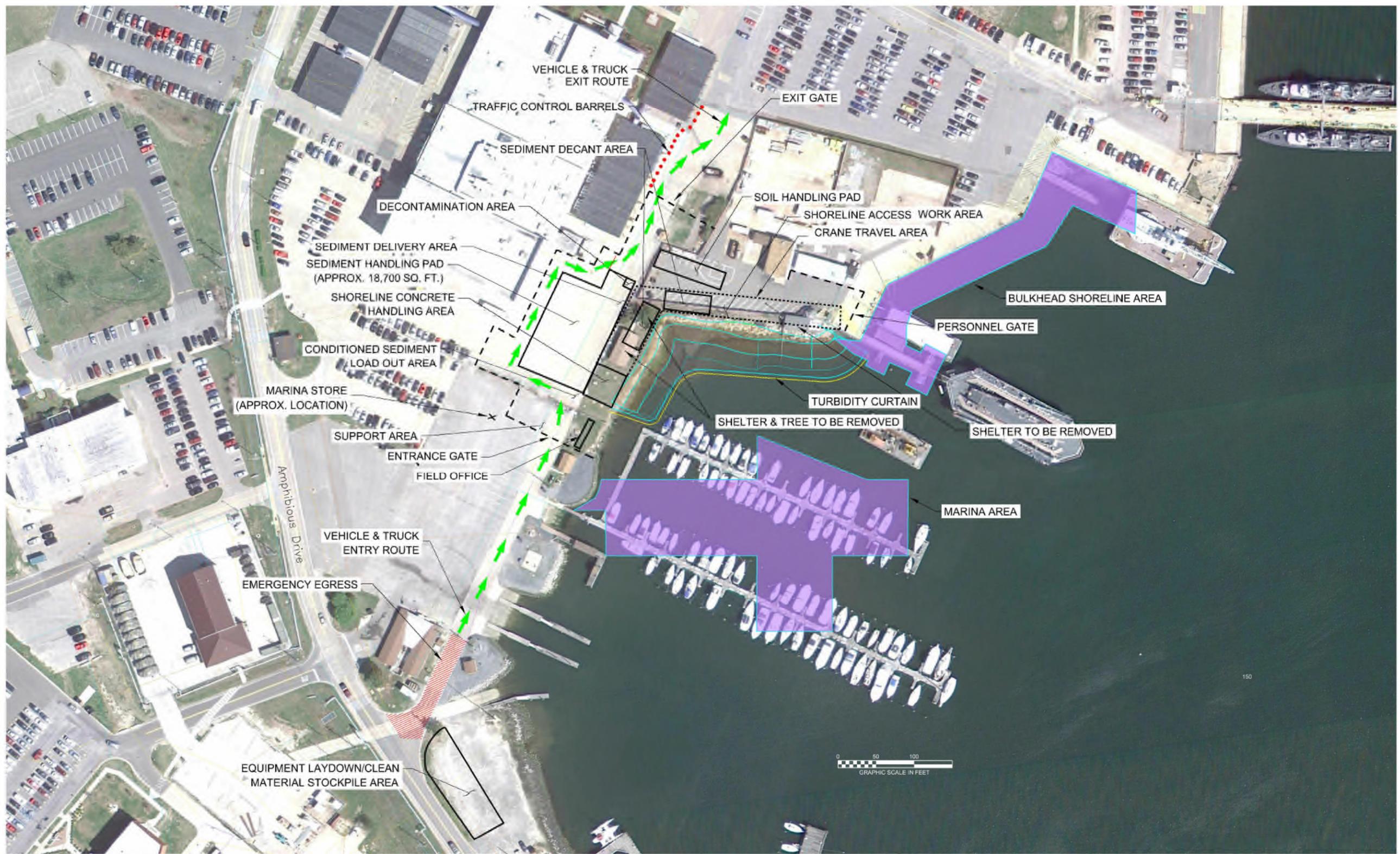
SOURCE: CH2MHill, SWMU 3 TCRA WORK PLAN



 Naval Facilities Engineering Command		
JEB Little Creek Virginia Beach, Virginia SWMU 3 TCRA APP Figure 1-1 Site Location & Vicinity Map		
DATE: 8-13-2013	DWG FILENAME: APP-1-1	REV: A
 TETRA TECH		

Figure 4-1. Organizational Chart





SOURCE: CH2MHILL, SWMU 3 TCRA WORK PLAN

- LEGEND:
- TEMPORARY FENCE
  - SEDIMENT AMENDMENT AREA
  - ▨ RIPRAP SHORELINE
  - ▨ SEDIMENT REMOVAL AREA - FOUR FEET TARGET DEPTH
  - ▨ SEDIMENT REMOVAL AREA - THREE FEET TARGET DEPTH



JEB Little Creek  
Virginia Beach, Virginia

Figure 9-1  
SWMU 3 Layout

DATE: 8-13-2013 | DWG FILENAME: 4659WE01APP9-1 | REV: A

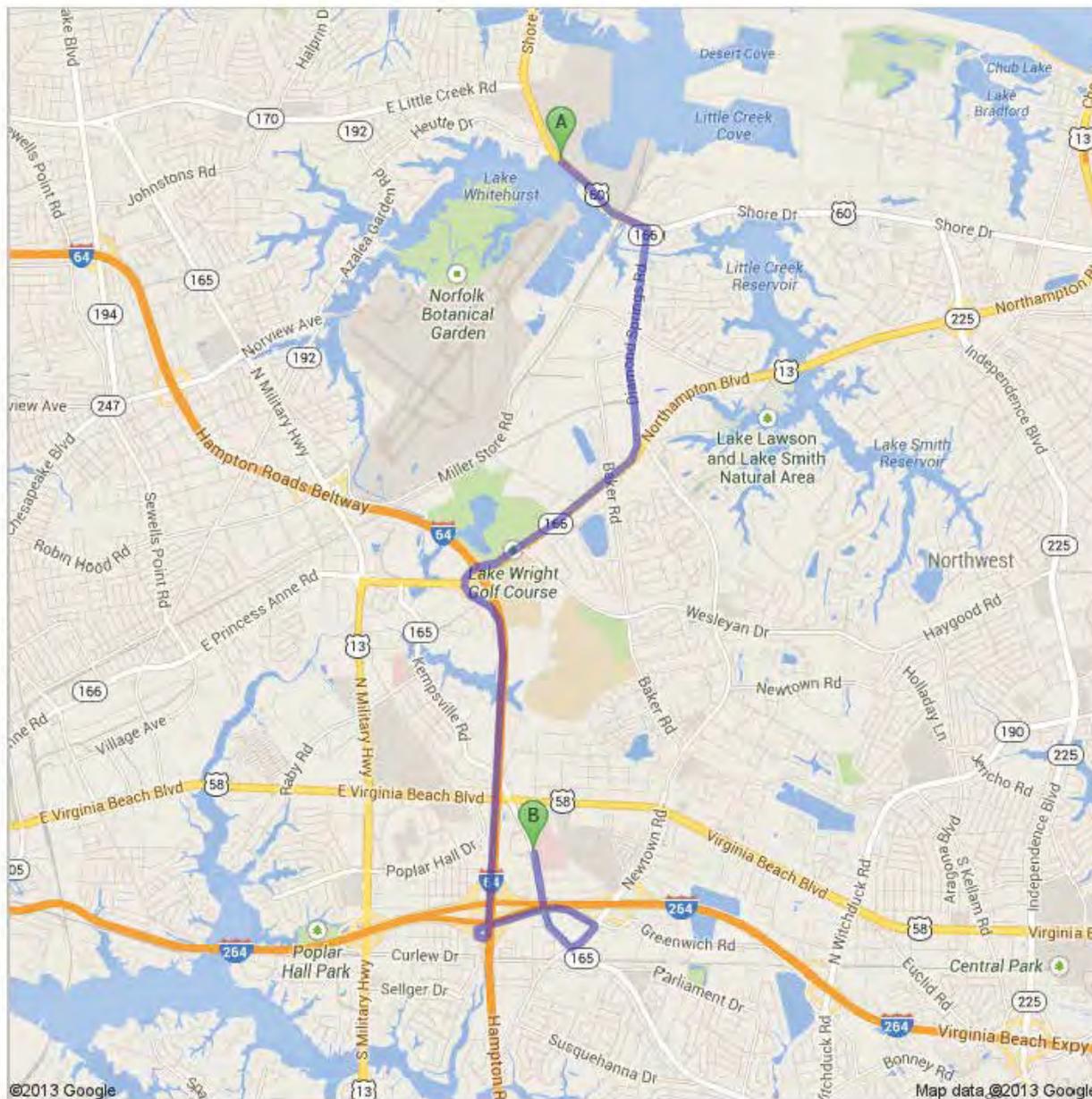


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Figure 9-2 Route and Directions to Nearest Hospital



**Directions to Sentara Leigh Hospital**  
830 Kempsville Rd, Norfolk, VA 23502  
7.4 mi – about 11 mins



**Directions to Sentara Leigh Hospital**

1. Head southeast on Shore Drive
2. Turn right onto Diamond Springs Road
3. Take the ramp to I-64
4. Merge onto Northampton Blvd
5. Merge onto I-64E via the ramp to Chesapeake/Suffolk
6. Take exit 284B for Newtown Road
7. Keep left at the fork, follow signs for Interstate 264E
8. Take exit 15A for Newtown Rd S
9. Keep right at the fork, follow signs for Newtown Road S and merge onto Newtown Rd
10. Turn right onto Kempsville Road
11. Destination will be on the right

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**APPENDIX A**  
**ACTIVITY HAZARD ANALYSES**

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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>MOBILIZATION AND SITE SETUP</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																																																			
	SIGNATURES	Activity #	<b>A1120</b>	AHA #	<b>1</b>																																																			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																																						
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="10" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td colspan="5" style="text-align: center;">Catastrophic</td> </tr> <tr> <td colspan="5" style="text-align: center;">Critical</td> </tr> <tr> <td colspan="5" style="text-align: center;">Marginal</td> </tr> <tr> <td colspan="5" style="text-align: center;">Negligible</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	E	E	H	H	M	E	H	H	M	L	H	M	M	L	L	M	L	L	L	L	Catastrophic					Critical					Marginal					Negligible				
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LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>																																																							
DATE PREPARED	<b>August 2013</b>																																																							
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																																							
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																																							
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																																																							
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<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																																																						
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																																						
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																																						
M = MODERATE RISK (CM or ET or PAR)																																																								
L = LOW RISK (ET or PAR)		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																																						

<b>AHA #1 – Activity/Work Task: Mobilization and Site Setup</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Arrival at Location	Lack of Emergency Preparedness and Health and Safety (General) before beginning work	Get to know the location if not familiar. SSHO to locate the emergency hospital and ensure routes are correct as shown in Figure 9-2. Conduct site orientation with the folks involved in mobilization tasking including establishment of laydown areas, unpacking and unloading and staging of materials and equipment and haul routes review the APP and this AHA, and the Emergency Response Plan and document the training. Ensure communications are established and working properly among team members. Develop a plan for mobilization organization and tasking and emphasize communication. Ensure emergency and basic safety equipment and PPE is located and available for use prior to starting site work. Use buddy system. SSHO will have site workers fill out medical data sheets that are included in an appendix to the APP.	M
2. Unloading and initial staging of materials and equipment including set up of site trailer  (general site hazards)	Vehicle operations from Tt or other tenant operations and delivery vendors could cause injury to personnel or others onsite	Workers operating company vehicles will have a valid state issued driver's license. Any Commercial Driver's License (CDL) truck and trailers will be operated by CDL qualified drivers. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use parking brake when parked. Use chocks when parked on inclines. Use dedicated spotter and standard hand signals for backing operations. Wear high visibility vest when working around operating vehicle traffic. Coordinate with other site tenants including the port as required to identify travel and traffic patterns and to delineate work areas.	M
	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed.	M
	Hoisting and Rigging for unloading of materials or equipment (if used during this AHA)	Refer to AHA 11 – Hoisting and Rigging, which will be followed in addition to this AHA.	M
	Ergonomic hazards such as sprains, strains, or back injury from lifting or repetitive actions	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Slips, trips, and falls could lead to injuries	Keep work areas free of debris and equipment in work paths. Follow good housekeeping in work areas. Correct hazards when seen, such as holes or	M

<b>AHA #1 – Activity/Work Task: Mobilization and Site Setup</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Unloading and initial staging of materials and equipment including set up of site trailer  (general site hazards) (continued)		other trip hazards. If they cannot be removed, they must be marked. When trailer is installed, stairs with adequate rails will be provided for entry of personnel into the trailer. Stairs and rails will be in good condition and will be attached on level with the trailer doors and the ground. The site trailer will be cribbed in level position. Tie down of the trailer will comply with EM 385 1-1, Section 04.A.03 requirements.	
	Handling sharp objects or using hand tools could cause cuts, punctures, or scrapes	Wear leather work gloves when handling materials that may be sharp or have sharp edges. Be familiar with the proper use and limitations of hand tools. Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and have a minimum of 2 persons with first aid and CPR training onsite.	M
	Use of construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider.	M
	Cold or heat stress and Weather hazards	Properly dress for the weather. SSHO to monitor weather and implement heat stress and cold stress controls as specified in the APP. Provide breaks for personnel to get either into cool or warm environment. Encourage a steady work pace. Ensure adequate drinking water is available. Know the signs and symptoms of exposure and keep an eye on your partner.	L
	Eye injuries from dust or debris or struck by	Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object still irritates or stays in the eye, seek medical attention as soon as possible. Follow up with eye exam is recommended any time an object gets into an eye since it is necessary to ensure 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, water mist can be used to control dust.	M
	Wind could make materials hard to handle	Avoid handling materials that could respond like a sail (e.g., plywood) in wind. Position vehicles so that doors do not get caught by the wind when opened. Hang onto door when opening and closing in high wind. Open and close doors carefully in the wind and only open one door at a time.	L
	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any	M

<b>AHA #1 – Activity/Work Task: Mobilization and Site Setup</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
		other sources of loud noise.	
Unloading and initial staging of materials and equipment including set up of site trailer  (general site hazards) (continued)	Lack of proper illumination in work areas could cause hazards to not be recognized or eye strain	During mobilization, if lighting is not yet set up, temporary lighting such as portable bright lumen flashlights may be necessary if ambient lighting is not sufficient, especially within the trailer. Work during daylight hours or provide adequate lighting source for work areas to minimize potential for injuries to occur from lack of visibility.	L
	Any ground penetrating activities (e.g., trailer anchors, if used) – potential underground utilities could be contacted	Implement Tt Corporate Procedure EHS 3-15 – Underground Utilities and local requirements to ensure all water, power, sewer, storm drain, communications, and gas lines have been located and marked.	M
	Fall hazards (falls from heights of 6 feet or greater)	No person will climb upon any equipment, shipping container, building, trailer, 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 Competent Person. At the present time, there is no fall protection plan in place to cover this task. A fall protection plan would need to be developed and implemented prior to doing the activity.	M
	Head injuries from struck by or falling objects	Wear hard hat when overhead hazards exist and when working in areas with operating construction equipment.	M
	Poisonous snakes	Watch for snakes and know how to identify ones that could be venomous. Keep hands and other body parts from placement into burrows, debris piles, or under objects or debris. Review procedures to follow in the event of a snake bite as are included in the APP.	L
	Contact with biting or stinging insects	Workers will apply DEET to work clothing following manufacturer’s instructions as a preventative measure for biting insects as required. Workers with allergies will let the SSHO know using the medical data sheet and will carry their own prescription medication as applicable. First aid and medical attention as required.	L
	Poisonous snakes	Watch for snakes and know how to identify ones that could be venomous. Keep hands and other body parts from placement into burrows, debris piles, or under objects or debris. Review procedures to follow in the event of a snake bite as are included in the APP.	L
	Electrical hazards could be present during tool use or during hookup of trailer	Ensure that a certified electrician performs all electrical work to hook up office trailer to electrical power source. Electrician to properly ground systems in accordance with electrical code.	M

<b>AHA #1 – Activity/Work Task: Mobilization and Site Setup</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
		Ensure that power cords are inspected and in good condition for use, that GFCIs are used properly, and portable generators are not overloaded. Ensure any power tools used are in good working condition and have third prong on cord or are double insulated. All live work requires arc flash protection.	

<b>AHA #1 – Activity/Work Task: Mobilization and Site Setup</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current state-issued driver’s license.	Daily vehicle inspection by drivers. Receipt inspection by SS.
Heavy Equipment	Operators will be qualified and experienced operators for use of the equipment they operate	Receipt inspection by SS. Daily inspection by operator.
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking. Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used

**Notes:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest.

**Abbreviations and Acronyms:**

- APP – Accident Prevention Plan
- EHS – Environmental, Health, and Safety
- MSDS – Material Safety Data Sheet
- OSHA – Occupational Safety and Health Administration
- SSHO – Site Safety and Health Officer

SS – Site Superintendent

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
2.			
3.			
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10.			

# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	PLACEMENT AND REMOVAL OF PORTADAM AND DEWATERING, INCLUDING CRANE OPERATIONS AND SHELTER REMOVAL	Overall Risk Assessment Code (RAC) (Use highest code)				<b>H</b>				
	SIGNATURES	Activity #	<b>A11140</b>	AHA #	<b>2</b>					
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>								
NAME & DATE ACCEPTED BY GDA:										
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Severity</b>	<b>Probability</b>							
TASK ORDER/DELIVERY #:	<b>WE01</b>		Frequent	Likely	Occasional	Seldom	Unlikely			
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>									
DATE PREPARED	<b>August 2013</b>									
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>									
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>									
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>		
SUBCONTRACTOR:	<b>N/A</b>			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	
DATE OF PREPARATORY MEETING:					Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
DATE OF INITIAL INSPECTION:						Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>
CONTRACTOR COMPETENT PERSON:		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)								
SITE SAFETY and HEALTH OFFICER		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard". Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity								
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place								
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.								
<b>H = HIGH RISK (FEAD DIRECTOR)</b>										
<b>M = MODERATE RISK (CM or ET or PAR)</b>										
<b>L = LOW RISK (ET or PAR)</b>										

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Lift planning (pre planning).	General – Hazard assessment and lift planning.	<p>A subcontractor Competent Person (TBD) (to be added to this AHA when known) will evaluate and weight, pick points, access and egress, work location, and other factors in advance of bringing a crane in, to develop a site-specific Lift Plan. If considered a critical lift, a Critical Lift Plan will be developed. A Crane package will be developed, including the Lift Plan that details all the required information, including rigging and inspection/certification details for the crane and all rigging. Before a lift is performed, the Navy Crane Department may request review and approval of the Crane Package and perform an inspection of the crane.</p> <p><i>This AHA task hazard analysis may be revised based on input from the subcontractor depending on the specific required activities, tools, and equipment used after the subcontract is in place and identify more detailed work steps.</i></p>	H
2. Provide for adequate clearance along the shoreline for crane placement	Potential for property damage and restricted motion of crane in swing radius as well as potential development of pinch points	Locate and mark structures for removal and structures that will remain and be protected from damage. These should be marked on site drawings. One small shelter is present on site that must be removed and staged onsite for Navy disposition or reuse.	M
3. Removal of shelter	Lack of coordination by team or improper order of removal could cause variety of injuries	Ensure team communicates with supervisor to develop the best means of dismantling the structure and the order and tasking of personnel. Structural supports should be the last items to remove so that the structure remains stable throughout removal. Ensure that team members are not working directly underneath other items being removed so that materials or tools do not fall onto a worker.	M
	Slips, trips, and falls could lead to injuries	Keep work areas free of debris and equipment in work paths. Follow good housekeeping in work areas. Correct hazards when seen, such as holes or other trip hazards. If they cannot be removed, they must be marked. Keep debris piles in a staging area away from active work area.	M
	<p>Electrical hazards could be present during if shelter has lighting or other electrical connections</p> <p>Power tool use with electrical cords and generators</p>	<p>Ensure that a power is disconnected and verified as being disconnected prior to beginning dismantling and removal.</p> <p>Ensure that power cords are inspected and in good condition for use, that GFCIs are used properly, and portable generators are not overloaded. Ensure any power tools used are in good working condition and have third prong on cord or are double insulated.</p>	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removal of shelter (continued)	Ladder use could cause fall injuries if used improperly	Ladders will be placed and secured from movement at the required intervals for ensuring egress. Ladders will be a minimum of 3 feet above the top of the landing. Workers will use 3 points of contact at all times when climbing or descending ladders. Workers will not carry tools or equipment in their hands when using a ladder. Workers will not work from ladders. Step ladders will not be used as straight ladders.	
	Ergonomic hazards such as sprains, strains, or back injury from lifting or repetitive actions	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Ensure work zone will be delineated to protect the public and other tenants from construction operations.	M
	Use of construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider.  Ensure staging area for building materials is not underneath power lines.	M
	Handling sharp objects or using hand tools could cause cuts, punctures, or scrapes	Wear leather work gloves when handling materials that may be sharp or have sharp edges. Be familiar with the proper use and limitations of hand tools. Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and have a minimum of 2 persons with first aid and CPR training onsite.	M
	Eye injuries from dust or debris or struck by	Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object cannot be removed, seek medical attention.	M
	Wind could make materials hard to handle	Avoid handling materials that could respond like a sail (e.g., sheet metal) in wind. Suspend operations where this could occur if wind will make sheet metal roofing subject to movement during removal and handling.	L

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removal of shelter (continued)	Heat stress and Weather hazards	Properly dress for the weather. SSHO to monitor weather and implement heat stress and cold stress controls as specified in the APP. Provide breaks for personnel to get either into cool or warm environment. Encourage a steady work pace. Ensure adequate drinking water is available. Know the signs and symptoms of exposure and keep an eye on your partner.	L
	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise.	M
	Head injuries from struck by or falling objects	Wear hard hat when overhead hazards exist and when working in areas with operating construction equipment.	M
	Hand injuries, punctures, lacerations, crush injuries	Wear leather work gloves for tool use and when handling sharp objects or moving materials. Identify potential pinch points and keep hands out of them. When performing team moves of materials, do not make sudden movements of the material until team has been notified and is clear. Have a first aid kit onsite.	M
	Fall hazards (falls from heights of 6 feet or greater)	No person will climb upon any equipment or the building 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 Competent Person. A fall protection plan would need to be developed and implemented prior to doing the activity if workers will be on the roof of the structure to remove sheet metal. Excavator with thumb may be used to remove roof if Navy approves since this would damage the roof. If fall protection plan is needed for this task, the SSHO (TBD) is the competent person and will ensure that a fall protection plan is prepared fall protection is used properly for this task.	M
4. Mobilize materials and mobile crane onto the site and set up crane in position	Truck and vehicle operation hazards, operational ability, potential for struck by and caught between. Potential damage to facility or structures.	Mobile crane will be driven and operated by a qualified person with appropriate commercial driver's license. Trucks delivering PortaDam materials will have appropriate commercial driver's license. Trucks and materials will enter the site following established traffic patterns and will have RapidGATE passes to enter the site. Workers around vehicles and heavy or mobile equipment will wear high visibility safety vests. Workers will stay out of blind spots. Spotters will be used when backing up.  Survey and delineate the project site and stage the crane and materials within a controlled work zone. Ensure that there is sufficient clearance around the entire crane when in position.	M
	Potential to strike overhead utilities when booms are raised on crane or when using construction equipment to unload	Booms will not be raised until the site is surveyed for overhead lines. Booms must maintain at least 15 feet clearance from energized lines, more clearance is required for higher KvA lines. If clearance cannot be maintained, electrical disconnection with utility service provider may be required.  If heavy equipment will be used for hosting and rigging tasks to offload materials, refer to AHA 11 –	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Mobilize materials and mobile crane onto the site and set up crane in position (continued)	PortaDam materials	Hoisting and Rigging, which will be followed along with this AHA.	
	Potential for overloading of the shoreline bank or destabilization of the crane	Crane will be positioned with adequate setback from the slope for stability. Outriggers will be placed on sufficiently sized and level crane mats and will be fully extended with tires off the ground as per manufacturer’s guidelines. The crane placement will be such that the load and boom configuration can reach and place the materials while staying less than 75% of the equipment’s rated capacity based on load charts.	M
	Lack of load testing within full operational range could lead to destabilizing of crane, side load of boom, or unstable picks	Competent person (TBD) to perform all required inspections of equipment and rigging before use. Qualified rigger and crane operator will perform with inspections and testing and the SS and SSO will observe prior to commencing PortaDam placement. Navy representative may also be present during inspections and operational testing. Conduct required operational testing and document the testing.	H
5. Set up and secure rigging to loads; preparing to lift.	Improper use of rigging or tools could cause injury or result in load shift or drops, overhead hazards, and potential eye injuries during rigging placement.	Operator and rigger(s) and any other parties of the lift team will review Lift Plan and plan each step of the lift in advance and sign the lift plan. Riggers will be Competent Persons (TBD) for rigging inspection and use/limitations. The Crane Operator will be a Competent Person (TBD) for crane operation. Rigging use will be per the approved Crane Package. Changes to Lift Plan must be approved in advance. Rigging will be inspected by a Competent Person before use, and any deficient or damaged rigging will be taken out of service. All required tags and certifications will be on rigging and visible for inspection. Tag lines, as necessary, will be put into place with the load prior to lift.  Ensure that the load is in a neutral and secure position (not under tension) prior to placing hands, feet, or other body parts in any potential pinch points of the load or rigging.  Use tools properly. Only use tools that are meant for the task. Do not use damaged or worn tools.	H
	Riggers and other personnel could be injured by the crane or the load.  Wind or chop on water could hinder the safety of crane operations and placement of the PortaDam structure.	All nonessential personnel will be out of the work zone before a lift is made. The work zone will be established prior to lifting the load. The pick team will consist of the crane operator and the rigger (and an additional dedicated spotter as required). The spotters and riggers will have visual and radio contact with the operator. Standard hand signals will be used among the team members. A signal will be made by the team that the lift is ready to be made, and the operator will signal the team that the lift will begin. The crane operator will begin the lift. The team members will watch for signs of load shift or any need to reconfigure the rigging scheme and notify the crane operator of the need to stop and lower the load. The load will be safely and slowly lowered, if necessary, at the	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Set up and secure rigging to loads; preparing to lift (continued)		<p>rigger/spotter direction for reconfiguration and retry. Refer to EM 385-1-1 Section 15, Rigging.</p> <p>Weather and wind conditions and sea state (wave action) will be monitored prior to lifting to ensure load control can be maintained. Crane operator will make this determination. Calm weather is best for these operations.</p> <p>When boats are used to spot from the water and assist with release of rigging or placement, the boat will be positioned at a safe distance away from the load during placement and never under the load or directly below the load.</p> <p>For boating operations, also review the boating AHA.</p> <p>Never position oneself under a suspended load for any reason.</p>	
	Shifting center of gravity with loads, potential for crane to overturn or material to swing	Operator will follow the crane load chart and configuration requirements and the Lift Plan so that the potential for overturning the crane does not exist during the lift. As required by manufacturer for safe operation, any outriggers will be properly deployed, and the crane will be positioned for the load and angle changes required for the pick.	H
6. Lifting and positioning load, lowering load.	Load shift could cause injury during movement or cause damage to pier or dock.	Never position oneself under a suspended load for any reason. Use tag lines to help position the load. Do not wrap tag lines around hands. Spotters/riggers will maintain visual sight of the load to ensure clearance to any other obstacles present and communicate with the operator using standard hand signals and/or radio communications as required. When the load is placed into position and rigging is not taut, the rigger will let the crane operator know the load is in position.	M
	Improper placement and configuration of PortaDam could cause dam to fail or sections to be damaged	Installation will be to manufacturer's guidelines and specifications, which will be reviewed by the installation team. The specifications will be onsite. The TtEC Project QC Manager will review the specifications and conduct quality inspections. An improperly placed section will not remain in place, but will be replaced. If boats are used for inspection, review boating AHA.	L
7. Release of rigging and final securing of PortaDam sections in place (from boat(s))	Shift in material position during placement and assembly could cause injury to personnel.	Qualified riggers will remove rigging. Before removing rigging, ensure the load is in a position and stable. Do not release rigging prematurely. Ensure rigging to crane is not under tension before loosening or removing rigging and communicate with the crane operator. When rigging is removed, notify the crane operator who will, with spotter assistance, retract and secure the crane for demobilization.	H
	Improper use of hand tools could cause injury	Use the correct tool for the job. Ensure tools are in good condition by inspecting them before use.	M
	Sprains and strains, back	Avoid working in awkward positions while performing tasks. Avoid jerking movements when using	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
	injuries	tools or placing materials. Try to team lift and team position materials into place. Do not lift more than 50 pounds singly. Repetitive tasks should be rotated amongst team members. Use legs to lift, not your back. Do not lift and turn at the same time.	
8. Install turbidity curtain and oil boom outside of the PortaDam	Boating hazards	Follow boating AHA. Wear Type II or better PFD. Boat operator and worker on deck will be in communication before starting and stopping boat movement. Sections of boom and turbidity curtain will be joined on shore and deployed into the water where boat and crew will position and anchor into place and tie off both ends.	M
	Sprains and strains, back injuries	Avoid working in awkward positions while performing tasks. Avoid jerking movements when using tools or placing materials. Try to team lift and team position materials into place. Do not lift more than 50 pounds singly. Repetitive tasks should be rotated amongst team members. Use legs to lift, not your back. Do not lift and turn at the same time.	M
9. With PortaDam structure in place, set up high volume pump and begin evacuating water	Moving and positioning of pump and hoses into place could cause injury to personnel handling it	Follow hoisting and rigging procedures listed above to move pump into place on the inside of the PortaDam structure. The pump will be rated and suited for in-water use for this application. Follow manufacturer's guidelines for placement and use. Ensure rigging is secured to a stable pick point in upright position. Stay out from underneath load during placement and use tag lines.  Install filter bag on end of discharge piping and secure the hose in place to the PortaDam structure so it does not move violently when pump is in operation. Ensure hose movement does not damage the liner of the PortaDam. Setup and test pump following manufacturer's guidelines. Keep face and body parts away from hoses and discharge lines during operation in case of failure.	M
	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise.	M
10. Dewater structure and maintain as required	Structure could fail to hold back the water when the tide is in, including sudden failures	As pumping of the PortaDam begins, monitor the PortaDam for any signs of failure or leakage. Repair or modify as required. There is no anticipated need for any personnel to enter the dewatered area within the cofferdam structure on foot. Personnel will stay out of this area.	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
11. Removal of PortaDam structure	Potential for water to rush into the dry areas and boats, if present, could shift suddenly	Removal will be done using a crane at lower tide levels and one section at a time will be removed. Boats will not be positioned immediately outside the dam when the first section is removed until water levels equalize on both sides. If possible, section will be removed from top down, to allow water to spill into the area in a more controlled manner.	M
	Shift in material position during removal and assembly could cause injury to personnel.	Qualified riggers will remove and attach rigging. Before removing rigging, ensure the load is in a position and stable. Do not release rigging prematurely. Ensure rigging to crane is not under tension before attaching or loosening or removing rigging and communicate with the crane operator. When rigging is attached, notify the crane operator who will, with spotter assistance, retract and remove the PortaDam sections for staging on land.	H
	Improper use of hand tools could cause injury	Use the correct tool for the job. Ensure tools are in good condition by inspecting them before use.	M
	Sprains and strains, back injuries	Avoid working in awkward positions while performing tasks. Avoid jerking movements when using tools or placing materials. Try to team lift and team position materials into place. Do not lift more than 50 pounds singly. Repetitive tasks should be rotated amongst team members. Use legs to lift, not your back. Do not lift and turn at the same time.	M
	Boating hazards	Follow boating AHA. Wear Type II or better PFD. Boat operator and worker on deck will be in communication before starting and stopping boat movement. Sections of boom and turbidity curtain will remain in place until final site stabilization.	M
	Sprains and strains, back injuries	Avoid working in awkward positions while performing tasks. Avoid jerking movements when using tools or placing materials. Try to team lift and team position materials into place. Do not lift more than 50 pounds singly. Repetitive tasks should be rotated amongst team members. Use legs to lift, not your back. Do not lift and turn at the same time.	M

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current State-issued driver's license.	Daily vehicle inspection by drivers.
Heavy Equipment	Operators will be qualified and experienced operators for use of the equipment they operate	Receipt inspection by SS. Daily inspection by operator.
Mobile Crane	Competent Person operation only. Trained and certified to operate the crane that will be used. Training certificate must be presented to the Navy and the SSHO with Crane Package. The SSHO will maintain a copy in the training files. The competent person(s) are: TBD	Crane initially tested and certified per Crane Package submittal before use to meet federal and state inspection and certification requirements (documented). Navy Crane Department inspection upon mobilization. Inspected daily by Competent Person (crane operator).
Ladders	Persons using ladders will be instructed on proper use of and inspection of ladders	Inspection by user prior to use. Routine inspection by SSHO.
Boats	Qualified operators will have U.S. Coast Guard approved boater safety qualifications identified in the APP and experience in use of the boats on the project. Certificates of training should be available and placed in the training record.	Inspect daily and before use by boat captain. Use the boating checklist form. Refer to EHS 6-6, Boating and boating AHA.
Rigging	Competent Person use only. Trained and experienced in the proper inspection and use (and limitation) of rigging. The names of the Competent Person(s) are: TBD	Rigging documentation of inspection submitted before use with Crane Package. Inspected before use by Competent Person (Rigger). Refer to EHS 6-6.
High Volume Pump	Training as per manufacturer's guidelines and specifications for setup and use and limitations.	Inspect before use and inspect daily when in operation and before startup. Service per manufacturer's guidelines.
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Type II or better PFD to be worn	Training in proper use and limitations of PFDs. SSHO or boat captain will brief workers on the use and limitations of PFDs and the location stowed on boats (when stowed vs. worn). Training in how to inspect and what to inspect for different	Daily inspection by users.

<b>AHA 2 – Placement and Removal of PortaDam and Dewatering, including crane operations and shelter removal</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
	types of PFDs.	
Fire extinguishers	Fire extinguisher training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking. (29 CFR 1926.50[d][2]) Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

**NOTES:**

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 will also be available on-site for review of specific materials and mitigation measures.

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed leather work boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves when indicated, high visibility safety vest when indicated, and PFD when indicated.

***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  
 CSP – Certified Safety Professional  
 dBA – decibels, A-scale  
 EHS – Environmental Health and Safety  
 EM –Engineer Manual

NTR –Navy Technical Representative  
 PFD – personal flotation device  
 RAC – Risk Assessment Code  
 SS – Site Superintendent  
 SSHO – Site Safety and Health Officer  
 TBD – to be determined  
 TtEC –Tetra Tech EC, Inc.

**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.

<b>NAME</b>	<b>SIGNATURE</b>	<b>TITLE</b>	<b>DATE</b>
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>EXCAVATION</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>		
	SIGNATURES	Activity #	<b>A1130, A1200, A1430</b>	AHA #	<b>3</b>		
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>					
NAME & DATE ACCEPTED BY GDA:		<b>Severity</b>					
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE01</b>						
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>						
DATE PREPARED:	<b>August 2013, Revised November 2013</b>						
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>						
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>						
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>						
SUBCONTRACTOR:	<b>N/A</b>						
DATE OF PREPARATORY MEETING:		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
DATE OF INITIAL INSPECTION:		Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
CONTRACTOR COMPETENT PERSON:		Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
SITE SAFETY and HEALTH OFFICER		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)					
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
<b>M = MODERATE RISK (CM or ET or PAR)</b>							
<b>L = LOW RISK (ET or PAR)</b>		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Operation of heavy equipment, general	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator. Operator's manual required for each piece of equipment. Various excavators have different load capabilities and centers of gravity that the operator must be familiar with and experienced with when using. Long stick excavators vs. other excavators.	M
2. Setup of soil and sediment dewatering pads	Slips, trips, and falls	Clear area to be used as pads of debris and trip hazards. When spreading out poly sheeting in containment area, the poly sheeting may be slippery, especially if wet. Watch out for edges of pavement and curbs as these may be hidden by poly and are trip hazards. Try to walk forwards rather than backwards.	L
	Heavy lifting and awkward positions	Team-lift or use material handling devices to move rolls of poly sheeting. Use good posture when lifting or moving materials. Do not self-lift more than 50 pounds alone. Avoid jerking movements or twisting while walking.	L
	Punctures, cuts, lacerations	Use only knives with retractable blades for cutting poly sheeting. Cut away from the body. Wear leather work gloves. Never place knives in any pocket on your body. Wear gloves when removing debris to clear the pad area	L
	Potential for spread of contamination at sediment and soil handling pads (planning ahead)	Construct pads so they are not too large an area to be effectively covered when not in use (to prevent rain accumulation) and because tarps are hard to manage in inclement weather, including wind. Slope the bermed area to enable recovery of any accumulated liquids including rainwater. Ensure an area is prepared for performing decontamination for those who exit the pad if contaminated, including an area to doff PPE. Provide a receptacle for used PPE as per the Waste Management Plan. Be prepared with a means of securing the tarp over the piles after waste placement to prevent wind from removing the tarp when covered. Workers should not be required to unnecessarily step into or come into contact with contaminated soils when covering and uncovering the pad.	L

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Setup of soil and sediment dewatering pads (continued)	Potential for spread of contamination at sediment and soil handling pads (planning ahead) (continued)	Be prepared as the soil dries out, to manage potential dust generation when covers are removed and soil is exposed, especially on windy days.	
3. Excavating and removal of soil	Contact with underground utilities.	Perform utility locate prior to performing excavations. Mark utilities and do geophysical verification. Hand dig or use non-aggressive methods around utilities if present.	M
	General excavation safety	Competent Person (SS Jon Cary or SSHO Louie McTall) will be onsite during excavation. It is anticipated that all excavations on land will be approximately 2 feet to a maximum of 4 feet in depth and there is no need for implementing full excavation and trenching procedures. However, if contamination is deeper and Navy directs additional depth, the need for additional precautions such as fall protection or safe setbacks may be required and this AHA will be updated accordingly. There is no anticipated need for workers to enter an excavation, and in no case, will entry into any excavation over 4 feet in depth occur without updates to the APP and AHAs. Excavations must be protected as required in Section 25 of the EM 385-1-1.	M
	Potential for finding buried items that are potentially hazardous during excavation	If any item is discovered that may be munitions related, buried cylinders, or other waste, work will stop and the find will be reported so that appropriate safety precautions can be put into place to handle the item or have it removed.	M
	Dust generated during soil handling presents an inhalation and/or ingestion hazard to workers because of site contaminants present in soil.. Soil contains lead, nickel, zinc, and tin. Lead presents the highest hazard to workers.  Also, dusts could allow the spread of contamination to adjacent areas if not controlled.	Ensure a means of dust suppression is available prior to and during excavation and subsequent soil handling activities in the form of a water truck with spray/mist capability. This will be used onsite to wet down soil and roadways during excavation and handling of soil to keep visible airborne emissions from occurring. Workers will stage upwind from the operation when possible. Operator will keep windows of cab closed if downwind. Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.  If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities until such time as dust can be controlled through misting activities.	M

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
	<p>Even soil that is below the cleanup level requiring removal may contain lead. Even lead in soil below the cleanup levels can present hazards to workers in the form of contact and/or inhalation/ingestion hazards.</p> <p>Environmental cleanup level is 400 mg/kg and lead in dust is hazardous to workers at 120 mg/kg.</p>	<p>Dust control is required not only for soils being removed because they are above the cleanup level; but as a general practice site wide in soil areas. If dusts are being generated in the work area, dust suppression practices will be employed to minimize dust generation.</p>	L
	<p>Contact with contaminated soil, should it occur, could present dermal or ingestion hazards to workers or workers could track contaminants out of controlled work areas to common areas or to their homes.</p> <p>Even contact with soil below the cleanup level requiring removal may contain lead. Even lead in soil below the cleanup levels can present hazards to workers in the form of contact and/or inhalation/ingestion hazards.</p>	<p>When possible, look to avoid contact with soil whenever possible and stage back from contaminated areas and minimize tracking through contaminated areas.</p> <p>Workers within the EZ who can come into contact with contaminated soils will wear (at SSHO direction based on contact potential for task):</p> <ul style="list-style-type: none"> <li>• Boot covers (disposable) or PVC boots (reusable after decontamination);</li> <li>• Disposable nitrile gloves for hand protection;</li> <li>• Tyvek, Durafab, or Kleenguard coveralls (potentially can be reused after decontamination and proper stowage for reuse)</li> </ul> <p>Proper decontamination procedures will be overseen by the SSHO prior to leaving the CRZ.</p> <p>Employees will be instructed to wash hands and (if necessary) face after leaving the CRZ and before eating, drinking, smoking, etc.</p> <p>Under no circumstances, will contaminated clothing be placed into any site or personal vehicle, break rooms, or office space.</p>	L
Excavating and removal of soil (continued)	Slips, trips, and falls	Excavation will be barricaded when left open and unattended. Work areas will be kept neat and clean. Trip hazards, if present, will be removed. Excavation depth is anticipated to shallow, but still is an opening where workers could slip or fall.	

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
	Construction equipment buckets and booms could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider. If lines are present and there is potential for contact, lines will be de-energized by utility company (there are two such lines and power poles known to be present). The voltage of the lines must be known.	M
	Contact with cables or lines placed in harbor	Verify with Navy and City whether there may be any cables or buried pipelines that run in the excavation area.	M
4. Excavation and removal of sediment	Slips, trips, and falls and potential falls when working along shoreline and slope edges could cause injuries Concrete and rip-rap on slopes may have rebar in it and it may protrude, making a fall hazardous for impalement in places	Work areas will be kept neat and clean. Trip hazards, if present, will be removed. There is no anticipated need for any workers to walk onto or down the slope, so workers will stay away from the slope and not walk down the slopes unless there is a reason and the SSHO evaluates the travel path and activity to be performed. Workers will not climb up or down any slopes 45 ° or greater. This is not anticipated to be required as the slopes appear on site drawings to be gradual.	M
	Contact with contaminated sediment, should it occur, could present dermal or ingestion hazards to workers or workers could track contaminants out of controlled work areas to common areas or to their homes.	When possible, look to avoid contact with soil whenever possible and stage back from contaminated areas and minimize tracking through contaminated areas. Workers within the EZ who can come into contact with contaminated soils will wear (at SSHO direction based on contact potential for task): <ul style="list-style-type: none"> <li>• Boot covers (disposable) or PVC boots (reusable after decontamination);</li> <li>• Disposable nitrile gloves for hand protection;</li> <li>• Tyvek, Durafab, or Kleenguard coveralls (potentially can be reused after decontamination and proper stowage for reuse)</li> </ul> Proper decontamination procedures will be overseen by the SSHO prior to leaving the CRZ. Employees will be instructed to wash hands and (if necessary) face after leaving the CRZ and before eating, drinking, smoking, etc. Under no circumstances, will contaminated clothing be placed into any site or personal vehicle, break rooms, or office space.	M

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Excavation and removal of sediment (continued)	<p>Even though sediment will be moist when removed, equipment and other surfaces that have sediment contact can dry out and then dusts could be generated after material dries. This can present an inhalation and/or ingestion hazard to workers because of site contaminants present in sediments. Soil contains lead, nickel, zinc, and tin. Lead presents the highest hazard to workers.</p> <p>Also, dusts could allow the spread of contamination to adjacent areas if not controlled.</p>	<p>Ensure a means of dust suppression is available prior to and during excavation and subsequent soil handling activities in the form of a water truck with spray/mist capability. This will be used onsite to wet down soil and roadways during excavation and handling of soil to keep visible airborne emissions from occurring. Workers will stage upwind from the operation when possible. Operator will keep windows of cab closed if downwind. Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.</p> <p>If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities until such time as dust can be controlled through misting activities.</p> <p>Ensure equipment is cleaned properly or covered to minimize drying of sediment and spread of contaminants.</p>	M
	Heat Stress	<p>SSHO to monitor for signs and symptoms of heat stress. Heat stress can be exacerbated when wearing chemical protective suits and respirators. Use the buddy system to observe your buddies. Take breaks as required to rest (work/rest schedules) and drink plenty of fluids and electrolytes. Refer to EHS 4-6 Temperature Extremes procedure.</p>	M
4. Loading, hauling, and dumping of transport vehicles	Potential for spills and releases from dump bed or during loading and dumping.	<p>For dry loads, beds must be sift proof and loads must be covered if windy. For wet loads (e.g., sediment), loads must be leak tight and/or lined for travel.</p> <p>Place liner under loading area to catch and contain dropped soil or sediment. Clean up spills of soil or sediment promptly.</p> <p>Ensure pads are designed for dump entry and containment during dumping of soils</p>	L
	Boom of excavator or lifted truck bed could strike power lines or come within 15 feet of lines if present	<p>Ensure load and unload areas are free from or isolated from electrical hazards and appropriate distances can be maintained. Survey the areas and haul routes. Know the voltages carried by power lines and the height of the power lines, Don't estimate it, check with power utility</p>	M
	Improper operation of dump trucks	<p>Operators must have commercial driver's license and be experienced in the proper use of the truck, how to raise and lower truck bed and dump gate</p>	M

<b>AHA #2 – Activity/Work Task: Soil and Sediment Excavation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Loading, hauling, and dumping of transport vehicles (continued)	Workers could be struck by dump truck gate or soil as it is unloaded	Do not stand directly behind dump truck or gate when it is released and opened. Spotter to direct all backing operations. Only spotter and operator to work in tandem to direct loading and unloading.	M
	Dust generated during soil handling could cause inhalation or ingestion of site contaminants with inhalation or ingestion of respirable dusts. Soil contains lead, nickel, zinc, and tin.  Also, dusts could allow the spread of contamination to adjacent areas if not controlled.	Ensure a means of dust suppression is available prior to and during excavation and subsequent soil handling activities in the form of a water truck with spray/mist capability. This will be used onsite to wet down soil and roadways during excavation and handling of soil to keep visible airborne emissions from occurring. Workers will stage upwind from the operation when possible. Operator will keep windows of cab closed if downwind. Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.  If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities until such time as dust can be controlled through misting activities.	L
	Other vehicle and base traffic hazards	Establish dedicated haul routes for transporting soil. Ensure proper traffic controls are in place to protect workers, pedestrians and other traffic. Watch out for other traffic operating in the area. Wear high visibility vests. Demarcate and barricade (as required) work zones	M
	Spread of contamination when loading and dumping is completed	Perform appropriate decontamination of truck beds and tools as well as excavator buckets to remove adhering soil and sediments. Do this over a pad or other containment structure so that spills can be cleaned up and managed appropriately.	M

<b>AHA #3 – Activity/Work Task: Soil and Sediment Excavation</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Excavator Excavator with thumb attachment Loader	Qualified, trained, experienced operators will operate heavy equipment. Operators: William Benson, Jon Cary, Garry Williams approved to operate all equipment listed	Receipt inspection by SS Daily inspection by users/operators. Task observation of operators by SS.
Water Truck (for dust suppression)	Trained and experienced operators will operate the water truck. William Benson, Jon Cary, Garry Williams	Receipt inspection by SS Daily inspection by users/operators. Task observation of operators by SS
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking. Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat, safety toed boots, safety glasses with side shields, standard work uniform (long pants, sleeved shirt), high visibility vest, hearing protection (as required), work gloves when indicated. Additional PPE as specified above.

**Abbreviations and Acronyms:**

- |                                      |  |
|--------------------------------------|--|
| AHA – Activity Hazard Analysis       | EZ – Exclusion Zone                                  |
| APP – Accident Prevention Plan       | OSHA – Occupational Safety and Health Administration |
| CIH – Certified Industrial Hygienist | PPE – Personal Protective Equipment                  |
| CRL – Corporate Reference Library    | RAC – Risk Assessment Code                           |
| CRZ – Contamination Reduction Zone   | SS – Site Superintendent                             |
| EM – Engineer Manual                 | SSHO – Site Safety and Health 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.

NAME	SIGNATURE	TITLE	DATE
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>REMOVAL AND PROCESSING OF SHORELINE RIP-RAP</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																															
	SIGNATURES	Activity #	<b>A1200</b>	AHA #	<b>4</b>																															
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																		
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="5" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	E	E	H	H	M	E	H	H	M	L	H	M	M	L	L	M	L	L	L	L
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PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																			
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																			
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																																			
SUBCONTRACTOR:	<b>N/A</b>																																			
DATE OF PREPARATORY MEETING:		Catastrophic	E	E	H	H	M																													
DATE OF INITIAL INSPECTION:		Critical	E	H	H	M	L																													
CONTRACTOR COMPETENT PERSON:		Marginal	H	M	M	L	L																													
SITE SAFETY and HEALTH OFFICER		Negligible	M	L	L	L	L																													
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)																																		
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																		
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																		
M = MODERATE RISK (CM or ET or PAR)																																				
L = LOW RISK (ET or PAR)		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																		

<b>AHA #4– Activity/Work Task: Removal and processing of shoreline rip-rap</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Operation of heavy equipment, general	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Front end loaders normally perform operations in quick forward and reverse operations. Stay out of the are unless you have made eye contact with the operations and your presence is acknowledged. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator.	M
2. Removing and staging rip-rap from shoreline (concrete rubble and debris)	Vehicle operations from Tt or other tenant operations and delivery vendors could cause injury to personnel or others onsite	Workers operating company vehicles will have a valid state issued driver's license. Any Commercial Driver's License (CDL) truck and trailers will be operated by CDL qualified drivers. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use parking brake when parked. Use chocks when parked on inclines. Use dedicated spotter and standard hand signals for backing operations. Wear high visibility vest when working around operating vehicle traffic. Coordinate with other site tenants including the port as required to identify travel and traffic patterns and to delineate work areas.	M
	Improper use of excavator with thumb or large items could lead to equipment damage or failure of load	Ensure operator knows load limits and capabilities of bucket and thumb for the materials being removed. Large slabs of concrete may require breaking up to move. Ensure swing radius is clear of all personnel and equipment that could be damaged when moving materials.	M
	Slips, trips, and falls and potential falls when working along shoreline and slope edges could cause injuries  Concrete and rip-rap on slopes may have rebar in it and it may protrude, making a fall hazardous for impalement in places  When rip-rap is removed, soils	Work areas will be kept neat and clean. Trip hazards, if present, will be removed. There is no anticipated need for any workers to walk onto or down the slope, so workers will stay away from the slope and not walk down the slopes unless there is a reason and the SSHO evaluates the travel path and activity to be performed.  If any slopes are greater than 45 degrees and could expose workers to a fall of 6 feet or more, barricades will be placed to keep workers 6 feet from the edge or a means of fall protection will be put into place and a fall protection plan will be developed. This is not anticipated to be required as the slopes appear on site drawings to be gradual.	M

<b>AHA #4– Activity/Work Task: Removal and processing of shoreline rip-rap</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removing and staging rip-rap from shoreline (concrete rubble and debris) (continued)	could become unstable and could subside or collapse  Exposure to concrete and cement dust (potential silica exposure)	Excavation competent person (TBD) and equipment operator to evaluate soil conditions along the slope to determine appropriate equipment setbacks. Tracks are to face the slope, not be parallel to it. Excavation competent person to evaluate the slope and soil conditions before allowing any workers to be on or along the banks. If rebar is present, it will be bent over using the bucket or cut off.  Ensure that there is effective dust control (mist spray to keep dust suppressed). If not, real time monitoring with a respirable aerosol monitor (RAM) will be required. Contact the SHM, a CIH.	
3. Cleaning of debris and removal of rebar from concrete	Falls onto rebar can cause severe injury. Concrete on pads can shift and crush worker	The piles will be staged so that workers can access areas to safely get into position and perform saw cutting of rebar without potential falls onto other rebar and so that loads will not shift when handled. Heavy equipment will be used as required to reposition slabs for worker access and safety. Entry into the debris staging area will be controlled.	M
	Ergonomic hazards such as sprains, strains, or back injury from lifting or repetitive actions	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Handling sharp objects or using hand tools could cause cuts, punctures, or scrapes	Wear leather work gloves when handling materials that may be sharp or have sharp edges. Be familiar with the proper use and limitations of hand tools and use the proper tool for the job. When using cutting tools, ensure the cut is away from the body. Ensure guards are in place.. Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and have a minimum of 2 persons with first aid and CPR training	M
	Use of construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider.	M
	Fire hazards when using cutting tools or grinders if sparks are produced or heat is generated	Ensure a properly rated fire extinguisher is located at the work site. Implement hot work procedures and hot work permit and have a dedicated fire watch present. Keep combustibles at least 30 feet from the work area.	M
	Cold or heat stress and Weather hazards	Properly dress for the weather. SSHO to monitor weather and implement heat stress and cold stress controls as specified in the APP. Provide breaks for	L

<b>AHA #4– Activity/Work Task: Removal and processing of shoreline rip-rap</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Cleaning of debris and removal of rebar from concrete (cont'd)		personnel to get either into cool or warm environment. Encourage a steady work pace. Ensure adequate drinking water is available. Know the signs and symptoms of exposure and keep an eye on your partner. Refer to EHS 4-6 Temperature Extremes.	
	Eye and face injuries from dust or debris or struck by or when using saws and cut off tools to cut rebar	<p>Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object cannot be removed, seek medical attention.</p> <p>To keep dust down, travel at slower speeds on unpaved roads and laydown areas. If required, water mist can be used to control dust.</p> <p>When cutting or grinding on rebar, a face shield will also be worn to protect the face from debris hazards and struck by hazards</p>	M
	<p>Dust generated during debris handling presents an inhalation and/or ingestion hazard to workers because of site contaminants present in soil that may be adhering to the debris. Soil contains lead, nickel, zinc, and tin. Lead presents the highest hazard to workers.</p> <p>Also, dusts could allow the spread of contamination to adjacent areas if not controlled.</p>	<p>Ensure a means of dust suppression is available to keep dusts down when handling and moving debris in the form of a water truck with spray/mist capability. Operator will keep windows of cab closed if downwind. Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.</p> <p>If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of debris handling activities until such time as dust can be controlled through misting activities.</p>	M
	Contact with contaminated soil adhering to the debris, should it occur, could present dermal or ingestion hazards to workers or workers could track contaminants out of controlled work areas to common areas or to their homes.	<p>When possible, look to avoid contact with soil whenever possible and stage back from contaminated areas and minimize tracking through contaminated areas.</p> <p>Debris will be staged on poly sheeting if possible so that adhering soil, should it come free, can be captured. Debris piles will be covered when not in use. Workers within the EZ who can come into contact with contaminated soils will wear (at SSHO direction based on contact potential for task):</p> <ul style="list-style-type: none"> <li>• Boot covers (disposable) or PVC boots (reusable after decontamination);</li> </ul>	L

<b>AHA #4– Activity/Work Task: Removal and processing of shoreline rip-rap</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Cleaning of debris and removal of rebar from concrete (cont'd)		<ul style="list-style-type: none"> <li>• Disposable nitrile gloves for hand protection;</li> <li>• Tyvek, Durafab, or Kleenguard coveralls (potentially can be reused after decontamination and proper stowage for reuse)</li> </ul> <p>Proper decontamination procedures will be overseen by the SSHO prior to leaving the CRZ.</p> <p>Employees will be instructed to wash hands and (if necessary) face after leaving the CRZ and before eating, drinking, smoking, etc.</p> <p>Under no circumstances, will contaminated clothing be placed into any site or personal vehicle, break rooms, or office space.</p>	
	Noise from tool or equipment use could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise.	M
	Head injuries from struck by or falling objects	Wear hard hat when overhead hazards exist and when working in areas with operating construction equipment.	M
	Poisonous snakes	Watch for snakes in the debris and know how to identify ones that could be venomous. Keep hands and other body parts from placement into burrows, debris piles, or under objects or debris. Review procedures to follow in the event of a snake bite as are included in the APP.	L

<b>AHA #4 – Activity/Work Task: Removal and processing of shoreline rip-rap</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current state-issued driver’s license.	Daily vehicle inspection by drivers. Receipt inspection by SS.
Heavy Equipment	Operators will be qualified and experienced operators for use of the equipment they operate	Receipt inspection by SS. Daily inspection by operator.
Hand and power tools, including saws and grinders	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task. Familiarization with the hot work procedures and permit requirements	Daily inspection by users/operators. If required, a hot work permit will be issued.
Portable Generator (if required)	Operators must be familiar with safe operation and shutdown and refueling of unit	Daily inspection by users/operators.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking. Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest.

**Abbreviations and Acronyms:**

APP – Accident Prevention Plan  
 EHS – Environmental, Health, and Safety  
 MSDS – Material Safety Data Sheet

OSHA – Occupational Safety and Health Administration  
 SSHO – Site Safety and Health Officer

SS – Site Superintendent

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>DEWATERING AND PROCESSING OF LIQUIDS FROM SOIL AND SEDIMENT AT DEWATERING PAD</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																																			
	SIGNATURES	Activity #	<b>A1430 , A1200 and A1300</b>	AHA #	<b>5</b>																																			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																						
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="10" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center;">Catastrophic</td> <td style="text-align: center;">E</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> </tr> <tr> <td style="text-align: center;">Critical</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Marginal</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Negligible</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L
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	CONTRACT NUMBER:						<b>N62470-13-D-8007</b>																																	
	TASK ORDER/DELIVERY #:						<b>WE01</b>																																	
	LOCATION:						<b>SWMU 3, JEB LITTLE CREEK</b>																																	
	DATE PREPARED:	<b>August 2013, Revised November 2013</b>																																						
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																							
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																							
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<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)																																						
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																						
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																						
M = MODERATE RISK (CM or ET or PAR)																																								
L = LOW RISK (ET or PAR)		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																						

<b>AHA #5 – Activity/Work Task: Dewatering and processing of liquids from soil and sediment dewatering pad</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Operation of heavy equipment, general	Construction equipment could cause injury to personnel if used during these tasks	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator.	M
2. Dewatering pad operations (general hazards)	Slips, trips, and falls	Poly sheeting may be slippery, especially if wet. Watch out for edges of drum pad berms as these may be hidden by poly and are trip hazards as are other drums. Maintain good housekeeping on drum pad to ensure sampling team can access areas around each drum without tripping over others.	L
	Punctures, cuts, lacerations could lead to injury to body parts	Wear leather work gloves when handling liner or tools. Keep other body parts and protective PPE from contact with sharp edges. Remove these hazards when feasible or protect them so workers cannot contact them.	L
	Heavy lifting and awkward positions	Team-lift or use of position pumps and hoses Use good posture when lifting or moving materials. Do not self-lift more than 50 pounds alone. Avoid jerking movements or rotating while walking or lifting.	L
	Exclusion zones	Maintain the exclusion zone (EZ) around the soil pads to ensure unauthorized personnel keep out and utilize the controlled entrance and exit point (contamination reduction zone). Only authorized personnel with proper PPE are allowed to enter the EZ if contact with soil is possible	L
	Wind could make covering of the pad challenging or lead to dust generation.	When covering or uncovering pad, ensure adequate team is assembled so that tarps do not become sails. Also ensure sufficient materials are on hand to secure the tarp over the berm so that wind does not remove the tarp or move the tarp allowing rain (if present) to enter berm. Keep soil surface misted as required to keep dust levels down. Uncover pad only as necessary. Uncover only on non-windy days. If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities and covering the pad until such time as dust can be controlled.  Should visible dusts be generated, ground workers who are within the	M

<b>AHA #5 – Activity/Work Task: Dewatering and processing of liquids from soil and sediment dewatering pad</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
2. Dewatering pad operations (general hazards) (cont'd)		EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.	
	Contact with potential contaminants in soil or sediment and potential spread of contaminants to other areas	Workers entering the pad to conduct these activities will wear nitrile gloves if they will come into contact with soil with hands, boot covers or PVC work boots if they will come into contact with soils or sediments or will be in the accumulated water, and Durafab, Kleenguard, or Tyvek suits to protect clothing if splashes could occur or contact with clothing is possible. In addition if splash hazards could occur, workers will wear safety goggles and face shields (e.g., during pump operations).  Appropriate means of decontamination will be provided for workers in the CRZ exiting the pad under direction of the SSHO and before doffing of PPE. SSHO will determine the appropriate level of decontamination based on site conditions and contact. Workers will keep contact with potentially contaminated soil to a minimum. A hand washing station will be located in the SZ for workers to wash hands before leaving the area to go on break. In addition to workers, any contaminated tools or equipment will also undergo appropriate level of decontamination to prevent the spread of potential contaminants.	L
3. Pump operation and treatment system operation	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise.	M
	Confined space hazards	Tanks are confined spaces. No person is allowed to enter a tank unless the confined space entry procedures are followed and the team is trained to perform these tasks. During these tasks, there is no anticipated need to enter any tank. Confined spaces will be marked as such. A separate AHA has been developed for tank cleaning operations in which entry may be required. NO ENTRY IS PERMITTED unless the APP is changed and a full Confined Space Entry Plan must be submitted for review by the SHM and OICC using and FCR.	M
	Improper tool use or improper tool selection for the job could cause injury to workers	Tools used to service pump or connections and fittings on treatment system will be selected based on uses specified by the manufacturer for the task at hand.  Tools that are not meant for prying will not be used to pry. Tools that are not the correct size will not be modified. Cheater bars will not be used. Pumps, if used, will be properly rated to handle the materials they	M

<b>AHA #5 – Activity/Work Task: Dewatering and processing of liquids from soil and sediment dewatering pad</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
3. Pump operation and treatment system operation (cont'd)		are intended to pump. Screw drivers and chisels will not be pounded on. Position tools that cut so they cut away from one's body and others. Wear leather gloves to protect from sharp edges and when using tools.	
	Contact with potential contaminants water and potential spread of contaminants to other areas	Workers conducting these activities will wear nitrile gloves if they will come into contact with contaminated water with hands, boot covers or PVC work boots if they will come into contact with water or wet soil or sediments or will be in the accumulated water, and Durafab, Kleenguard, or Tyvek suits to protect clothing if splashes could occur or contact with clothing is possible. In addition if splash hazards could occur, workers will wear safety goggles and face shields (e.g., during pump operations). Appropriate means of decontamination will be provided for workers in the CRZ exiting the pad under direction of the SSHO and before doffing of PPE. SSHO will determine the appropriate level of decontamination based on site conditions and contact. Workers will keep contact with potentially contaminated soil to a minimum. A hand washing station will be located in the SZ for workers to wash hands before leaving the area to go on break. In addition to workers, any contaminated tools or equipment will also undergo appropriate level of decontamination to prevent the spread of potential contaminants.	L
	Improper operation of treatment system could lead to a release or injury to persons	The manufacturer and supplier of the treatment system will set up the system and train workers how to operate the system properly and shut the system down properly, including procedure for back-flushing if required. An SOP will be developed or provided to follow for this task. Wear proper PPE such as hearing protection, eye protection, including goggles and face shield if splashes could occur. MSDS for any flocculent used will be on hand and workers will be familiar with the hazards and precautions. Vessels under pressure (if any) will be depressurized prior to loosening any fittings or cam-locks following manufacturer or supplier instruction.	M
	Head protection	Hard hats will be worn when the treatment system is active and when using pumps.	

<b>AHA #5– Activity/Work Task: Dewatering and processing of liquids from soil and sediment dewatering pad</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.
Sump pump	Training in proper use and servicing of pump	Inspection prior to use daily.

**Notes:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

***Abbreviations and Acronyms:***

- APP – Accident Prevention Plan
- SSHO – Site Safety and Health Officer
- PPE – personal protective equipment
- SHM – Safety and Health Manager
- SS – Site Superintendent
- SSHO – Site Safety and Health 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.

NAME	SIGNATURE	TITLE	DATE
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>BACKFILL OF EXCAVATED AREAS AND SITE RESTORATION, INCLUDING RIP-RAP PLACEMENT AND SWALE AREA CONSTRUCTION</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																																			
	SIGNATURES	Activity #	<b>A1210 and A1450</b>	AHA #	<b>6</b>																																			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																						
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="10" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center;">Catastrophic</td> <td style="text-align: center;">E</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> </tr> <tr> <td style="text-align: center;">Critical</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Marginal</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Negligible</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L
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	TASK ORDER/DELIVERY #:						<b>WE01</b>																																	
	LOCATION:						<b>SWMU 3, JEB LITTLE CREEK</b>																																	
	DATE PREPARED:	<b>August 2013, Revised November 2013</b>																																						
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																							
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<b>AHA #6 – Activity/Work Task: Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Operation of heavy equipment, general	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator. Various excavators have different load capabilities and centers of gravity that the operator must be familiar with and experienced with when using. Long stick excavators vs. other excavators.	M
2. Delivery and placement of clean fill on land and over sediment and slope	Boom of excavator or lifted truck bed could strike power lines or come within 15 feet of lines if present	Ensure load and unload areas are free from or isolated from electrical hazards and appropriate distances can be maintained. Survey the areas and haul routes.	M
	Improper operation of dump trucks	Operators must have commercial driver’s license and be experienced in the proper use of the truck, how to raise and lower truck bed and dump gate	M
	If shooter truck is used to place sand in sediment area, eye and debris ejection is a hazard as well as conveyor pinch points	Only the shooter truck operator will operate the truck. PPE will include hard hat and safety glasses for operator. Other persons will not be within 10 feet on either side of conveyor and only on side by operator and in view of operator. Conveyor will be posted with pinch point hazard signage and there will be operator kill switch conspicuously on the truck by the operational area. Do not stick hands into any conveyor system. If truck does not operate correctly, the vendor will leave the site to make repairs.	M
	Dusts could be generated and pose an inhalation and ingestion hazard to workers – silica dust and/or site contaminants.	Soil and sand may contain silica. Silica dust is an inhalation hazard. Dust control is required if dusts are generated during placement of clean soil/sand.  In addition, existing soils on slope may contain lead. Even lead in soil below the cleanup levels can present hazards to workers in the form of contact and/or inhalation/ingestion hazards. Cleanup level is 400 mg/kg and lead in dust is hazardous to workers at 120 mg/kg.  A means of dust control (water misting/spraying) will be employed if this	L

<b>AHA #6 – Activity/Work Task: Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Delivery and placement of clean fill on land and over sediment and slope (continued)		<p>activity creates dust.</p> <p>Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.</p> <p>If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities until such time as dust can be controlled through misting activities.</p>	
3. Placement and securing of geotextile membrane on slope (if it requires workers to be on foot in these areas)	Slips, trips, and falls  Potential for sloughing of slope walls	<p>When spreading out membrane and when working on slopes, the membrane may be slippery, especially if wet. Also, working on slopes makes for hazardous footing and unstable walking surfaces. Wear sturdy safety toed leather boots with good treads. Excavation competent person will evaluate slope and soil conditions before allowing entry by workers onto these slopes to ensure there is no collapse hazard.</p> <p>If slope is &gt; 45 degrees workers will not walk on them.</p>	M
	Cuts and lacerations or other injuries from falling on slopes	Ensure that there is no protruding rebar or other impalement hazards, including sharp materials on slopes where workers will work.	M
	Potential for water to intrude on the PortaDam structure after placement of sand layers	Ensure the PortaDam structure is functioning properly and has held water out successfully. Observe for signs of potential leakage or failure and be prepared to leave the area if water begins to intrude or if a sudden failure occurs. Limit travel to the extent necessary to secure the liner.	M
	Working downslope of operating equipment – struck by falling objects or debris, being under suspended loads, potential for equipment operation to destabilize soils	<p>Heavy equipment operations and workers on foot below slope must be carefully coordinated to the task at hand. Workers will never be under a suspended load and the operator of the equipment must not place a suspended load over workers. The excavation competent person (TBD) will evaluate the slope stability based on potential loading of the soil by heavy equipment. Loads, if lifted, will have tag lines. Only the person with the tag line will be in the work area, but the worker will be positioned to the side of the load.</p> <p>If hoisting by mechanical means is performed for this task, also review and follow the AHA for Hoisting and Rigging – AHA 11.</p>	M
	Heavy lifting and awkward positions	Team-lift or use material handling devices to move or unroll membrane.	M

<b>AHA #6 – Activity/Work Task: Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Placement and securing of geotextile membrane on slope (if it requires workers to be on foot in these areas) (continued)		Use equipment whenever possible to move larger or cumbersome loads. Use good posture when lifting or moving materials. Do not self-lift more than 50 pounds alone. Avoid jerking movements or twisting while walking.	
	Punctures, cuts, lacerations	Use only knives with retractable blades for cutting the membrane. Cut away from the body. Wear leather work gloves. Do not carry knives in pockets on one's body. Wear gloves when removing debris.	M
4. Placement of concrete and rock and rip-rap on slope	Shifting of rock or falling of rock to areas below the slope	Workers will not be on slope near or below where rock and concrete is being placed onto slope. Placement is entirely by heavy equipment.	M
5. Compaction of fill on land	Back and forth repetition of tracks – workers could be struck, turning around or pivoting of excavator cab could strike personnel or equipment	Ensure the entire footprint is demarcated so workers or pedestrians or vehicles do not enter compaction area where they can be struck. Establish a marker that the operator can visually reference and line up to when backing to stay within compaction zone. Ensure excavator, if it will pivot for visibility by operator, has free swing radius at 360 degrees and keep personnel and equipment out of that radius.	M
	Fugitive dusts associated with clean fill placement and compaction	Dust suppression is available in the form of a water truck with spray/mist capability will be used to keep soil to keep visible airborne emissions down. Workers will stage upwind from the operation when possible. Operator will keep windows of cab closed if downwind.	L
6. Seeding and final restoration	Seed and fertilizer mixture spreading could get dust in eyes, contact with fertilizer	Wear safety glasses during seed spreading activities. Have and review fertilizer MSDS. Wear gloves when handling fertilizer and wash hands after use.	L
	Potential for erosion prior to final stabilization, which could cause need for rework and turbidity in harbor from runoff	Leave temporary stormwater controls in place on land and also leave turbidity curtain in place until the site is stabilized and vegetation has established.	L

<b>AHA #6 – Activity/Work Task: Backfill of excavated areas and site restoration, including rip-rap placement and swale area construction</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Excavator (including long stick if required)	Trained and experienced operators will operate heavy equipment.	Receipt inspection by SS Daily inspection by users/operators. Task observation of operators by SS.
Water Truck (for dust suppression)	Trained and experienced operators will operate the water truck.	Receipt inspection by SS Daily inspection by users/operators. Task observation of operators by SS
Geophysical equipment and DGPS units (to verify utility locations and to mark limits of restoration areas.	Only qualified geophysical technicians trained in care and use of this equipment	Receipt inspection by geophysical lead. Daily inspection and any required function and/or QC check by user.
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

**Abbreviations and Acronyms:**

- APP – Accident Prevention Plan
- DGPS – differential global positioning system
- SSHO – Site Safety and Health Officer
- SS – Site Superintendent
- SZ – Support Zone
- PPE – personal protective equipment

SHM – Safety and Health Manager

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
2.			
3.			
4.			
5.			
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10.			

# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>BOATING OPERATIONS</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>H</b>		
	SIGNATURES	Activity #	<b>A1240, A1220</b>	AHA #	<b>7</b>		
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>					
NAME & DATE ACCEPTED BY GDA:		<b>Severity</b>					
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE01</b>						
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>						
DATE PREPARED	<b>August 2013</b>						
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>						
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>						
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>						
SUBCONTRACTOR:	<b>N/A</b>						
DATE OF PREPARATORY MEETING:		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
DATE OF INITIAL INSPECTION:		Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
CONTRACTOR COMPETENT PERSON:		Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
SITE SAFETY and HEALTH OFFICER		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)					
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		" <b>Severity</b> " is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
<b>M = MODERATE RISK (CM or ET or PAR)</b>							
<b>L = LOW RISK (ET or PAR)</b>		" <b>Probability</b> " is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					

<b>AHA 7 – Boating Operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Pre-launch (when applicable).	General precautions to be taken.	Boat captain will use the boating checklist in Appendix D before launch to ensure all required safety devices and equipment are onboard and within service dates; check fuel levels; ensure outboards (as equipped) are secure and in proper position for travel; lash down any loose materials, check trailer and hitch equipment; verify trailer brake lights and backup lights are functional, etc. Perform tow vehicle inspection.	M
2. Launch boat (when applicable), safety when at dock	Failure of proper backing or stopping can cause struck by and pinch point injuries or property damage.	Use spotters for all backing operations. Ensure spotter stands in line of sight of the person backing the vehicle. Verify understanding of hand signals used for backing, going forward, stopping, and turning left or right. All personnel who back a trailer are trained and qualified to do so and are designated by their supervisor. Typically, this person should be the qualified boat captain. Use parking brake and wheel chocks, and ensure operator is not moving vehicle before coming between truck and boat to unhitch boat from trailer.	M
	Personnel can slip or trip while on the dock and when getting on or off the boat, including falls into water.	Personnel should use appropriate footwear (leather deck shoes or work boots) to ensure that there is enough tread on the soles to minimize slipping. Look out for trip hazards such as ropes and cleats on dock. When climbing up or down any ladder or climbing onto or off a boat, always ensure three points of contact. Always place supplies, hoses, cords, and other equipment in areas away from normal foot traffic, and equipment and tools in a safe location that does not present a trip hazard to work areas. Wear a type II or better PFD when working on deck of boat or on docks without adequate guard rails.	L
	Other vehicle and boat traffic at launch could cause struck by hazards.	Use proper etiquette and rules posted at the marina or launch point. Allow the persons ahead of you space to finish their operations before proceeding. Likewise, when launching, watch out for other vehicles and boats that may encroach into your operating space or launch next to you (if space allows). If they are backing adjacent to you, do not turn your back on them. Safely secure your boat away from the launch point and move the vehicle and trailer out of the way to the designated parking area (if parking will be done).	M
3. Perform refueling activities	Workers could be exposed to gasoline and spills could occur.	Portable fuel cans for small boats will be refilled and mixed at a service station and brought to the boats and hooked up to the outboard as required for operation when refueling is required. Larger boats with internal tanks will be refilled either at a service station (on trailer) or at a marina with public fuel dispensing capabilities. Delineate the refueling zone by keeping combustibles away. Review the Material Safety Data Sheet (MSDS) for gasoline and know the hazards. The Boat Captain is responsible for safety during refueling. Have some spill pads present. Ensure a visual or other means of overfill prevention is present so as not to overfill the tank and cause a spill. Keep control of the nozzle at all times during refilling. Position	L

<b>AHA 7 – Boating Operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Perform refueling activities. (continued)		upwind so as not to breathe the gasoline vapors. Follow additional spill prevention measures as specified in the APP (Section 9.0) to minimize the potential for spills; and follow spill response measures in the APP (Section 9.0) if spills do occur. Any sheen in the water must be reported.	
	During fueling of boat, there is potential for fire; potential fire on startup.	No smoking or other sources of ignition when fueling. Engine must be off and cooled. There must be a properly rated fire extinguisher available (see Table 9-2 in the APP). Refuel in a manner to prevent any spills as noted in the above. A blower must be available and used on inboard boats to evacuate accumulation of vapors prior to starting the boat. Flame arrestor must be present and functional on inboard boats.	M
4. Operate boats.	Failure to meet EM 385-1-1 Section 19F (Launches, Motorboats, and Skiffs) requirements. Use of boats could cause injury or death.	Follow the requirements of EM 385-1-1 19F. All boat operators are qualified and trained in boat use procedures and must be authorized to operate boats. Where U.S. Coast Guard licensing is required, operators will have such licensing. Follow requirements for small boat operations in the APP and training requirements in the APP. The boat captain will ensure all boat passengers have been briefed on safety and rules onboard, and the location, use, and inspection of emergency equipment as well as the procedures to follow in the event of a shipboard emergency, including man overboard and abandon ship per Section 9.0 of the APP and that personnel wear PFD on deck. Practice drills will be executed prior to or during first deployment for situations such as man overboard, fires and explosions, and abandon ship and the results of the drill documented to the SSHO for the project. The boat captain will inspect boat daily before use.	H
	Noise from boat engine could cause hearing loss to workers.	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule also applies to personnel working around heavy equipment and generators.	L
	Personnel can slip or trip while on the dock and when getting on or off the boat or fall into the water during operation and egress.	Personnel should use appropriate footwear (leather deck shoes or work boots) to ensure that there is enough tread on the soles to minimize slipping. Look out for trip hazards and correct or mark and warn if trip hazards are found. Those hazards that cannot be removed must be marked. When climbing up or down ladders or going from boat to dock, always ensure three points of contact. Work is authorized during daylight hours only; otherwise proper illumination at dock and on boats must be provided. Always place supplies, hoses, cords, and other equipment in areas away from normal foot traffic, and equipment and tools in a safe location that does not present a trip hazard to work areas. Use buddy system on deck. Have PFD on and properly secured while on boat decks. If personnel are transferred from boat to barge, the transfer must occur via a gangway or ladder system. Have a whistle on PFD to notify in case of man overboard. Do not conduct work over the side or extend body over the rail while boat	L

<b>AHA 7 – Boating Operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Operate boats. (continued)		is in motion. The boat captain will ensure work is not being conducted prior to acceleration.	
	Boat could run out of fuel when operating or traveling (travel not anticipated).	Ensure there is enough fuel supply for the trip and the return to dock plus 1/3 in reserve.	M
	Boat could malfunction and drift into shore or hazardous area if engine does not work.	Ensure communications are working on the boat. Have anchor and enough line to deploy in the event of motor/engine malfunction. Preventive maintenance and servicing of boat as required by manufacturer for hours run will be maintained to help minimize malfunctions. Have tool kit onboard for minor repair needs.	M
	Severe weather can cause hazardous boating conditions or damage to boat.	Monitor the local and national weather service broadcasts prior to mobilization by boat and during the day. Pay attention to weather advisories and storm warnings, namely hurricanes. Monitor actual water conditions for dangerous wave action. Get persons to dock before conditions are bad whenever possible. Use extra precautions when getting on and off boats in high wind or seas and assist each other. Watch for pinch points between boat and dock. Follow provisions in the APP for severe weather. Have sufficient bumpers and fenders to place between boats and floats to minimize wear and tear and damage. The boat captain will verify proper use of knots and means to secure boat.	M
	Grounding.	Use caution in the shallow areas. Use depth meter and spotting to avoid striking the bottom or grounding.	L
	Boat could be struck by other boats in area.	Boat operator is in charge of situational awareness while on the water. Boat operator will not be doing other tasks. Monitor Channel 16 and follow U.S. Coast Guard rules for lighting, mooring, at anchor, rights of way, and other vessel operations. Use air horn in the event of a boat coming close.	M
	Heat or cold stress may be experienced.	Boat occupants will be monitored for signs and symptoms of heat stress and cold stress (in colder weather, wet weather, or if wind chill is a factor) in accordance with the APP. Hydration and work/rest regimens will be followed. Survival kits on the boat (or staged nearby on the dock) will include blankets in the event of hypothermia or to prevent hypothermia for boat occupants. Boat occupants will be prepared with raingear and a change of clothing in the event they get wet and chilled. Boat survival kit, if used, will be restocked with necessary equipment. Adequate drinking water and electrolyte fluids will be available for boaters. As required, work in open boats or unheated cabins may require regular breaks in a heated location. Likewise, cabins will offer shade for breaks during warm weather.	M

<b>AHA 7 – Boating Operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Operate boats. (continued)		Implement EHS 4-6 – Temperature Extremes.	
	Sunburn for boat occupants.	Use sunscreen SPF 15 or greater as necessary on exposed areas. Wear a hat to protect head from sunburn.	L
	Eye injury.	Safety glasses (clear or tinted) are the minimum required eye protection for all work areas. Eyewash required (15 minute, 0.4 gal per min as required by regulations).	L
	Head injury.	Wear hard hat when overhead hazards exist.	L
	Lack of communication in widely dispersed areas could lead to a delayed response in an emergency.	Ensure that each boat has working cell phones (check reception) and access to a working marine radio with Channel 16. Ensure boat operators have contact with other boats, barge, shore operations, and know what channel to talk on for radio chatter. Verify that marine radio communication via Channel 16 is operational. Use the buddy system on boats. Verify routes to local hospital and know location of dock in the event of an emergency.	L
5. Operate boats in conjunction with dive activities	Divers could be injured by boats, dive boat configuration could present hazards	Refer to Diver Operations AHA and Dive Plan, which will be reviewed if boating is a component of dive tasks.	M

<b>AHA 7 – Boating Operations</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current state issued driver’s license.	Daily vehicle inspection by drivers.
Boats	Qualified Operators will have U.S. Coast Guard approved boater safety qualifications, and when required, U.S. Coast Guard licenses with appropriate rating for the boat and operations they perform as identified in the APP and experience in use of the boats they operate.	Inspect daily and before use. Use the boating checklist form.
PFDs	Training in proper use and limitations of PFDs. Auto-inflatable PFDs will not be authorized for this project. Boat captain will brief workers on the use and limitations of PFDs and the location stowed on boats (when stowed vs. worn). Training in how to inspect and what to inspect for different types of PFDs.	Daily inspection by users.
Fire extinguishers	Fire extinguisher training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, by or under direction of the boat captain, SSHO, or SS (Emergency Coordinator). The boat captain is responsible for U.S. Coast Guard required emergency and safety equipment onboard the boat.	Initially and at least weekly thereafter or after use for restocking. (29 CFR 1926.50[d][2]) Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

**NOTES:**

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 as applicable, Dive Safety Plan. TtEC Corporate Safety Programs will also be available on-site for review of specific materials and mitigation measures. Refer to EHS 6-6, Boating. Refer to EM 385-1-1 Section 19, Floating Plant and Marine Activities, and Section 05.J.

Personal Flotation Devices. Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), sturdy deck shoes, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves when indicated, high visibility safety vest when indicated, and PFD when indicated.

***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

CSP – Certified Safety Professional

dBa – decibels, A-scale

EHS – Environmental Health and Safety

EM – Engineer Manual

MSDS – Material Safety Data Sheet

PFD – personal flotation device

PM – Project Manager

RAC – Risk Assessment Code

SPF – sun protection factor

SSHO – Site Safety and Health Officer

SS – Site Superintendent

TiEC – Tetra Tech EC, Inc.

**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.

<b>NAME</b>	<b>SIGNATURE</b>	<b>TITLE</b>	<b>DATE</b>
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>BARGE PLACEMENT OF AQUABLOK™ AGENT AND CORE SAMPLING</b>	Overall Risk Assessment Code (RAC) (Use highest code)				<b>H</b>																			
	SIGNATURES	Activity #	<b>A1240, A1220</b>	AHA #	<b>8</b>																				
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																							
NAME & DATE ACCEPTED BY GDA:																									
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Severity</b>	<b>Probability</b>																						
TASK ORDER/DELIVERY #:	<b>WE01</b>		Frequent	Likely	Occasional	Seldom	Unlikely																		
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>																								
DATE PREPARED	<b>August 2013</b>		Catastrophic	E	E	H	H	M																	
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																								
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>								Critical	E	H	H	M	L											
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																								
SUBCONTRACTOR:	<b>N/A</b>														Marginal	H	M	M	L	L					
DATE OF PREPARATORY MEETING:																									
DATE OF INITIAL INSPECTION:																					Negligible	M	L	L	L
CONTRACTOR COMPETENT PERSON:																									
SITE SAFETY and HEALTH OFFICER																									
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																							
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																							
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																							
<b>M = MODERATE RISK (CM or ET or PAR)</b>		<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																							
<b>L = LOW RISK (ET or PAR)</b>																									

<b>AHA 8– Barge placement of AquaBlok™ agent and core sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Lift planning (pre planning).	General – Hazard assessment and lift planning for crane operations.	<p>A subcontractor Competent Person (TBD) (will be included at a later date) will evaluate and weight, pick points, access and egress, work location, and other factors in advance of bringing a crane on the barge and develop a site-specific Lift Plan. Since a portion of this crane work will include crane use to place or lift submerged loads (addressed further in AHA 12 with diving operations) a portion of the work with this crane will be a critical lift and a Critical Lift Plan will need to be developed for that activity. Crane use for this AHA for placement of agent into the water is not considered to be a critical lift. A Crane package will be developed, including the Lift Plan that details all the required information, including rigging and inspection/certification details for the crane and all rigging. Before a lift is performed, the Navy Crane Department may want to review and approve the Crane Package and perform an inspection of the crane.</p> <p><i>This AHA task hazard analysis may be revised based on input from the subcontractor depending on the specific required activities, tools, and equipment used after the subcontract is in place and identify more detailed work steps.</i></p>	H
2. Provide for adequate clearance and stability of crane on barge	Potential for restricted motion of crane in swing radius as well as potential development of pinch points on barge deck	Prior to using crane, the area around the crane will be evaluated for material that may be within this zone.	M
3. Tug and Barge operations (general)	Operator and deckhand qualifications	Tug and boat operators must have appropriate USCG approved training and qualification (and licensing as applicable) to operate the vessel(s) and sufficient experience. Deckhands will be experienced and trained to perform the types of operations they will be asked to perform on deck.	M
	Boating operations (general)	AHA 7 will also be reviewed with all members of the team who work on boats or barges.	M
	Failure to follow USCG rules or to display proper day shapes or navigation lights	Follow the USCG rules of the road for tug and barge operations when in travel and when spudded or at anchor. Display proper navigation lights and day shapes. Watch for other traffic, including small boats coming into and out of other marinas or the waterway. Ensure vessel has horn to warn other vessels.	M

<b>AHA 8– Barge placement of AquaBlok™ agent and core sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Tug and Barge operations (general) (continued)	Slips, trips, and falls on deck could lead to injuries or falls into the water  Stairs and gangways could be slippery or move if not secured	Keep work areas free of debris and equipment in work paths. Follow good housekeeping in work areas. Correct hazards when seen. Watch for cleats, lines, and other hazards. Wear a type II or better PFD when working on decks without adequate side rails. Use the buddy system so that a man overboard situation gets prompt attention. PFDs will have an attached whistle to blow to get the attention of the deck crew or shore personnel.  Gangways and fixed ladders on boats will be in good condition and maintained with anti-skid traction for use. Gangways used for transfer of personnel between boats and tugs will be secured to both vessels. Tug and barge will be made up to each other for the transfer.	M
	Electrical hazards could be present when power tools and cords or generators are used	Ensure that power cords are marine grade, are inspected and in good condition for use, that GFCIs are used properly, and portable generators are not overloaded. Ensure any power tools used are in good working condition and have third prong on cord or are double insulated.	M
	Ladder use could cause fall injuries if used improperly	Portable ladders (if used) will be placed and secured from movement at the required intervals for ensuring egress. Portable ladders will be a minimum of 3 feet above the top of the landing. Fixed ladders on vessels will be in good condition and have slip resistant walking surfaces. Workers will use 3 points of contact at all times when climbing or descending ladders. Workers will not carry tools or equipment in their hands when using a ladder. Workers will not work from ladders. Step ladders will not be used as straight ladders.	
	Ergonomic hazards such as sprains, strains, or back injury from lifting or repetitive actions	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Eye injuries from dust or debris or struck by	Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object cannot be removed, seek medical attention.	M
	Handling sharp objects or using hand tools could cause cuts, punctures, or scrapes	Wear leather work gloves when handling materials that may be sharp or have sharp edges. Be familiar with the proper use and limitations of hand tools. Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and have a minimum of 2 persons with first aid and CPR training onsite.	M

<b>AHA 8– Barge placement of AquaBlok™ agent and core sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Tug and Barge operations (general) (continued)	Wind or chop on water could make materials hard to handle on deck	Avoid handling materials that could respond like a sail (e.g., sheet metal) in wind. Suspend operations where this could occur if wind will cause unsafe conditions for the task	L
	Head injuries from struck by or falling objects	Wear hard hat when overhead hazards exist and when working in areas with operating construction equipment or cranes.	M
	Fall hazards (falls from heights of 6 feet or greater)	No person will climb upon any equipment or structure 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 Competent Person. A fall protection plan would need to be developed and implemented prior to doing the activity. If fall protection plan is needed for this task, the SSHO (TBD) is the competent person and will ensure that a fall protection plan is prepared fall protection is used properly for this task or will have the subcontractor prepare the plan for the task and SSHO will review.	M
4. Loading of supersacks of agent or bulk agent onto barge deck (likely to be done offsite)	Construction equipment could cause injury to personnel	Workers operating construction equipment (e.g., to load agent onto barge) will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Ensure work zone will be delineated to protect the public and other tenants from construction operations.	M
	Improper stacking of supersacks on barge could lead to load shift	Ensure the materials are placed in stable manner on deck and protected or lashed down to deck to avoid movement or from being tossed overboard.	M
	Improper containment of loose agent on deck could lead to slip hazards and loss over the side	Contain agent in a cell or large hopper on barge deck (exact specification not known). Maintain good housekeeping to clean up any stray agent on the deck outside of the cell.	L
5. Crane operational testing and pre-ops inspections	Lack of load testing within full operational range could lead to destabilizing of crane, side load of boom, or unstable picks	Competent person (TBD) to perform all required inspections of equipment and rigging before use. Qualified rigger and crane operator will perform with inspections and testing and the SS and SSHO will observe prior to commencing with placement of agent. Navy representative may also be present during inspections and operational testing. Conduct required operational testing and document the testing.  Barge will be spudded.	H
	Improper use of rigging of clamshell bucket could	Operator and rigger(s) and any other parties of the lift team will review Lift Plan and plan each step of the lift in advance and sign the lift plan. Riggers will be Competent Persons (TBD) for	H

<b>AHA 8– Barge placement of AquaBlok™ agent and core sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Crane operational testing and pre-ops inspections (continued)	cause injury or result in load shift or drops	<p>rigging inspection and use/limitations. The crane operator will be a Competent Person (TBD) for crane operation. Rigging use will be per the approved Crane Package. Changes to Lift Plan must be approved in advance. Rigging will be inspected by a Competent Person before use, and any deficient or damaged rigging will be taken out of service. All required tags and certifications will be on rigging and visible for inspection. Tag lines, as necessary, will be put into place with the load prior to lift.</p> <p>Ensure that the load is in a neutral and secure position (not under tension) prior to placing hands, feet, or other body parts in any potential pinch points of the load or rigging.</p> <p>Use tools properly. Only use tools that are meant for the task. Do not use damaged or worn tools.</p>	
6. Commence placement of agent	<p>Riggers and other personnel could be injured by the crane or the load.</p> <p>Wind or chop on water could hinder the safety of crane operations and placement of the clamshell bucket in position</p>	<p>All nonessential personnel will be out of the work zone before a lift is made. The work zone will be established prior to lifting the load. The pick team will consist of the crane operator and the rigger (and an additional dedicated spotter as required). The spotters and riggers will have visual and radio contact with the operator. Standard hand signals will be used among the team members. A signal will be made by the team that the lift is ready to be made, and the operator will signal the team that the lift will begin. The crane operator will begin the lift. The team will watch for signs of load shift or any need to reconfigure the rigging scheme and notify the crane operator of the need to stop and lower the load. The load will be safely and slowly lowered, if necessary, at the rigger/spotter direction for reconfiguration and retry. Refer to EM 385-1-1 Section 15, Rigging.</p> <p>Weather and wind conditions and sea state (wave action) will be monitored prior to lifting to ensure load control can be maintained. Spuds will be placed prior to conducting agent placement. Crane operator will make this determination.</p> <p>When boats are used to spot from the water and assist with release of rigging or placement, the boat will be positioned at a safe distance away from the load during placement and never under the load or directly below the load.</p> <p>For boating operations, also review the boating AHA. Boats will stay out of the swing radius and not be positioned under a suspended load for any reason.</p>	M
	Potential to damage boats and docks in the marina	<p>Experienced crane operator will conduct and control the crane and placement of the agent using onboard displays and DGPS (as required) and visual observations. Rigger will be spotter and will help communicate with operator when visibility is not adequate to ensure material or bucket does not contact or dump onto boats or docks.</p> <p>Pre job coordination with the Marina personnel will help ensure that the area is secured from</p>	M

<b>AHA 8– Barge placement of AquaBlok™ agent and core sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Commence placement of agent (continued)		entry by unauthorized personnel or spectators that could get into a controlled work zone. Shore personnel will help enforce the barricades and precautions.  When operations get too close to boats or other structures, the operations will be evaluated to determine when the operations in that area should shift to that of diver assisted placement of agent (covered in AHA 12).	
	Shifting center of gravity with loads, potential for material to swing	Operator will follow the crane load chart and configuration requirements and the Lift Plan so that the potential for load to swing (not anticipated being much of a hazard with clamshell bucket and operator controls for placement).	H
7. After placement is complete, collect core samples	Coring tool use hazards	This part to be completed with subcontractor when tools or equipment have been identified.	M

<b>AHA 8 – Barge placement of AquaBlok™ agent and core sampling</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current State-issued driver's license.	Daily vehicle inspection by drivers.
Heavy Equipment	Operators will be qualified and experienced operators for use of the equipment they operate	Receipt inspection by SS. Daily inspection by operator (when on site)
Barge mounted crane	Competent Person operation only. Trained and certified to operate the crane that will be used. Training certificate must be presented to the Navy and the SSHO with Crane Package. The SSHO will maintain a copy in the training files. The competent person(s) are: TBD	Crane initially tested and certified per Crane Package submittal before use to meet federal and state inspection and certification requirements (documented). Navy Crane Department inspection upon mobilization. Inspected daily by Competent Person (crane operator).
Ladders	Persons using ladders will be instructed on proper use of and inspection of ladders	Inspection by user prior to use. Routine inspection by SSHO.
Boats	Qualified operators will have U.S. Coast Guard approved boater safety qualifications identified in the APP and experience in use of the boats on the project. Certificates of training should be available and placed in the training record.	Inspect daily and before use by boat captain. Use the boating checklist form. Refer to EHS 6-6, Boating and boating AHA.
Rigging and clamshell bucket	Competent Person use only. Trained and experienced in the proper inspection and use (and limitation) of rigging. The names of the Competent Person(s) are: TBD	Rigging documentation of inspection submitted before use with Crane Package. Inspected before use by Competent Person (Rigger). Refer to EHS 6-6.
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Type II or better PFD to be worn	Training in proper use and limitations of PFDs. SSHO or boat captain will brief workers on the use and limitations of PFDs and the location stowed on boats (when stowed vs. worn). Training in how to inspect and what to inspect for different types of PFDs.	Daily inspection by users.

<b>AHA 8 – Barge placement of AquaBlok™ agent and core sampling</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Fire extinguishers	Fire extinguisher training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking. (29 CFR 1926.50[d][2]) Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

Notes:

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 will also be available on-site for review of specific materials and mitigation measures.

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed leather work boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves when indicated, high visibility safety vest when indicated, and PFD when indicated.

**Abbreviations and Acronyms:**

- |  |                                       |
|--|---------------------------------------|
| AHA – Activity Hazard Analysis               | NTR –Navy Technical Representative    |
| APP – Accident Prevention Plan               | PFD – personal flotation device       |
| CFR – Code of Federal Regulations            | RAC – Risk Assessment Code            |
| CHMM – Certified Hazardous Materials Manager | SS – Site Superintendent              |
| CIH – Certified Industrial Hygienist         | SSHO – Site Safety and Health Officer |
| CSP – Certified Safety Professional          | TBD – to be determined                |
| dBA – decibels, A-scale                      | TtEC –Tetra Tech EC, Inc.             |
| EHS – Environmental Health and Safety        |                                       |
| EM –Engineer Manual                          |                                       |

**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.

NAME	SIGNATURE	TITLE	DATE
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>TANK CLEANING</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																															
	SIGNATURES	Activity #	<b>A1300 and A1470</b>	AHA #	<b>9</b>																															
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																		
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="5" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	E	E	H	H	M	E	H	H	M	L	H	M	M	L	L	M	L	L	L	L
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<b>AHA #9 – Activity/Work Task: Tank Cleaning</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Evaluate the job to determine if the tanks can be cleaned without entry	Confined space entry can be hazardous work. Use of high pressured water spray can be hazardous	Evaluate whether a stinger and vac truck and pressure washer can adequately remove sediments and clean tank Evaluate alternate methods. However if any part of the body enters tank in any way, it is considered confined space work, but for these tanks, if the job can be safely done without physical placement of worker fully in tank, it is preferable. <i>Note: AHA may need to be updated based on tools used and methods used to conduct the cleaning as well as per the cleaning agent used (if used)</i>	M
2. Clean tank	Contact with residual soil contaminants, including lead	Workers will wear PVC work boots and disposable Duramax, Kleenguard, or Tyvek splash suit. Openings at wrist and cuffs will be duct taped to keep water out. Workers will wear hard hat, face shield and safety goggles as well as nitrile or rubber gloves. Dry wipes will be used as necessary to defog and clean face shield. Decontamination and contamination reduction zone will be established at exit point (with secondary containment) for workers to be cleaned off and to doff used PPE. A hand washing station will also be located in the work area and workers will wash hands and face before leaving or going on breaks. No gum chewing or other hand to mouth activities will be performed until decontamination has been provided in the CRZ.	M
	Tool use hazards, including mild pressure washer (if used), shovels, brooms, etc.	Use tools as per manufacture's intended use. Use tools that are in good condition and are not broken or damaged. Inspect tools prior to use.	M
	Using vacuum hoses person could get arm or leg sucked into hose or bruises	Use small diameter hose and lowest vacuum pressure needed to do the job. Train workers on proper use and to keep the suction end of hose under control so it does not jerk around.	M
	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise. Working around a vacuum suction truck (if used) is considered a high noise area and all personnel will wear hearing protection.	M
	Heavy lifting and awkward positions	Team-lift or use of position pumps and hoses Use good posture when lifting or moving materials. Do not self-lift more than 50 pounds alone. Avoid jerking movements or rotating while walking or lifting.	L
	Lack of proper illumination or visibility in tank	Lighting, if required, will be provided. Lighting in wet environments will be protected with GFCI and be rated for wet use.	M
	Clean tank	Heat stress when working and wearing PPE	Workers will be trained in the recognition and avoidance of heat stress and the buddy system will be used to monitor workers for heat stress

<b>AHA #9 – Activity/Work Task: Tank Cleaning</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
(continued)		and give them breaks and potable water to drink (in designated areas)	
	Spills or releases of contaminated residues	Area and operation will be set up with secondary containment and control for water and sludge removed from the tank and a waste disposal container for used PPE. Spills will be promptly cleaned up. Spills will be reported to the NTR and COR as well as the SHM.	L

<b>AHA #9– Activity/Work Task: Tank Cleaning (includes confined space entry)</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
Vacuum truck or other tools for washing tank and removing water and sediments	To be determined	To be determined
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.
Sampling or handling equipment and tools	Trained and qualified individuals will conduct container sampling and open or pump containers. Persons using tools will know the limitations and proper use of the tools	Inspect sampling equipment and tools prior to use. Clean and decontaminate tools before each sample as required.

**Notes:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

**Abbreviations and Acronyms:**

- APP – Accident Prevention Plan
- SSHO – Site Safety and Health Officer
- PPE – personal protective equipment
- SHM – Safety and Health Manager
- SS – Site Superintendent

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>DEMOBILIZATION AND WASTE DISPOSAL</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																															
	SIGNATURES	Activity #	<b>A1230, A1300 and A1470</b>	AHA #	<b>10</b>																															
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>  <table style="margin: auto; border-collapse: collapse;"> <tr> <td rowspan="5" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> </tr> <tr> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	E	E	H	H	M	E	H	H	M	L	H	M	M	L	L	M	L	L	L	L
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CONTRACT NUMBER:	<b>N62470-13-D-8007</b>																																			
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LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>																																			
DATE PREPARED:	<b>August 2013, Revised November 2013</b>																																			
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																			
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																			
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																																			
SUBCONTRACTOR:	<b>N/A</b>																																			
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SITE SAFETY and HEALTH OFFICER		Negligible	M	L	L	L	L																													
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																																		
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																		
H = HIGH RISK (FEAD DIRECTOR)		" <b>Severity</b> " is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																		
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L = LOW RISK (ET or PAR)		" <b>Probability</b> " is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																		

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Staging materials and loading materials for transfer offsite including removal of site trailer	Vehicle operations from Tt or other tenant operations and delivery vendors could cause injury to personnel or others onsite	Workers operating company vehicles will have a valid state issued driver's license. Any Commercial Driver's License (CDL) truck and trailers will be operated by CDL qualified drivers. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use parking brake when parked. Use chocks when parked on inclines. Use dedicated spotter and standard hand signals for backing operations. Wear high visibility vest when working around operating vehicle traffic. Coordinate with other site tenants including the port as required to identify travel and traffic patterns and to delineate work areas.	M
	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed.	M
	Ergonomic hazards such as sprains, strains, or back injury from lifting or repetitive actions	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Slips, trips, and falls could lead to injuries	Keep work areas free of debris and equipment in work paths during the move. Follow good housekeeping in work areas. Correct hazards when seen, such as holes or other trip hazards. If they cannot be removed, they must be marked. When trailer is removed, stairs should not be removed until the last of personnel are done inside the trailer. As soon as trailer is removed, trailer tie-down anchors and leftover cribbing will be removed from the ground and the ground smoothed to match existing grade.	M
	Electrical hazards during disconnect from trailer power and other use of cords or generators for temporary power.	All electrical disconnects will be done by a certified electrician. Ensure that power cords are inspected and in good condition for use, that GFCIs are used properly, and portable generators are not overloaded. Ensure any power tools used are in good working condition and have third prong on cord or are double insulated.	
	Pinch points and crush hazards	The site trailer cribbing will be removed without placement of personnel under the trailer when trailer is elevated. Trailer will be lowered when no persons have body parts or hands near trailer. When trailer is back on wheels, wheels will be chocked until it is time to move trailer.	M

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Staging materials and loading materials for transfer offsite including removal of site trailer (cont'd)	Handling sharp objects or using hand tools could cause cuts, punctures, or scrapes	Wear leather work gloves when handling materials that may be sharp or have sharp edges. Be familiar with the proper use and limitations of hand tools. Report even minor injuries to your supervisor for evaluation. Have a first aid kit available and have a minimum of 2 persons with first aid and CPR training onsite.	M
	Construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated.	M
	Cold or heat stress and weather hazards	Properly dress for the weather. SSHO to monitor weather and implement heat stress and cold stress controls as specified in the APP. Provide breaks for personnel to get either into cool or warm environment. Encourage a steady work pace. Ensure adequate drinking water is available. Know the signs and symptoms of exposure and keep an eye on your partner.	L
	Eye injuries from dust or debris or struck by	Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object cannot be removed, seek medical attention.  To keep dust down, travel at slower speeds on unpaved roads and laydown areas. If required, water mist can be used to control dust.	M
	Wind could make materials hard to handle	Avoid handling materials that could respond like a sail (e.g., plywood) in wind. Position vehicles so that doors do not get caught by the wind when opened. Hang onto door when opening and closing in high wind. Open and close doors carefully in the wind and only open one door at a time.	L
	Noise could cause hearing loss and make it hard to communicate	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise.	M
	Lack of proper illumination in work areas could cause hazards to not be recognized or eye strain	During demobilization, if lighting has been disconnected, temporary lighting such as portable bright lumen flashlights may be necessary if ambient lighting is not sufficient, especially within the trailer. Work during daylight hours or provide adequate lighting source for work areas to minimize potential for injuries to occur from lack of visibility.	L
	Fall hazards (falls from heights of 6 feet or greater)	No person will climb upon any equipment, shipping container, building, trailer, 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 Competent Person. At the present time, there is no fall protection plan in place to cover	M

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Staging materials and loading materials for transfer offsite including removal of site trailer (cont'd)		this task. A fall protection plan would need to be developed and implemented prior to doing the activity.	
	Head injuries from struck by or falling objects	Wear hard hat when overhead hazards exist and when working in areas with operating construction equipment.	M
2. Load out of waste soil from soil containment berms to trucks	Construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated.	M
	Eye injuries from dust or debris or struck by objects, fugitive dusts	Wear safety glasses with side shields at all times when working. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object cannot be removed, seek medical attention.  To keep dust down, travel at slower speeds on unpaved roads and laydown areas. If required, water mist can be used to control dust in the soil loading pile. Truckloads must be tarped before leaving the site.	L
	Exposure to lead in the waste soil if dusts are generated during soil loading activities	Ensure a means of dust suppression is available prior to and during excavation and subsequent soil handling activities in the form of a water truck with spray/mist capability. This will be used to keep visible airborne emissions from occurring. Workers will stage upwind from the operation when possible. Operator will keep windows of cab closed if downwind. Should visible dusts be generated, ground workers who are within the EZ and could be exposed to dusts will wear full face air purifying respirators with P-100 filters as prescribed in the APP.  If dust generation cannot be effectively controlled on particularly windy dry days, the SS and SSHO will consider shutting down of site soil handling activities until such time as dust can be controlled through misting activities.  Waste transporter will be informed about and have profile and manifest for waste and will be advised about the contaminants in the soil and the PPE to wear if handling soil. SSHO to brief truck drivers.	L
	Contact with contaminated soil, should it occur, could present dermal or ingestion hazards to	When possible, look to avoid contact with soil whenever possible and stage back from contaminated areas and minimize tracking through contaminated areas.	L

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
2. Load out of waste soil from soil containment berms to trucks (cont'd)	workers or workers could track contaminants out of controlled work areas to common areas or to their homes.	<p>Workers within the EZ who can come into contact with contaminated soils will wear (at SSHO direction based on contact potential for task):</p> <ul style="list-style-type: none"> <li>• Boot covers (disposable) or PVC boots (reusable after decontamination);</li> <li>• Disposable nitrile gloves for hand protection;</li> <li>• Tyvek, Durafab, or Kleenguard coveralls (potentially can be reused after decontamination and proper stowage for reuse)</li> </ul> <p>Proper decontamination procedures will be overseen by the SSHO prior to leaving the CRZ.</p> <p>Employees will be instructed to wash hands and (if necessary) face after leaving the CRZ and before eating, drinking, smoking, etc.</p> <p>Under no circumstances, will contaminated clothing be placed into any site or personal vehicle, break rooms, or office space.</p>	
	Fall hazards (falls from truck or equipment)	No person will climb upon any equipment or up on or near dump truck bed where there are no hand rails or ladder. Tarping will be done via mechanical tarp deployers on the truck rather than by operator climbing up on loads.	M
	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed.	M
	Vehicle operations from Tt or other tenant operations and dump trucks could cause injury to personnel or others onsite	Workers operating company vehicles will have a valid state issued driver's license. Any Commercial Driver's License (CDL) truck and trailers will be operated by CDL qualified drivers. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use parking brake when parked. Use chocks when parked on inclines. Use dedicated spotter and standard hand signals for backing operations. Wear high visibility vest when working around operating vehicle traffic. Coordinate with other site tenants including the port as required to identify travel and traffic patterns and to delineate work areas.	M
3. Waste transport and disposal	Improper waste manifesting and marking and labeling or transport could lead to improper disposal	Waste manifests will be prepared that include the proper disposal facility based on the profile for the containers that are sent to that facility. All markings and labels will be checked to ensure they are complete and legible. A TtEC approved and qualified/permitted waste transporter will be used to receive and transport project wastes. All offsite transportation and disposal must be in accordance with the stringent requirements of RCRA (if required) and USDOT HMR as required, including any federal and state solid waste or hazardous	M

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Waste transport and disposal (continued)		waste regulations. Placards will be offered where required. Only properly trained and experienced personnel will prepare profiles, manifests, LDRs, check markings and labels, or offer these materials into transport. Navy to sign all manifests.	
	Improper loading or securing of loads could lead to spill, damage, or injury	The transporter picking up the waste will be contacted to waste containers provided are proper for the site wastes. All loads will be covered before leaving the site.	M

<b>AHA #10 – Activity/Work Task: Demobilization and Waste Disposal</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Site vehicles	Drivers must have current state-issued driver’s license.	Daily vehicle inspection by drivers. Receipt inspection by SS.
Heavy Equipment	Operators will be qualified and experienced operators for use of the equipment they operate	Receipt inspection by SS. Daily inspection by operator.
Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand tool for the task.	Daily inspection by users/operators.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest.

***Abbreviations and Acronyms:***

- APP – Accident Prevention Plan
- EHS – Environmental, Health, and Safety
- MSDS – Material Safety Data Sheet
- OSHA – Occupational Safety and Health Administration
- SSHO – Site Safety and Health Officer
- SS – Site Superintendent

**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.

NAME	SIGNATURE	TITLE	DATE
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>HOISTING AND RIGGING</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																										
	SIGNATURES	Activity #	<b>A1240, A1220, A1140</b>	AHA #	<b>11</b>																										
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																													
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LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>																														
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<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each "Hazard" with identified safety "Controls" and determine (RAC)																													
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																													
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																													
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<b>AHA #9– Activity/Work Task: Hoisting and Rigging</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Operation of heavy equipment, general	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator.	M
2. General Precautions	Task hazards and general precautions on use of this AHA.	Refer to AHAs for work tasks in which hoisting and rigging will be performed as part of that task (e.g., mobilization and site setup). Materials being hoisted and the hazards will vary based on what is being lifted and where it is being placed. All hoists and all rigging situations will be unique and must be properly evaluated by the Competent Person (SS, TBD, unless otherwise specified by name in writing) and the operator of the heavy equipment being used. Tasks in which hoisting and rigging may be performed may include mobilization and demobilization, drum handling, placement of trench boxes, etc. All these tasks have unique hazards to consider. This AHA addresses general precautions for performing hoisting and rigging tasks.	M
	Slips, trips, and falls	Clear area to be worked in of loose debris and trip hazards. Ensure a travel path for rigging team.	L
	Heavy lifting and awkward positions	Team-lift or use material handling devices as required. Use good posture when lifting or moving materials. Do not self-lift more than 50 pounds alone. Avoid jerking movements or rotating while walking.	L
2. Rigging and hoisting operations	Improper hoisting and rigging experience and training could result in injuries to workers or equipment damage	The hoisting and rigging competent person, (SS, TBD) will oversee all use of rigging and all hoisting operations performed onsite on a task specific basis. Persons performing equipment operation and rigging tasks will have written proof of qualifications for these tasks. The subcontractor, when required, will provide a qualified rigger to perform the rigging within the EZ when required. This person, when name becomes known, will be added to this AHA as a competent person.	M
	Improper stability of equipment or swing radius could cause equipment failure or damage	The operator will ensure that adequate swing radius for equipment, rigging, and load is established prior to performing the pick. The ground under the hydraulic excavating equipment will be stable and verified sufficient for equipment and load stability. Load charts will be	M

<b>AHA #9– Activity/Work Task: Hoisting and Rigging</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Rigging and hoisting operations (continued)		consulted for the lift as applicable.	
	Failure of rigging or equipment used to perform the hoist could result in injury or equipment damage	Operational testing will be performed as required by EM 385 1-1 Section 16.S.03.b. This testing will be documented by the competent person. More than one test may be required depending upon the materials being hoisted and the rigging being used (e.g., trench box vs. drum). All equipment used for hoisting will meet the manufacturer's guidelines for use in performing hoisting tasks (or the equipment will not be used for this purpose). All operating procedures will be per the manufacturer's operating manual, including load rating capacities and charts if required. No hoisting or rigging tasks will be done that constitute a critical lift. If load capacity is within 20 % of capacity, a larger piece of equipment or another means of lifting will be provided. Never allow persons to be positioned under a suspended load.	M
	Improper or damaged rigging could cause injury or loss of load	Only positive latching devices will be used to secure the load and rigging. All rigging used to perform the hoist will be inspected by the competent person to ensure it is properly rated, is in good condition, and is properly configured for the lift. Taglines will be used to control the load being hoisted and moved as necessary to control the load movement.	M
	Setting up of rigging could lead to cause pinch points, cuts, or scrapes	Ensure neutral configuration of rigging and slack in rigging before attaching straps. Ensure communication with operator before attaching rigging so that boom and bucket on excavator are not engaged. Wear leather work gloves. Watch out when running hands underneath or on equipment or materials due to sharp edges or pinch points. Wear leather work gloves when handling rigging and materials.	M
	Improper communications and planning could lead to confusion and errors in the pick	The rigger and the operator will be in visual and verbal communication. Standard and recognized hand signals will be used for communication. Rigger and operator to verify that non-involved persons are clear of the load (not underneath or in swing radius). Lift will not occur until rigger notifies operator to do so.	M
Release of rigging could lead to cause pinch points	Ensure neutral configuration of rigging and slack in rigging before releasing straps. Ensure communication with operator before removing rigging so that boom and bucket on excavator are not engaged. Wear leather work gloves.	M	

<b>AHA #9 – Activity/Work Task: Hoisting and Rigging</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Excavator (equipped properly for attachment of rigging)	Trained and experienced operators will operate heavy equipment.	Receipt inspection by SS. Daily inspection by users/operators. Task observation of operators by SS. Ensure equipment meets manufacturer's guidelines for performing hoisting. Have copy of manufacturer's operation manual onsite.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.
Hoisting and Rigging Equipment	Competent person (SS, TBD) is responsible for hoisting and rigging	Initial and before use inspection of equipment and material used for hoisting and rigging, operational testing of the equipment and material.

**Notes:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

**Abbreviations and Acronyms:**

- APP – Accident Prevention Plan
- SSHO – Site Safety and Health Officer
- SS – Site Superintendent
- PPE – personal protective equipment

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>FENCE REMOVAL AND INSTALLATION</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																															
	SIGNATURES	Activity #	<b>A1110 and A1350</b>	AHA #	<b>13</b>																															
PWD/OICC/ROICC OFFICE		<div style="text-align: center;"> <b>Risk Assessment Code (RAC) Matrix</b> </div> <table style="margin: auto; border-collapse: collapse;"> <tr> <td rowspan="5" style="text-align: center; vertical-align: middle; padding: 10px;"><b>Severity</b></td> <td colspan="5" style="text-align: center; padding: 5px;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center; padding: 5px;">Frequent</td> <td style="text-align: center; padding: 5px;">Likely</td> <td style="text-align: center; padding: 5px;">Occasional</td> <td style="text-align: center; padding: 5px;">Seldom</td> <td style="text-align: center; padding: 5px;">Unlikely</td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>E</b></td> <td style="text-align: center; padding: 5px;"><b>E</b></td> <td style="text-align: center; padding: 5px;"><b>H</b></td> <td style="text-align: center; padding: 5px;"><b>H</b></td> <td style="text-align: center; padding: 5px;"><b>M</b></td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>E</b></td> <td style="text-align: center; padding: 5px;"><b>H</b></td> <td style="text-align: center; padding: 5px;"><b>H</b></td> <td style="text-align: center; padding: 5px;"><b>M</b></td> <td style="text-align: center; padding: 5px;"><b>L</b></td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>H</b></td> <td style="text-align: center; padding: 5px;"><b>M</b></td> <td style="text-align: center; padding: 5px;"><b>M</b></td> <td style="text-align: center; padding: 5px;"><b>L</b></td> <td style="text-align: center; padding: 5px;"><b>L</b></td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>M</b></td> <td style="text-align: center; padding: 5px;"><b>L</b></td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
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NAME & DATE ACCEPTED BY GDA:																																				
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>																																			
TASK ORDER/DELIVERY #:	<b>WE01</b>																																			
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>																																			
DATE PREPARED	<b>October 2013</b>																																			
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																			
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																			
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																																			
SUBCONTRACTOR:	<b>N/A</b>																																			
DATE OF PREPARATORY MEETING:		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>																													
DATE OF INITIAL INSPECTION:		Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>																													
CONTRACTOR COMPETENT PERSON:		Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>																													
SITE SAFETY and HEALTH OFFICER		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>																													
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																																		
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																		
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																		
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		<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																		

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Evaluate area where current fence is to be removed or placed (general site-specific hazard assessment)	Site specific potential for slips, trips, falls, leading edges, slopes, debris, and other hazards (e.g., potential falls into water, etc.) which may become known.	SSHO and fence contractor foreman to evaluate hazards at each work location and take appropriate steps to mitigate identified hazards. As required, this AHA will be updated as appropriate to address any additional identified hazards and precautions to mitigate the hazard if not addressed below.	M
2. Remove existing fence and stage for reuse (includes un-securing of chain link from posts, laying down and rolling up chain link for reuse, pulling of posts and concrete anchors and either staging for reuse or disposing of material)	Slips, trips, and falls	<p>Pay attention to where you are walking. Locate and mark surface debris that could present a trip hazard. Store and stage tools and equipment properly and follow good worksite housekeeping practices.</p> <p>Establish an orderly laydown area (approved through TtEC SS) for materials for reuse. Discard materials not for reuse in designated receptacle for trash or recyclables.</p> <p>If work will proceed on or along a slope (e.g., along edge of shoreline), ensure that workers work on the uphill side of fence line whenever possible. Watch for loose riprap debris (e.g., concrete) that could shift underfoot. Stabilize any materials that require personnel to walk on them.</p> <p>If any work could expose worker to vertical fall of 6 feet or more (currently not expected for this task), a fall protection plan and additional worker protection requirements will be required.</p> <p>Once posts are removed, holes need to be filled so as not to present a trip hazard.</p>	M
	Potential for falls into water if working along shoreline of Little Creek Harbor	If workers will be exposed to a potential fall into water (if working along Little Creek shoreline at high tide), workers will wear Type II or better PFD.	L
	Failure to observe and prepare for encounter with insects, rodents, or snakes could cause injury to worker.	Observe for insects, rodents, and snakes. Apply DEET as necessary. Avoid placing hands in concealed areas. Observe for any ground nesting bees or hornets and report nests to supervisor if discovered. Wear protective gloves. Use tools wherever possible to dislodge objects first, before placing hands low to ground to move objects. Report any stings, bites, rashes, etc. to supervisor and SSHO for evaluation.	M
	Construction equipment could cause injury to personnel (general)	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
2. Remove existing fence and stage for reuse (includes un-securing of chain link from posts, laying down and rolling up chain link for reuse, pulling of posts and concrete anchors and either staging for reuse or disposing of material) (cont'd)		around heavy equipment and must remain visible to the operator.	
	Reciprocating or band saws used to cut off vertical fence posts (if used) can cut or strike workers causing severe injuries if used improperly	Workers will be trained and experienced in the use of saws and will operate the saws as per manufacturer's recommendation. Saw blades will be sharp and replaced as often as required to keep them sharp. Inspect saws before use. Wear steel toe leather work boots, leather work gloves when using saws.	M
	Eye injuries when using saws and cutting tools	Workers will wear safety glasses and a face shield (plastic) when using saws to cut metal fence materials. Locate a portable emergency eye wash at each work area. If something enters the eye, do not rub. Set up portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object still irritates or stays in the eye, seek medical attention as soon as possible. Follow up with eye exam is recommended any time an object gets into an eye since it is necessary to ensure object does not remain, even if it cannot be felt.	M
	Potential for fires if cutting of fence creates sparks	If cutting will cause sparks, a Hot Work Permit is required. SSHO will assist subcontractor in implementation of EHS 6-5 (Welding/Hot Work).	L
	Use of construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider.	M
	Any ground penetrating activities– potential underground utilities could be contacted if construction equipment is used to remove concrete anchors other than pulling them directly from the ground	Implement Tt Corporate Procedure EHS 3-15 – Underground Utilities and local requirements to ensure all water, power, sewer, storm drain, communications, and gas lines have been located and marked. Do not dig to remove fence post and concrete without proper utility locates and verifications by calling 811 (call before you dig), private utility locates, and verification.	M
	Hoisting and Rigging using construction equipment (e.g., loader/excavator) for loading or unloading of materials or equipment (if used during this AHA)	Refer to and review/follow AHA 11 – Hoisting and Rigging, in addition to this AHA.	M
	Workers could experience strains from manually moving materials and equipment or manually digging with shovels.	Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting, and getting help when moving or shifting 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. Wear leather work gloves when using shovel or digging.	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
2. Remove existing fence and stage for reuse (includes un-securing of chain link from posts, laying down and rolling up chain link for reuse, pulling of posts and concrete anchors and either staging for reuse or disposing of material) (cont'd)		Use equipment as much as possible to maneuver heavy or awkward items.	
	Punctures, cuts, scrapes, from sharp fence materials	Wear leather work gloves when handling fence materials and hand or power tools. Report cuts and scrapes to supervisor and SSHO.	M
	Fence sections as they are removed could strike worker when no longer taut to posts (sections tend to roll or fall over) – potential for bruises, cuts, eye injuries, head injuries, etc.	Use team method to remove fence and use proper tools for removing chain link from posts. Ensure team is trained and familiar with proper fence removal methods and tool use. Wear leather work gloves, safety glasses, and hard hat. Ensure team is prepared as sections are removed from posts. Use caution when rolling fence materials as they will be heavy and will tend to shift.	M
	Noise could cause hearing loss while using saws or operating heavy equipment	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule also applies to personnel working around heavy equipment.	M
	Workers could be exposed to extreme temperatures or workloads that tend to cause heat or cold stress.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather and strenuous activity. Wear broad-spectrum sunscreen lotion of SPF 15 or better; wear layered clothing appropriate for colder weather allowing for addition or subtraction as required.	M
	Slips, trips, and falls in debris piles from cutting.	All fence material will be placed into manageable piles to keep potential trip and fall hazards to a minimum.	M
	Sections of metal chain link fence can be hard to manage and heavy	As sections of fence are removed, sections will be rolled up and secured with ties and to keep the debris manageable. Wear leather work gloves, hard hat, safety glasses when handling sections of chain link fence. Use mechanical equipment to lift rolls of fence material if possible. Do not lift more than 50 pounds by yourself.	M
3. Place new fence materials (includes receipt of materials or use of staged materials, rolling out of chain link fencing, post holing and placement of posts, securing chain link to fence posts and tensioning)  Concrete pouring for posts is included in Step 4 below.	Site specific potential for slips, trips, falls, leading edges, slopes, debris, and other hazards (e.g., potential falls into water, etc.) which may become known.	SSHO and fence contractor foreman to evaluate hazards at each work location and take appropriate steps to mitigate identified hazards. As required, this AHA will be updated as appropriate to address any additional identified hazards and precautions to mitigate the hazard if not addressed below.	M
	Failure to observe and prepare for encounter with insects, rodents, or snakes could cause injury to worker.	Observe for insects, rodents, and snakes. Apply DEET as necessary. Avoid placing hands in concealed areas. Observe for any ground nesting bees or hornets and report nests to supervisor if discovered. Wear protective gloves. Use tools wherever possible to dislodge objects first, before placing hands low to ground to move objects. Report any stings, bites, rashes, etc. to supervisor and SSHO for evaluation.	M
	Construction equipment could cause	Workers operating construction equipment will be qualified and designated	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
<p>3. Place new fence materials (includes receipt of materials or use of staged materials, rolling out of chain link fencing, post holing and placement of posts, securing chain link to fence posts and tensioning) (cont'd)</p> <p>Concrete pouring for posts is included in Step 4 below.</p>	injury to personnel (general)	operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator.	
	Slips, trips, and falls	<p>Pay attention to where you are walking. Locate and mark surface debris that could present a trip hazard. Store and stage tools and equipment properly and follow good worksite housekeeping practices.</p> <p>Establish an orderly laydown area (approved through TtEC SS) for materials</p> <p>If work will proceed on or along a slope (e.g., along edge of shoreline), ensure that workers work on the uphill side of fence line whenever possible. Watch for loose riprap debris (e.g., concrete) that could shift underfoot. Stabilize any materials that require personnel to walk on them.</p> <p>If any work could expose worker to vertical fall of 6 feet or more (currently not expected for this task), a fall protection plan and additional worker protection requirements will be required.</p>	M
	Workers could be exposed to extreme temperatures or workloads that tend to cause heat or cold stress.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather and strenuous activity. Wear broad-spectrum sunscreen lotion of SPF 15 or better; wear layered clothing appropriate for colder weather allowing for addition or subtraction as required.	M
	Potential for falls into water if working along shoreline of Little Creek Harbor	If workers will be exposed to a potential fall into water (if working along Little Creek shoreline at high tide), workers will wear Type II or better PFD.	L
	Use of construction equipment could strike overhead power lines	The travel path, staging, and other locations where mobile equipment with booms will be operated will be evaluated for potential overhead lines. The SSHO will establish the required clearance distances that are required and areas to be avoided will be marked and communicated or isolated through coordination with the local utility provider.	M
	Any ground penetrating activities– potential underground utilities could be contacted if construction equipment, including augers) is used for placement of posts and digging of post holes	Implement Tt Corporate Procedure EHS 3-15 – Underground Utilities and local requirements to ensure all water, power, sewer, storm drain, communications, and gas lines have been located and marked. Do not dig to remove fence post and concrete without proper utility locates and verifications by calling 811 (call before you dig), private utility locates, and verification.	M
	Hoisting and Rigging using construction	Refer to and review/follow AHA 11 – Hoisting and Rigging, in addition to this	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
<p>3. Place new fence materials (includes receipt of materials or use of staged materials, rolling out of chain link fencing, post holing and placement of posts, securing chain link to fence posts and tensioning) (cont'd)</p> <p>Concrete pouring for posts is included in Step 4 below.</p>	equipment (e.g., loader/excavator) for loading or unloading of materials or equipment (if used during this AHA)	AHA.	
	Use of marking paint to demarcate fence installation location and post hold locations can expose workers to paint fumes	Follow manufacturers' instructions on use of paint. Review MSDSs. Never point spray paint containers at another person.	L
	Punctures, cuts, scrapes, from fence materials and pinch points.	<p>Wear leather work gloves when handling fence materials and tools.</p> <p>Keep hands out of pinch points such as when unrolling materials or securing anchors.</p> <p>Pay special attention to top and bottom of chain link fence and any raw edges where links could be cut and sharp.</p> <p>Do not place hands under the fence edges.</p> <p>Ensure workers know the proper steps in securing and attaching fence to post and use the proper tools, connectors, and clamps.</p>	M
	Workers could experience strains from manually moving materials and equipment including rolls of chain link fencing. Fence materials are heavy and cumbersome.	<p>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. Employees will not lift more than 50 pounds alone. Encourage a steady, sustainable work pace and as required, rotate repetitive tasks among workers.</p> <p>Use equipment as much as possible to maneuver heavy or awkward items.</p>	M
	Tensioning of the fence using a come-along could cause injury. Defective tool could injure worker. Improper use of tool could injure worker. Use of wrong size come-along for task could cause injury to worker or damage to fence.	<p>Inspect come-along. Look for wear of ratchet, loose handle or ratchet, defective hooks, wear of wire, chain or strap (depends on material used in come-along). Workers must be trained on use of come-along. Avoid placing hand or fingers between handle and ratchet body or between handle and fence. Wear leather work gloves when handling. Ensure come along is rated for force needed to stretch fence fabric.</p> <p>Ensure team is trained on proper fence installation methods and tool use.</p> <p>Wear leather work gloves, eye and face protection and hard hat.</p>	M
	Use of powered auger to dig postholes improperly can cause injuries	Use tools in accordance with manufacturer's requirements. Inspect tool before use. Do not wear loose clothing around augers and do not place any part of body in or near rotating parts. Know the procedures for backup up auger and removing debris that may get lodged in parts. Always secure power source and isolate hazardous energy before attempting to remove debris.	M
	Reciprocating or band saws used to cut off vertical fence posts (if used) or chain	Workers will be trained and experienced in the use of saws and will operate the saws as per manufacturer's recommendation. Saw blades will be sharp	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
	link can cut or strike workers causing severe injuries if used improperly	and replaced as often as required to keep them sharp. Inspect saws before use. Wear steel toe leather work boots, leather work gloves when using saws.	
4. Concrete handling for post installation	Workers could experience eye hazards from concrete dust.	Safety glasses are the minimum required eye protection for all work areas. Locate a 15 minute portable emergency eye wash at each work area. Flush objects from eyes; do not rub.	M
	Mixing and pouring of concrete can present exposure to silica dusts, irritation to respiratory tract, and caustic chemical skin reaction or sensitization	Obtain and review MSDS for concrete raw materials such as sand and concrete mixtures with crew. Avoid breathing of dusts by positioning upwind of areas where concrete materials are being used. Practice good dust control through water misting while pouring dry materials. If dusts are not able to be controlled, a properly fitting dust mask can be worn. Wear nitrile gloves under leather work gloves when handling concrete. Wear long sleeve shirts. Have access to and use hand washing stations and remove concrete mix and dust promptly if it gets on skin. If dust cannot be controlled a respirable aerosol monitor (RAM) will be used to assess exposure.	L
	Concrete mixers (if used) have rotating parts that can cause injury	Do not place hands into rotating barrel unless machine is turned off and unplugged from power source. If outside of mixer has rotating gears they must be guarded. Ensure workers know how to properly use mixers. Do not overload mixers beyond rated capacity.	M
	Bags of concrete are heavier than 50 pounds and can cause back injury and strains	Do not order 80 pound bags of concrete. Purchase 60 pound bags and if possible, have concrete bags in back of pickup or at level with the mixer to reduce strain in lifting and turning while mixing. Have worker on stable platform as required in order to not require lifting and positioning of concrete over waist level.	M
	Noise could cause hearing loss while using mixers and equipment	Hearing protection is required when sound levels exceed 84 dBA continuously. Rotate tasks to avoid long periods of exposure. SSHO to monitor noise levels in work area as required assessing adequacy of hearing protection for users and those in the area who may be performing other tasks.	M

<b>AHA #13 – Job/Task: Fence Removal and Installation</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
1. Vehicles	Drivers must have current state-issued driver’s license.	Receipt inspection by SS. Daily and before use by operator. Use equipment safety checklist.
2. Mobile construction equipment including auger attachment or powered post hole digger	Only trained equipment operators may operate mobile construction equipment.	Receipt inspection by SS. Operator qualification by SS. Inspect all equipment upon arrival at site and on each day of use. Use equipment checklist. Have operations manual onsite and be familiar with proper use of equipment and attachments.
3. Hand and power tools	Training in use of hand and power tools by the SSHO or designee and review of operating manual. Use proper hand or power tool for the task.	Daily inspection by users/operators. Inspect tools and power cords to ensure they are listed by a NRTL. Inspect for damage to tools or cords.
4. First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	First aid kits must be inspected weekly as required by OSHA. Fire extinguishers must be inspected monthly. Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.
5. Concrete mixer	Specific training for power and hand tools will be provided. Review operators’ manual for each tool and ensure that directions are followed.	Inspect before each use. Maintain and use as per manufacturer’s recommendation.
6. Fire Extinguishers	Fire extinguisher training including use/limitations.	At least monthly by SSHO or designee.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

**Abbreviations and Acronyms:**

AHA – Activity Hazard Analysis  
 APP – Accident Prevention Plan  
 CIH – Certified Industrial Hygienist  
 CRL – Corporate Reference Library  
 EHS – environmental health and safety  
 EM – Engineer Manual  
 mph – miles per hour  
 OSHA – Occupational Safety and Health Administration  
 PE – Professional Engineer  
 PPE – personal protective equipment

RAC – Risk Assessment Code  
 SPF – sun protection factor  
 SS – Site Superintendent  
 SSHO – Site Safety and Health Officer  
 UL – Underwriters Laboratories

**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.

NAME	SIGNATURE	TITLE	DATE
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>TEMPORARY SERVICE</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>L</b>			
	SIGNATURES	Activity #	<b>A1110</b>	AHA #	<b>14</b>			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE01</b>							
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>							
DATE PREPARED:								
PREPARED BY:								
REVIEWED BY:								
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
SUBCONTRACTOR:	<b>Power Electric</b>							
DATE OF PREPARATORY MEETING:			Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
DATE OF INITIAL INSPECTION:			Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
CONTRACTOR COMPETENT PERSON:		Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>	
SITE SAFETY and HEALTH OFFICER		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>		<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						

Job Steps	Hazards	Controls	RAC
1. Mount Backboard and equipment.	Strain	<ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Use a second person to help lift.</li> <li>• Use equipment to help lift.</li> </ul>	L
	Miss Utilities	<ul style="list-style-type: none"> <li>• All utilities must be located before excavating. Call 811 to have Miss Utilities marked.</li> <li>• Hand dig site holes when crossing any underground utility.</li> <li>• Make a visual inspection for any utility that has not been marked.</li> </ul>	L
	Cuts/ Lacerations	<ul style="list-style-type: none"> <li>• Wear cut resistant gloves when working with sharp metal.</li> </ul>	L
2. Install Conduit	PVC Glue Fumes	<ul style="list-style-type: none"> <li>• Use MSDS to identify the proper PPE to be used prior to use.</li> <li>• Use PVC Glue in well ventilated areas.</li> </ul>	L
3. Pull Wire	Strain	<ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Use a second person to help lift/ pull.</li> <li>• Use equipment to help lift/ pull.</li> </ul>	L
4. LOTO existing panel for tie in.	Electrocution	<ul style="list-style-type: none"> <li>• <b>Do not work on energized circuit above 50 volts.</b></li> <li>• Wear arc flash gear per NFPA 70E Table 130.7(C)(15)(a) 130.7(C)(16). (see attached tables)</li> <li>• Use GFCI at source when operating or using cord and plug-connected equipment.</li> <li>• Ensure all cords have ground prong and are not missing.</li> </ul>	L
	Cuts/ Lacerations	<ul style="list-style-type: none"> <li>• Wear gloves when working with sharp metal.</li> </ul>	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Shovels Generator Extension Cords GFCI LOTO/ Arc Flash Rigging Equipment Hand Tools	OSHA 30 CPR/ First Aid LOTO/ Arc Flash Excavation/ Trenching Equipment Trained  <b>Competent Person:</b>  Larry Henderson Chris Jenkins Matt Pynn	Equipment Trained Extension Cords GFCI Rigging Equipment Equipment Checklist Miss Utilities Ticket Arc Flash Gear PFAS Hand Tools
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	Initially and at least weekly thereafter or after use for restocking.

**Notes:**

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

Personal Protective Equipment for this AHA will consist of hard hat (when overhead safety hazards exist), safety toed boots, safety glasses with side shields, standard work uniform (long pants, ¾ length sleeve shirt). Hearing protection (as required). Work gloves worn when indicated, High visibility safety vest. Additional PPE as specified below.

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
2.			
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>TREE REMOVAL</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>																																			
	SIGNATURES	Activity #	<b>A1120</b>	AHA #	<b>15</b>																																			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																						
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center;">Catastrophic</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> </tr> <tr> <td style="text-align: center;">Critical</td> <td style="text-align: center; background-color: red;">E</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center;">Marginal</td> <td style="text-align: center; background-color: orange;">H</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> <td style="text-align: center; background-color: green;">L</td> </tr> <tr> <td style="text-align: center;">Negligible</td> <td style="text-align: center; background-color: yellow;">M</td> <td style="text-align: center; background-color: green;">L</td> </tr> </table>				<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L
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Critical	E					H	H	M	L																															
Marginal	H					M	M	L	L																															
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CONTRACT NUMBER:	<b>N62470-13-D-8007</b>																																							
TASK ORDER/DELIVERY #:	<b>WE01</b>																																							
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<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																																						
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																						
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L = LOW RISK (ET or PAR)																																								

<b>AHA #15 – Job/Task: Tree Removal</b>			
Job Steps	Hazards	Controls	RAC
1. Establish limits of tree removal activities	Exposure to poison ivy or oak.	<p>As area is inspected, identify any "suspicious" vegetation that may be poison oak. Mark these areas with warning tape or spray paint in preparation for vegetation clearance. Avoid contact with these plants. Wear long sleeve shirts and pants. Wear disposable gloves Wear an "ivy blocker" and have Technu<sup>®</sup> or Zanfel post-exposure washing agent available.</p> <p>These plants need to be removed carefully to avoid spreading vegetation throughout the site or spraying plant debris on personnel or equipment. Also cutting tools that cut this vegetation need to be cleaned and handled carefully as the oils can remain on cutting surfaces. Refer to Health and Safety Guideline (HSG) 2-8 in the CRL for details.</p>	L

<b>AHA #15 – Job/Task: Tree Removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Establish limits of tree removal activities (continued)	Workers could be exposed to lead contaminated soil.	Ensure all workers are aware of the potential hazards of the lead contaminated soil.  During vegetation clearing ground disturbing activities will be kept to a minimum. Vegetation is only to be cut to within 6-inches of the ground surface. Keep dust generation low during any clearing activities. Wear leather work gloves (at a minimum) during any manual grubbing tasks and for incidental contact with soils during vegetation removal.	L
	Slips, trips, and falls	Pay attention to where you are walking. Locate and mark surface debris that could present a trip hazard. Store and stage tools and equipment properly and follow good worksite housekeeping practices.	L
	Encounters with insects, rodents, or snakes could cause injury to worker.	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. Apply DEET as necessary. 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.	L
	Construction equipment could cause injury to personnel	Workers operating construction equipment will be qualified and designated operators. Operate at safe speeds and obey local traffic speeds and rules. Wear seat belt while seated. Use dedicated spotter and standard hand signals for backing operations. Construction equipment will have backup alarms installed. Workers working around construction equipment will stay out of the swing radius and to enter the swing radius, must make contact with the operator and have operator acknowledgement prior to entry. Only personnel necessary to perform work tasks will be in controlled work zones around heavy equipment and must remain visible to the operator.	M

**AHA #15 – Job/Task: Tree Removal**

Job Steps	Hazards	Controls	RAC
<p>2. Tree cutting (includes using chainsaws)</p>	<p>Chainsaws can cut or strike workers causing severe injuries if used improperly</p>	<p>Workers will be trained and experienced in the use of chainsaws and will operate the chainsaws as per manufacturer's recommendation. Anti-kick teeth will be in place and chain guard mechanism in place. Chainsaws will be industrial or professional grade and maintained per manufacturer's requirements. Chain will be kept sharp. Inspect chainsaw before use. Wear steel toe leather work boots, leather work gloves and chainsaw chaps when working with chainsaws.</p>	<p>M</p>
	<p>Eye injuries with flying wood chips and debris when using chainsaws.</p>	<p>Workers will wear safety glasses and a face shield when using chainsaws. A portable emergency eye wash is located at the site trailer. If something enters the eye, do not rub. Use portable eyewash for flushing of eye to try to remove object. Notify supervisor so eye can be monitored. If object still irritates or stays in the eye, seek medical attention as soon as possible. Follow up with eye exam is recommended any time an object gets into an eye since it is necessary to ensure object does not remain, even if it cannot be felt.</p>	<p>M</p>
	<p>Noise could cause hearing loss while using saws or operating heavy equipment</p>	<p>Hearing protection is required when sound levels exceed 84 dBA continuously. This rule also applies to personnel working around heavy equipment and when using chainsaws.</p>	<p>M</p>
	<p>Slips, trips, and falls during cutting activities</p>	<p>As trees are felled and limbed, debris will be placed into manageable piles to keep potential trip and fall hazards to a minimum.</p> <p>Keep saw in off position when walking to new locations. Ensure you carry saw with chain facing out and away from body so that if you do fall, you do not fall onto chain. Lock in the chain keeper device when moving if saw is to remain in operation. Watch your steps.</p>	<p>L</p>
	<p>Workers on ground around tree felling activities could be struck by falling trees or limbs</p>	<p>In work areas where trees are being felled, workers doing other tasks or cutting other trees will not work within the fall radius of trees being felled by another worker plus a buffer of 25 feet. Workers will wear high-visibility vests on the ground and have a means of communication.</p> <p>Workers cutting trees will be experienced in proper tree cutting techniques to direct fall direction away from them. Workers will ensure the area around the tree is clear so they can get clear of the trunk quickly when tree begins to fall. Workers must communicate carefully with each other and positively establish the proximity of other personnel prior to felling a tree and signal to others the tree falling prior to felling it.</p>	<p>M</p>

<b>AHA #15 – Job/Task: Tree Removal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Tree cutting (continued)	Refueling of equipment could cause fires or spills.	Ensure saws are turned off and allowed to cool before being refueled. Do not overfill saws by ensuring a small size fuel can is used which the worker can maintain good control over during refueling. Place equipment on a spill pad for refueling. Visually inspect refueling point to ensure overfill is not done. Do not fill to capacity; leave space for expansion in the tank.  Do not smoke in or near refueling areas. Do not refuel in back of a pickup truck. Have a fire extinguisher present at the refueling site and ensure workers are trained in their use.	M
	Punctures, cuts, scrapes, from vegetation debris such as sharp limbs	Remove limbs that present a puncture hazard in areas being worked in. When removing limbs using saw, watch where you are going and do not walk backwards.	L
	Lack of communication could lead to a delayed response in an emergency.	Ensure that each work team has a cellular telephone, or access to a cellular 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.	L
3. Moving cut trees to staging area	Workers could experience strains from manually moving materials and equipment.	When possible, use heavy equipment (e.g., excavator with thumb) to move and stack log debris.  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.	L
	Log stacks could roll and injure personnel	Provide restraints on sides of haul vehicles and storage areas to contain logs if they shift. Keep personnel away from stacking operations and stage and load logs on level ground if possible. Do not ever walk on top of stacked logs.	L

<b>AHA #15 – Job/Task: Tree Removal</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
1. Vehicles	Drivers must have current state-issued driver’s license.	Receipt inspection by SS. Daily and before use by operator. Use equipment safety checklist.
2. Heavy construction equipment	Only trained equipment operators may operate mobile construction equipment. Qualified Operators: William Benson and Garry Williams	Receipt inspection by SS. Operator qualification by SS. Inspect all equipment upon arrival at site and on each day of use. Use equipment checklist. Have operations manual onsite and be familiar with proper use of equipment and attachments.
3. Cutting tools - chainsaw	Trained in proper use. Review operators’ manual for each tool and ensure that directions are followed.	Inspect before each use. Maintain as per manufacturer’s recommendation.
4. First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, are by or under direction of the SSHO.	First aid kits must be inspected weekly as required by OSHA. Fire extinguishers must be inspected monthly. Eyewashes inspected weekly. Potable water changed weekly unless a preservative solution is used.

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat, safety toed boots, safety glasses with side shields, standard work uniform (long pants, sleeved shirt), high visibility vest, hearing protection (as required), work gloves when indicated. Additional PPE as specified above.

**Abbreviations and Acronyms:**

- |                                      |  |
|--------------------------------------|--|
| AHA – Activity Hazard Analysis       | OSHA – Occupational Safety and Health Administration |
| APP – Accident Prevention Plan       | PPE – Personal Protective Equipment                  |
| CIH – Certified Industrial Hygienist | RAC – Risk Assessment Code                           |
| CRL – Corporate Reference Library    | SS – Site Superintendent                             |
| EM – Engineer Manual                 | SSHO – Site Safety and Health 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.

<b>NAME</b>	<b>SIGNATURE</b>	<b>TITLE</b>	<b>DATE</b>
1.			
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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>PAVILION DEMOLITION</b>	Overall Risk Assessment Code (RAC) (Use highest code)			<b>M</b>			
	SIGNATURES	Activity #	<b>A1140</b>	AHA #	<b>16</b>			
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>						
NAME & DATE ACCEPTED BY GDA:								
CONTRACT NUMBER:	<b>N62470-13-D-8007</b>	<b>Severity</b>	<b>Probability</b>					
TASK ORDER/DELIVERY #:	<b>WE01</b>		Frequent	Likely	Occasional	Seldom	Unlikely	
LOCATION:	<b>SWMU 3, JEB LITTLE CREEK</b>							
DATE PREPARED:	<b>November 2013</b>		Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
PREPARED BY:	<b>Louie McTall, SSHO</b>		Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>		Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>		Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
SUBCONTRACTOR:	<b>N/A</b>							
DATE OF PREPARATORY MEETING:								
DATE OF INITIAL INSPECTION:								
CONTRACTOR COMPETENT PERSON:								
SITE SAFETY and HEALTH OFFICER								
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)						
<b>E = EXTREMELY HIGH (PWO/OICC/ROICC)</b>		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity						
<b>H = HIGH RISK (FEAD DIRECTOR)</b>		<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place						
<b>M = MODERATE RISK (CM or ET or PAR)</b>								
<b>L = LOW RISK (ET or PAR)</b>								
		<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.						

<b>AHA #16 – Job/Task: Pavilion Demolition</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Train and refresh workers to safety protocol prior to any work being done. This training will include general and area specific hazards that may be encountered throughout every phase of this project.	<p><u>Demolition</u> – struck by or crushed by falling debris, premature building collapse.</p> <p><u>Material handling</u> – struck-by Heavy Equipment and other vehicles, musculoskeletal injuries.</p> <p><u>Hand and power tools</u> – soft tissue injuries, Electric shock, Eye injuries; Noise; Slips, trips.</p>	<p>Review Demolition Plan with workers.</p> <p>Brief workers concerning safety requirements for the following tasks including proper PPE-hard hats, reflective vest, safety glasses w/side shields, hearing protection, steel toe boots;</p> <p>Review housekeeping practices, the use of GFCI’s, provide adequate amounts of drinking water for workers, and adequate amounts of lighting.</p> <p>Discuss emergency action requirements, emergency eye wash locations, egress routes and emergency contact phone numbers.</p> <p>Workers shall review this AHA and sign to acknowledge that they have reviewed it and will follow the outlined procedures.</p> <p>Daily safety meetings will take place and documentation of worker attendance will maintained by Tetra Tech EC.</p>	L
2. Pavilion Demolition	Heavy Equipment Hazards	<p>Only qualified personnel shall operate the excavators and loaders.</p> <p>Maintain ground man to direct operator.</p> <p>Documented daily inspections shall be conducted on the equipment prior to use. Tetra Tech EC shall maintain Safety Zone around the swing radius of the excavator.</p> <p>Ensure spotter for heavy equipment stays in line-of-sight of driver at all times.</p> <p>Use flagmen/signalers when needed.</p> <p>Excavators used for demolition shall be equipped with a debris screen to protect the operator in the cab from debris impacts.</p> <p>All heavy equipment shall be equipped with roll over protection systems and backup alarms.</p> <p>All ground personnel shall be prohibited from working in heavy equipment areas.</p> <p>Personnel will not work under any portion of heavy equipment including buckets or booms.</p>	M
	Struck-by moving heavy equipment, other vehicles, and suspended loads.	<p>Wear Hi-Visibility safety reflective vest.</p> <p>Maintain minimum two (2) foot distance from any vehicle and stay in line of site of Operator.</p> <p>Stay in designated areas away from equipment. Site Control Zones.</p> <p>Designating routes of ingress &amp; egress with safety cones, “Right of Way” signage. The designated means of access shall be indicated on the site map.</p> <p>Other access ways (into work area/ jobsite) shall be indicated as not safe for access and closed at all times.</p>	M

<b>AHA #16 – Job/Task: Pavilion Demolition</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Pavilion Demolition (continued)	Falling Materials, Structural Collapse	Establish a clear zone within which no workers or others will be situated while the heavy equipment removes or knocks down the building. Use demolition techniques that minimize the amount of material that falls at one time, so that all material that is removed is removed in a controlled manner and lands or is placed into the intended area. When moving material from one area to another, ensure that entire path is clear of any personnel that could be injured by debris that may fall from the heavy equipment During demolition, continuing inspections by a <b><u>Competent Person (Jon Cary or Louie McTall)</u></b> shall detect hazards resulting from weakened supports or loosened material.	M
	Fire hazards of heavy equipment	Maintain equipment in good, safe working order; good housekeeping practices; Flammable or combustible liquids shall be drawn from, or transferred into, containers or tanks outside only through a close piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. All heavy equipment will be equipped with operational backup alarms and a 10-B:C minimum fire extinguisher.	M
	Inclement Weather	Be aware of possible thunderstorm activity. Shut down and retract or lower boom if thunder is heard or lightning is observed. Work may resume only when 30 minutes have elapsed since last thunder clap is heard or lightning is observed.	M
	Emergency Egress Routes	Evacuation routes will be posted in the meeting room. These routes are to be clearly understood by all personnel prior to start of work Rally points and head counts as per Tetra Tech EC procedures.	M
3. Handling Construction Debris	Fire Hazards	No hot work shall be done without inspecting the area for and/or removing potential flammable/combustible materials. Any abrasive disc saw or grinder requires a Hot Work Permit. Fire extinguishers (minimum 10A:60-B:C) must be within 20 ft. of all hot work taking place. A fire watch will be utilized for a minimum of 30 minutes after hot work has ceased. No hot work shall take place until a Hot Work Permit has been issued by Tetra Tech EC and JEB Little Creek. No hot work will be performed on a painted surface, stainless steel or galvanized metal without prior surface preparation, PPE, or engineering controls.	M

<b>AHA #16 – Job/Task: Pavilion Demolition</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Handling Construction Debris (continued)	Dust Hazards	Remove structure and debris in a manner to minimize release of dust. Use dust suppression such as water sprays to keep dust levels down.	
	Pinch Points	Wear leather gloves, safety-glasses, hard hats, safety-toe footwear. Keep hands out of pinch points.	M
	Eye Injuries	ANSI Z87.1 approved safety glasses shall be worn to protect the eye.	L
	Slip/Trip/Fall	Good housekeeping shall be maintained to eliminate any debris from getting outside of the fenced in areas. No material will be stored outside of the fenced in areas. Electrical cords will not be run so that they create a trip hazard. Appropriate signage will be utilized as needed to warn workers of hazards. Do not climb on pile of debris.	L
	Foot Injury	Protective toe footwear meeting ASTM F2412-05 and F2413-05 will be worn at all times on this site.	L
4. Equipment Fueling and Maintenance	Physical Hazards during Maintenance	Mechanized equipment shall be shut down before and during fueling operations, and during maintenance. Closed systems, with an automatic shut-off that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running. EM-385-1-1 section 16.A.06. Only certified mechanics or heavy equipment operators familiar with equipment parts and operation shall work on machinery.	M

<b>AHA #16 – Job/Task: Pavilion Demolition</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Hand tools	Training in proper use by Supervisor.	Upon receipt at site and daily by users
Heavy Equipment: Hydraulic Excavator/s Equipped with hydraulic thumb and Wheel Loader	Only trained equipment operators may operate mobile construction equipment. Demolition Competent Persons: Jon Cary and Louie McTall Qualified Operators: William Benson, Garry Williams, and Jon Cary approved to operate all equipment listed	Initial by supervisor, SSHO. Notify ET if requested to do so before inspection. Documented daily equipment inspections by operator are to be conducted and recorded on inspection checklist form.
PPE, hard hats (ANSI Z89-1-1997), safety glasses (ANSI Z87.1), steel toe boots (ASTM F2412 and F2413), hi-viz vest, (ANSI Type 2), hearing protection, gloves, and clear face shield.	Trained in proper use by Supervisor.	Inspected by users prior to each use.

**Abbreviations and Acronyms:**

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|--|--|
| <p>AHA – Activity Hazard Analysis<br/>ANSI – American National Standards Institute<br/>APP – Accident Prevention Plan<br/>ASTM – American Society for Testing and Materials<br/>CIH – Certified Industrial Hygienist<br/>CRL – Corporate Reference Library</p> | <p>EM – Engineer Manual<br/>OSHA – Occupational Safety and Health Administration<br/>PPE – Personal Protective Equipment<br/>RAC – Risk Assessment Code<br/>SS – Site Superintendent<br/>SSHO – Site Safety and Health Officer</p> |
|--|--|

**NOTES:**

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

Personal Protective Equipment for this AHA will consist of hard hat, safety toed boots, safety glasses with side shields, standard work uniform (long pants, sleeved shirt), high visibility vest, hearing protection (as required), work gloves when indicated. Additional PPE as specified above.

The Brenda A. Mayberry Pavilion is a single story structure consisting of wooden frame, no exterior walls, wooden roof truss, plywood roof, and asphalt shingles. A concrete slab on grade makes up the foundation system. The electrical service connected to the structure has been disconnected. The hazardous materials survey reported that no hazardous materials are present. The pavilion footprint is approximately 1,080 square feet.

The Dry Dock Pavilion is a single story structure consisting of wooden frame, no exterior walls, wood plank flooring, plywood roof, and asphalt shingles. The foundation system consists of a wooden frame on grade filled with ballast rock. There is no electrical service connected to the structure. The hazardous materials survey reported that no hazardous materials are present. The pavilion footprint is approximately 600 square feet.

**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.

<b>NAME</b>	<b>SIGNATURE</b>	<b>TITLE</b>	<b>DATE</b>
1.			
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**APPENDIX B**  
**CORPORATE SAFETY AND HEALTH POLICY STATEMENT**

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## STATEMENT OF SAFETY AND HEALTH POLICY

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:

- 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 expected 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<sup>®</sup>, Do It Right<sup>®</sup>, and Shared Vision<sup>®</sup>, Zero Incident Performance<sup>®</sup> operating philosophies.

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**APPENDIX C**  
**EHS PROGRAMS AND PROCEDURES**

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**Purpose:** The purpose of this procedure is to establish a process for periodic inspections of project sites, offices and warehouses.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
		<b>Title:</b>	EHS Inspections
<b>Version Date - Type:</b>	11/09/2010 - Revised	<b>Original Issue</b>	02/01/95
		<b>Date:</b>	
<b>Category:</b>	Company Procedures	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
<b>Sub-Category:</b>	Departmental/Discipline	<b>Document</b>	Procedure
		<b>Type:</b>	
<b>Keyword Index:</b>	EHS Compliance/Waste Management, Field Activities/Environmental H&S, Training, Monitoring, Nonconformance and Corrective and Preventive Action	<b>Document</b>	Skip Parry
		<b>Owner</b>	

See Below

The purpose of this procedure is to establish a process for periodic inspections of project sites, offices and warehouses.

This procedure applies to all Tetra Tech EC, Inc. (TtEC) ("the Company") project sites, offices, and warehouses, including subcontractor activities.

The Project Manager (PM) is responsible for:

- a. Planning and budgeting for inspections as part of the project planning process in accordance with Task Initiation Procedure, PO-2 and the Project's Risk Management Plan.
- b. Ensuring that inspections are conducted in accordance with this procedure.
- c. Reviewing Environmental Health and Safety (EHS) inspection reports with on-site management.

The Site Manager (SM) or PM is responsible for:

- a. Participating in weekly EHS inspections as practicable.

- b. Ensuring that action items are developed, documented, and implemented and tracked to closure.

Site Supervisors are responsible for:

Conducting weekly EHS inspections for their area(s) of responsibility.

Ensuring that weekly inspection action items are implemented and documented in the project files.

The Operations Manager for each office and warehouse is responsible for ensuring that:

- a. Inspections of the office and, if applicable, warehouse are conducted on a quarterly basis.
- b. Action items are implemented and documented in a timely manner.

The Director, EHS Services, is responsible for:

- a. Reviewing and updating the inspection checklists as necessary.
- b. Monitoring conformance with the Project Environmental and Safety Manager (PESM) inspection requirements.
- c. Developing Lessons Learned Reports, Event Reports, or ZIP Bulletins for selected inspection findings

The PESH is responsible for:

- a. Approving and documenting PESH inspection frequency.
- b. Performing the PESH inspections and/or designating the appropriate technical specialist, as necessary, per the project schedule and budget.
- c. Immediately communicating significant violations or potential violations to the Project Manager and the Director, EHS Services.
- d. Preparing PESH inspection reports, issuing the report, and posting to the Company PESH inspection Database located on Lotus Notes within 10 days of the inspection.
- e. Tracking closure of each PESH inspection.
- f. Providing training in proper inspection techniques and as required to address action items.
- g. Reviewing EHS inspection reports.

The ESS is responsible for:

- a. Performing informal daily inspections of the worksite and documenting observations in the safety logbook.
- b. Assisting the PM or SM with weekly inspections.
- c. Reviewing the weekly and monthly inspection checklists for completeness, thoroughness, and trends.  
[Trends of action items in weekly and monthly EHS inspection results should be reviewed for similar](#)

[situations in other areas.](#)

The Office Environmental and Safety Coordinator (ESC) is responsible for:

- a. Assisting with quarterly inspections of the office and, if applicable, the warehouse.
- b. Training alternate office personnel on how to conduct office inspections.

For projects encompassing 1-week duration or more of consecutive workdays, the Site Supervisor shall conduct a weekly inspection of his/her area(s) of responsibility at the project site. The inspection shall:

- a. 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).
- b. 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. Attachment B may be used to document the inspection.

PESM inspections are budgeted inspections of remediation, clean construction, and consulting and engineering (C&E) projects. The PESH will either perform the inspection and/or designate an appropriate technical specialist. The PESH shall utilize a hierarchical risk based approach to determine inspection frequency at remediation, C&E, and clean construction projects.

- a. Specific checklist to be used for a given inspection will be determined by the PESH, based on the scope and risks of the project. The pertinent portions of each applicable checklist should be covered during at least one inspection annually.
- b. For programs with multiple task orders, the PESH will identify the task orders which should be inspected. Inspection frequency will be risk based to include an assessment of project scope, complexity, staffing, potential environmental, health, and safety standards.
- c. Inspections should occur soon after site mobilization and initiation of site activities. Subsequent PESH inspections shall be based upon the results of previous inspections; greater risk = increased inspection frequency. The PESH shall coordinate the date and time of the inspection with the PM and the SM.

For C&E field projects the PESH shall evaluate the need for field inspections. The determination of whether an inspection(s) is required should consider the factors described in paragraph b. above

Inspection frequency should be identified in the project EHS Plan.

The PESH shall **immediately** call the Director, EHS Services to report significant inspection findings including those that might require agency reporting. The Director, EHS Services, in conjunction with the legal department, will help the Project Manager and PESH determine if the finding requires agency reporting. If a determination is made that a finding must be reported, the client and agency will be notified

in accordance with EHS 1-7, Event Reporting and Investigation.

The PESM shall post inspection reports, including checklists (Attachment C) and action items (Attachment E or equivalent), to the PESM Inspection Database within 10 days of the inspection.

All Action Items should be classified by the PESM as either Major or Minor, or recommendation. Major findings shall receive first priority schedule for addressing action items.

Action items should be addressed as described in the Action Item Report by the Project Manager and forward the completed Action Item Report to the PESM.

The PESM shall review the completed Action Item Report to ensure completeness and appropriate closure of all Action Items. The PESM shall post completed Action Item Reports to the PESM Inspection Database and close the inspection.

The Operations Manager shall ensure that EHS inspections are conducted at least quarterly at each office and warehouse, except for fire extinguishers and first aid kits which shall be inspected monthly. Attachment F, or an equivalent, shall be used to conduct and document the inspection. The Operations Manager shall send a copy of the completed Inspection Checklist to the Director EHS Services.

The Operations Manager shall ensure implementation and documented closure of all action items using the Action Item Report (Attachment E) or equivalent. The Operations Manager shall send the completed Action Item Report to the Director, EHS Services, within 30 days of conducting the inspection.

Inspection results should be analyzed for root causes. At least annually, the Director, EHS Services OR Director, Quality Programs, or his/her designee, shall review PESM inspection findings to identify trends.

This review should be documented and forwarded to the ESQ Program Directors, and to the Chief Executive Officer.

The ESQ Program Directors and the Chief Executive Officer will utilize the analysis to develop program and environmental objectives and targets, as appropriate.

The Director, EHS Services, shall ensure that individuals responsible for conducting inspections understand the Company's program requirements; applicable federal, state and local laws and regulations; and proper inspection techniques.

Records of all inspections and closure of identified Action Items related to EHS inspections shall be documented and maintained by the office or project as follows:

- a. Informal Inspections - Project Files
- b. Weekly Inspections - Project Files
- c. PESM Inspection Report - PESM Inspection Database
- d. Completed PESM Inspections Action Item Report - PESM Inspection Database
- e. Completed Office/Warehouse Inspections and Action Item Reports - Operations Manager

## 4.1 Definitions

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.

An observed finding which by itself is not a direct hazard, or potential harm to human health or the environment. Minor findings are usually associated with documentation, programmatic deficiencies, recordkeeping, reporting, or management/organizational practices.

### **Example #1: Findings associated with Stormwater Control Systems**

- a. **Major** - A significant breach in 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 OSHA Ladder Standards**

- a. **Major** - Defective extension ladder observed.
- b. **Minor** - Failure to ensure all ladders are routinely inspected.

The ESS and all Company employees and Company subcontractor employees should be continuously aware of workplace and environmental conditions and the work practices of their fellow workers. If a substandard condition of work practice is identified, it shall be brought to the attention of the individual or supervisor, and corrected. Hazard Report and Suggestion Form (Attachment A) can be used to report substandard conditions or work practices. ZIP Slip (Attachment G) can be used to report exceptional practices or substandard conditions. ZIP Slips may be completed electronically using the Company Zip Slip Database. The Compliance Hot Line can also be utilized for anonymous reporting (See PP-18, Employee Reporting, Hotline and Non Retaliation).

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

The PESH should utilize the appropriate PESH Inspection Checklists (Attachment C) to perform the site inspection. Only the portions of the checklist applicable to the project being inspected will be utilized. The PESH should modify the inspection checklist as necessary for major projects.

Detailed environmental compliance checklists are very useful for the first PESH inspection of a site to ensure nothing is overlooked. (This is especially helpful if you are not the Project Regulatory Compliance Specialist and are not familiar with site activities). For subsequent PESH inspections, the Project's Regulatory Compliance 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 site is implementing the Plan/s.

The PESH Inspection shall include:

- a. High risk activities (HIPO) 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.
- b. Completion of applicable and selected portions of the PESH Inspection Checklists or equivalent documentation (Attachment C).
- c. A review of on-site records (e.g., permits, agency approvals, waste analyses, waste profiles, waste manifests, discharge monitoring reports, training records, etc.).
- d. Positive recognition of conformance.
- e. Non-conformance noted by the PESH that can be remedied during the conduct of the inspection will be corrected. Conformance and non-conformance shall be documented on the PESH Inspection Checklists.
- f. Training of project and subcontract personnel, when possible, to address non-conformances.
- g. Identification of any observed positive practices.

The PESH will stop work if any conditions or work practices are identified which pose imminent danger to the environment or to the safety and health of personnel.

**Please Describe Your Reference Here**

**Place Your Link in this Column**

1. Environmental Health & Safety Programs, Procedure EHS 1-7, Event Reporting and Investigation
2. Personnel Practices Procedure PP-18, Employee Reporting, Hotline, and Non-Retaliation
3. Project Initiation and Operations Procedure PO-2, Task Initiation (TIP)
- 4.
- 5.
- 6.

## Please Provide a Description of the Attachment

- A. Hazard Report and Suggestion Form
- B. EHS Weekly Checklists and Action Item Report
- C. PESH Inspection Checklist(s)

## Place Your Attachments Here



ehs 1-7 Attachment B040301.doc



EHS 3-3 Attachment B, 3-24-2011.doc



EHS3-3 Attachment C Air, 8-10-09.doc



EHS 3-3 Attachment C Asbestos 5-24-11.doc



EHS 3-3 Attachment C Conservation, 6-21-06.doc



EHS 3-3 Attachment C Drinking, 6-21-06.doc



EHS 3-3, Attachment C EHS Programs, 6-5-06.doc



EHS 3-3 Attachment C Field Construction 5-24-11.doc



EHS 3-3 Attachment C HazWaste, 5-25-11.doc



EHS 3-3 Attachment C Lead, 6-30-09.doc



EHS 3-3 Attachment C Oil and Haz Subst, 7-6-09.doc



EHS 3-3 Attachment C PCB, 6-27-06.doc



EHS 3-3 Attachment C Solid, 6-27-06.doc



EHS3-3 Attachment C UST AST 5-24-11.doc



EHS 3-3 Attachment C Wetlands, 8-1-09.doc



EHS 3-3 Attachment C Wastewater, 6-30-09.doc



EHS 3-3 Attachment C Hazwaste Perm, 5-25-11.doc



EHS 3-3 Attachment C, Radioactive Mat DOE, 7-25-2005.doc



EHS 3-3 Attachment C, Radioactive Mat NRC, 7-25-2005.doc



EHS 3-3 Attachment C, Radioactive Mat, 7-2005.doc



EHS 3-3 Attachment E.doc



EHS 3-3 Attachment Fgc122809.doc

E. Action Item Report

F. EHS Office/Warehouse Inspection Checklist

G. ZIP Slip

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Tetra Tech EC, Inc.

Proprietary Information

**EHS 1-7 ATTACHMENT B**



	<b>HAZARD REPORT AND SUGGESTION FORM</b>	<b>Hazard Type:</b> Condition <input type="checkbox"/> Practice <input type="checkbox"/>
<p><i>The form is intended to provide a means for any employee to report hazards in the work place, or to make suggestions that will improve safety, environmental protection, quality or productivity. It may also be used to report Near Miss incidents with a low loss potential. If desired, the Report may be submitted anonymously. Please provide enough information to allow an effective evaluation of the hazard or suggestion. Your input is appreciated and all suggestions will be evaluated. If your name is included, we may request further information, and will inform you of the disposition. Thank You!</i></p>		
<b>DESCRIBE CONDITION OR PRACTICE:</b>		
<b>SUBMITTED BY (OPTIONAL):</b>		<b>DATE:</b>
<b>IMMEDIATE CORRECTIVE ACTION COMPLETED:</b>		<b>COMPLETED BY</b>
		<b>COMPLETION DATE</b>
<b>RECOMMENDATIONS FOR FURTHER CORRECTIVE ACTION</b>	<b>RESPONSIBLE PERSON</b>	<b>TARGET DATE</b>
		<b>COMPLETION DATE</b>
<b>FOR OFFICE USE ONLY</b>		
<b>POTENTIAL INCIDENT TYPE:</b>		
Slip/Trip/Fall	Strain/Overexertion	Fire
Struck by or against	Chemical Exposure	Environmental Release
Caught in, between or under	Property damage	Other (Explain)
Project/Office/Location: _____		
Report Given To: _____		Date: _____
Tracking Number: _____		



**ATTACHMENT B  
TETRA TECH EC, INC.**

**EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT**

Inspection Type:     Weekly         Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
<b>Weather Conditions at time of Inspection</b> _____.		
<b>Work Conditions</b>		
1. Housekeeping		
2. Walking/Working Surfaces		
3. Aisles and Passageways		
4. Platforms/Scaffolding		
5. Ladders		
6. Stairs, Guardrails, Toe-boards		
7. Exits/Egress		
8. Roadways		
9. Ventilation i think this can go away since I don't know what it refers to.		
10. Lighting		
11. Noise Exposure		
12. Ergonomics (EHS 3-1, Attachment B)		
13. Site Perimeter and Control Zones Identified		
<b>Equipment</b>		
14. Hand/Portable Tool Condition, Storage and Use		
15. Machine, Conditions/Guarding		
16. Mobile/Heavy Equipment a. Physical inspection of equipment b. Review of daily inspection reports c. Review of equipment deficiency corrections logs/records		
<b>Material Handling Equipment</b>		
17. Hoisting and Rigging		
18. Lifting Aids Used When Possible		
19. Proper Lifting Techniques Used		
<b>Electrical Safety</b>		
20. Power Cords		
21. GFCI		
22. Generators		
23. Breaker Box Access/Clearance		
<b>Hazardous Materials</b>		
24. Hazardous Chemical List Current		
25. MSDS		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
26. Labeling		
27. Signs/Postings/Color Coding		
28. Proper Storage and Segregation of Hazardous Materials		
29. Compressed Gas Storage and Use		
<b>Emergency Systems</b>		
30. Emergency phone numbers posted		
31. Evacuation routes, rally points shown on site map		
32. Fire extinguishers inspected monthly		
33. Eyewashes and showers periodically inspected, units flushed, and fluids periodically changed		
34. First Aid Kits/Stations		
35. Emergency Rescue Equipment		
<b>Protective Equipment</b>		
36. PPE used, stored, and maintained in accordance with EHS plan		
37. Respirator use, storage, and maintenance		
<b>Hazardous Waste Storage Area (HWSA)/Satellite Accumulation Area (SAA)</b>		
38. If HWSA are present, they are being inspected and documented weekly.		
39. Findings are being corrected.		
40. Wastes stored in designated, secured area with "Hazardous Waste" signage. For SAA, area is marked "SAA". SAA located at the point of generation.		
41. Containers of hazardous waste marked with the words "hazardous waste"		
42. Wastes accumulated onsite are within allowed time limits (e.g., < 90 days for large quantity generators) - check accumulation start dates on containers in HWSA and compare to tracking log.		
43. Waste in SAA limited to max of 55 gallons and when full, moved to HWSA within 3 days.		
44. Hazardous Waste Container Standards:		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
i. DOT-spec. containers (for wastes to go off-site only)		
ii. Intact/in good condition		
iii. Waste compatible with containers (e.g., no evidence of corrosion, softening, bulging)		
iv. Securely closed and stored to prevent rupture/leaking, except when add/remove waste.		
45. Reactive/ignitable wastes stored at least fifty (50) feet from property.		
46. Liquid wastes within secondary containment (BMP, check WMP to determine state requirements).		
47. Incompatible wastes separated by a dike, wall, berm or other device.		
48. In HWSA, containers are separated by minimum 36 inch aisle space. Labels and markings are visible and legible on all containers.		
<b>Hazardous Waste Tank Storage Area</b>		
49. Daily written inspection is being conducted and is maintained on site. The inspection requirements in the plan are being documented as required.		
<b>Waste/Stockpiles</b>		
50. Refer to: 1. Attachment C – Hazardous Waste Less Than 90 Days For Hazardous Waste Stockpiles; 2. Attachment C – Solid Waste For State Regulated/Non-Hazardous Stockpiles; and/or 3. Attachment C – PCB for PCB Stockpiles		
<b>TSCA PCB Wastes</b>		
51. Inspected every 30 days at a minimum. Refer to Attachment C - PCB Checklist for < 30 day or less than 1 year storage area requirements and general PCB container storage requirements		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
<b>Spill Prevention and Preparedness</b>		
52. Outside of containers or tanks (as applicable) show no signs of deterioration, leaks, or discharges at seams, gaskets, piping, pumps, valves, rivets, or bolts.		
53. Appropriate containment materials are available and accessible, which may include: drip pans, dikes, berms, retaining walls, curbing, other barriers, spill diversion ponds, retention ponds, or integrated secondary containment structures.		
54. Spill control and response materials are available, which may include: designated spill response kits, drip pans, sorbent materials, oil retention booms (floating or sorbent), sand bags/temporary curbing devices, fuel recovery pumps/collection hoses, fuel recovery tank trucks, and tools.		
55. Is there any evidence of a sheen or discoloration on the ground? Are hazardous materials stored properly in a manner that minimizes potential for spills?		
56. Emergency Contact Lists are current and posted.		
57. People have received training.		
58. Does the project have a Spill Response, Control, and Countermeasures (SPCC) Plan? If yes, are inspections being performed and documented as required in the plan? Has the plan been updated as required?		
<b>Stormwater Pollution Prevention and Erosion Controls</b>		
59. Are site activities causing land disturbance being performed (grading, excavating, clearing and grubbing, demolition and foundation removal, etc?)		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:     Weekly         Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
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?		
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?		
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?		
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.?		
62. Does the project have a total land disturbance = or > 1 acre or is the project part of a larger or common plan of development that could exceed an acre of disturbance?		
63. Does the project have a Stormwater Pollution Prevention Plan (SWPPP)? If yes, are inspections being performed and documented as required in the plan?		
64. Fugitive Dust – Appropriate BMPs are instituted for fugitive dust emissions.		
<b>Other Conditions or Work Practices</b>		
65.		
66.		
67.		
68.		



ATTACHMENT B  
TETRA TECH EC, INC.

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Project/Location:	Inspector/s:	Time/Date:	
ACTION ITEM	RESPONSIBLE PARTY	SCHEDULE	DATE COMPLETED
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

Reviewed by: \_\_\_\_\_  
Site Superintendent/ Site Manager

\_\_\_\_\_ Date

cc: *Project Manager (monthly only)*  
*PESM (monthly only)*

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>REQUIREMENTS</b>		<b>COMMENTS/NOTES</b>

*This checklist applies to projects where asbestos materials or waste are present.*

<b>Surveying/Sampling Non-School Buildings</b>		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>1. Licensing/Certification/Accreditation.</b> State/local regulations require that persons/company performing asbestos surveying/sampling in a facility be AHERA-accredited building inspectors if results will be used to determine negative presence of asbestos. (State/local air and safety regulations). Ensure copies of accreditation are present in project file.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>2. Handling/Disposal of Sampling Wastes/PPE.</b> Sampling wastes/PPE are being handled and disposed of in accordance with state/local requirements. (State/local air and safety regulations)	
<b>Demolition/Renovation</b> ( <i>Applies if facility (or portion thereof) is being demolished or renovated. Demolition and renovation require an asbestos survey to be performed to ascertain presence, quantity, and location of asbestos containing materials.</i> ) <i>Note that some state or local regulatory agencies require prior notice for demolition even if no asbestos was identified in the survey (e.g., Puget Sound Clean Air Agency).</i>		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>3. Written Notification.</b> Written notification has been provided to EPA/state regulatory agency with a delegated NESHAP asbestos program. Notice is maintained in on-site files. Notice provided based upon type of project. <i>Note: State/local (e.g., air agencies) regulations may establish different size/time periods for notification so be sure to check local requirements.</i> a. Demolition/renovation of at least 260 linear ft (160 ft <sup>2</sup> ) or 35 ft <sup>3</sup> of 1% Regulated Asbestos-Containing Material (RACM) -- 10 day notice provided. b. Demolition of less than 260 linear ft (160 ft <sup>2</sup> ) or 35 ft <sup>3</sup> of 1% RACM - 10 day notice provided. c. Renovation of less than 260 linear ft (160 ft <sup>2</sup> ) or 35 ft <sup>3</sup> of 1% RACM - no notice required. d. Revised notice provided if amounts of RACM changed by more than 20% or start date changes. (40 CFR 61.145(b)) e. Asbestos containing roof material, if more than 160 ft <sup>2</sup> is removed. (40 CFR 761, Appendix A provides EPA interpretive ruling)	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>4. Removal.</b> RACM was removed prior to demolition unless it is: a. Category I non-friable Asbestos-Containing Material (ACM) in good condition, b. On facility component which is encased in hard material/adequately wetted, c. Not accessible for testing; not discovered until work began, or d. Category II non-friable ACM unlikely to crumble during demolition. (40 CFR 61.145(c))	

 **TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— ASBESTOS**

**CONFIDENTIAL**

Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>5. Non-Component Removal/Emissions Controls.</b> RACM is adequately wetted unless:</p> <ul style="list-style-type: none"> <li>a. Agency has indicated that wetting would unavoidably damage equipment/pose safety hazard,</li> <li>b. Exhaust ventilation and collection system designed and operated to capture asbestos emissions is in use and no visible emissions to outside air,</li> <li>c. Glove bag system is being used which is operating to contain particulate asbestos, or</li> <li>d. Leak-tight wrapping is being used to contain all ACM. (40 CFR 61.145(c))</li> </ul>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>6. Component Removal/Emissions Controls.</b> RACM is stripped with appropriate wetting/exhaust venting or components are placed in leak-tight wrapping. Large components in which ACM is not disturbed and components are placed in leak-tight wrapping/labeled do not need to be stripped. (40 CFR 61.145(c)(4))</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>7. RACM Handling.</b> No visible emissions to outside air. RACM is carefully lowered to ground without damaging; use leak-tight chutes or containers if removal occurs 50 feet above ground. If temperature is below 0° C, no wetting is required. Temperature records kept for beginning, middle and end of each day and are recorded and retained for 2 years. (40 CFR 61.145(c))</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>8. Training.</b> Foreman trained in NESHAP regulations is present during shipping, removal, and handling. Verify that proof of training is at project site. OSHA requires annual refresher course. (40 CFR 61.145(c), 29 CFR 1926)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>9. Posting Area.</b> Removal/storage area is demarcated and access is restricted. (29 CFR 1929 and 1915; state air regulations)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>10. Health and Safety Requirements.</b> OSHA regulations specify requirements that include minimizing exposure, for establishing engineering controls and work practices, monitoring, PPE, medical surveillance, warning/posting/labeling, training/certification of asbestos workers and air monitors, recordkeeping.</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>11. Minimizing Emissions.</b> All areas of building where RACM is present are being cleaned using HEPA vacuuming, steam-cleaning of carpets/wet-cleaning of floors and horizontal surfaces. (GMP)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>12. Vehicle Placarding.</b> All vehicles are marked with visible asbestos hazard warning signs. (40 CFR 61.150 and 61.149)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>13. Disposal.</b> Disposal facility has been prequalified under TTEC procedures for disposal of ACM.</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>14. Labeling.</b> Containers/wrapped materials destined for disposal are labeled with generator name/location/asbestos label as specified in 29 CFR 1910.1001(j)(2) or 1926.58(k)(2)(iii). (40 CFR 61.150(d))</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>15. Shipping papers.</b> Shipment papers are prepared and signed by generator. (40 CFR 61.150(d))</p>	

 **TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— ASBESTOS**

**CONFIDENTIAL**

Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>16. Transportation.</b> Transporter has been pre-qualified under TTEC procedures for transportation subcontractors. Transportation on public roads of asbestos waste complies with 49 CFR 172.101 and 173, Subpart J. <i>Complete the “Oil and Hazardous Substances Management” checklist.</i>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>17. Reports.</b> Exception report has been submitted to EPA/delegated agency if shipment paper was not returned within 45 days. (40 CFR 61.150(d)) Note: May be managed by client. Ensure ESS is aware of who’s responsibility it is to file exception reports.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>18. Recordkeeping.</b> Waste shipment records, exception reports and notifications are retained in project files.. (40 CFR 61.150(d), GMP)	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>19. Deconwater/Treatment Filters/PPE.</b> These waste streams may be regulated RACM. If so, they have been properly handled and disposed of. Review site documentation showing regulated status of these wastestreams.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>20. State Hazardous Waste.</b> RACM and wastes generated during remedial activity may be a state special/hazardous waste. Review EPP/WMP for any state-specific requirements relating to ACM.	
<b>School Building</b> ( <i>Applies if surveying, sampling, conducting written assessments, developing management plans, and conducting demolition renovation or operation and maintenance in public or non-public schools are performed.</i> )		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>21. Training.</b> The following persons have been trained in accordance with State or Federal requirements. a. Inspectors that conduct asbestos surveys. (40 CFR 763.85(a)) b. Workers conducting response actions or maintenance activity. c. Contractor/Supervisors conducting response actions/maintenance activities. d. Persons who develop management plans per 40 CFR 763.93. e. Project Designer who designs activities associated with response actions/maintenance activities. f. Project Monitor who oversees abatement activities performed by contractor. (40 CFR 763, Appendix C) Review site training matrix to determine if training requirements are being maintained for all site personnel.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>22. Surveys/Written Assessment.</b> Surveys should be repeated every 3 years to reassess condition of all friable known or assumed ACM. Review date of most recent survey for project activities related to ACM.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>23. Sampling.</b> During survey, material suspected of containing asbestos has been sampled in accordance with 40 CFR 763.86. Analysis is being performed by an accredited laboratory. At completion of response actions functional space must be sampled. (40 CFR 763.86, .87, and .90) Review project documentation to ensure samples were collected as determined necessary.	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>24. Asbestos Management Plan.</b> Each facility with ACM has an asbestos management plan. (40 CFR 763.93)	

 **TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— ASBESTOS**

**CONFIDENTIAL**

Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>25. Response.</b> Response action is being conducted in accordance with written assessment developed under 40 CFR 763.88. The response action includes:</p> <ul style="list-style-type: none"> <li>a. Damaged/significantly damaged thermal system insulation (TSI) ACM which is being repaired or removed. All other TSI ACM and covering is being maintained intact and undamaged.</li> <li>b. Damaged friable surfacing ACM which is either being encapsulated, enclosed, removed or repaired.</li> <li>c. Significantly damaged friable ACM which is being isolated, access is restricted, and ACM is enclosed/encapsulated or removed. (40 CFR 763.90)</li> </ul>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>26. Operations and Maintenance Plan.</b> An O&amp;M Plan is being implemented if friable surfacing ACM, TSI ACM, and miscellaneous ACM that has potential for damage is found. If those materials have significant damage, O&amp;M plan is being implemented, area is isolated, access is restricted, preventative measures are being instituted, and ACM is being removed, encapsulated, restricted or repaired. (40 CFR 763.91)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>27. Air Sampling.</b> Air sampling during and after completion of response action is being conducted in accordance with 40 CFR 763.90. Records of air sampling are being maintained in accordance with 40 CFR 763.94.</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>28. Notification.</b> Local education agency is providing annual written notification to parents, teachers and employee organization of availability of asbestos management plan. (40 CFR 763.93)</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>29. Minimizing Exposure.</b> All areas of building where friable ACM is present is cleaned using HEPA vacuuming, steam-cleaning of carpets/wet-cleaning of floors and horizontal surfaces. (40 CFR 763.91(c))</p>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p><b>30. Record Keeping.</b> The following records, as applicable, are being maintained in the project files:</p> <ul style="list-style-type: none"> <li>a. Air sampling information.</li> <li>b. Cleaning records for activities described in 40 CFR 763.91(c).</li> <li>c. Other records, as required by client under contract, training records, description of response actions, surveillance activities, O&amp;M activities, etc.</li> </ul>	

-- End of Checklist --



PESM INSPECTION CHECKLIST— CONSERVATION RESOURCES AND ENVIRONMENTAL REVIEWS

CONFIDENTIAL

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**Location-Dependent Programs**

		<p><b>1. River.</b> If project site is located adjacent to or within a designed Wild and Scenic River, regulatory agency has been consulted regarding protective measures. Project is in compliance with those measures. Documentation is maintained. (Wild and Scenic Rivers Act, State regulations)</p>	
		<p><b>2. Coastal Zone Management Act.</b> If project site is located within a designated federal/state coastal zone, Coastal Zone Management Act Certification has been obtained and is maintained in files. (CZMA, State/local regulations)</p>	
		<p><b>3. Shoreline Protection.</b> If project site is located within protected shoreline area in the state, a Shoreline Protection Act permit has been obtained. Project is in compliance with permit terms and conditions. (State/local regulations)</p>	
		<p><b>4. Public Lands.</b> If project activities are located or are occurring within federal, state, local public lands, including parks, forests, reserves, and trails, access and use authorization were obtained &amp; documented. (Federal/State/local regulations)</p>	

**Environmental Review**

		<p><b>5. National Environmental Policy Act.</b> If applicable, project activities are in compliance with any mitigation measures specified in the final documentation (e.g., FONSI). (40 CFR 1500-1508)</p>	
		<p><b>6. State Environmental Policy Act.</b> Project files contain documentation demonstrating completion of the environmental review and site activities are in compliance with any mitigative measures specified in this document. (State regulation)</p>	
		<p><b>7. CERCLA/State Mini-CERCLA Cleanup.</b> Project is not required to undergo environmental review because it is being conducted under CERCLA or State cleanup law.</p>	
		<p><b>8. Exempt.</b> Project is categorically exempt or has obtained specific exemption that it is not required to undergo environmental review. Project files contain proper documentation. (40 CFR 1500, State regulations)</p>	



PESM INSPECTION CHECKLIST— CONSERVATION RESOURCES AND ENVIRONMENTAL REVIEWS

CONFIDENTIAL

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**Location or Activity-Dependent Programs**

		<p><b>9. Archaeological/Cultural/Historic Resources.</b> Project activities involve excavation or other land disturbing activities. If State Historic Preservation Officer files show that no surveys have been conducted and client has no information about cultural resources at the site, Tetra Tech EC cultural resources specialist or client designated specialist conducted a survey prior to commencing land disturbing activities. (36 800, E.O. 11593)</p>	
		<p><b>10. Threatened/Endangered Species.</b> If applicable, project files contain notification and regulatory agency response. Project is in compliance with any mitigative measures. If "takings" occur, approval has been obtained. (50 CFR 17, 50 CFR 402.6, state/local regulations)</p>	
		<p><b>11. Fish and Wildlife Collection.</b> Permit/approval, if required, has been obtained and fish/wildlife collection regulations and guidance are being complied with. (33 CFR 230-330, State/local regulations)</p>	

--End of Checklist--



PESM INSPECTION CHECKLIST— DRINKING WATER, SOLE SOURCE AQUIFER, WELLHEAD PROTECTION AND WATER WITHDRAWAL

CONFIDENTIAL

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A	<b>REQUIREMENTS</b>
			<b>COMMENTS/NOTES</b>

*This checklist applies to projects in which drinking water sources are being constructed/modified/abandoned, groundwater is being withdrawn, or sole source aquifers or wellheads are being impacted.*

**Drinking Water Systems.** (Applies if project involves connection to or upgrading a drinking water system.)

			<b>1. Design.</b> System design has been approved by regulatory agency and is being constructed in accordance with design plans.	
			<b>2. PE Certification/Stamping.</b> If applicable, drawings are properly stamped/certified.	
			<b>3. Water System Permits.</b> If required, permit is maintained in files and activities are in compliance with permit terms/conditions.	
			<b>4. Water System Connection Approvals/Plumbing Code.</b> If applicable, the connection design has been approved by the local authority and conforms to the local plumbing code.	
			<b>5. Other Permits/Certifications.</b> Permits to conduct construction, demolition, and road alteration/interference have been obtained. If fill brought in, certification that fill is clean is maintained in files. <i>Complete the "Field/Construction/Road Activities" Checklist to demonstrate compliance.</i>	
			<b>6. Waste Management.</b> Construction debris and other wastes, if any, are being properly managed, transported, and disposed of. <i>Complete applicable waste checklists.</i>	
			<b>7. Easements/Right-of-Ways.</b> Activities are being conducted on property owned/controlled by third parties. Easements and right-of-ways have been obtained prior to conduct of activities and are contained in project files.	

**Well Construction and Abandonment.** (Applies if construction or abandonment of water supply or monitoring wells are performed.)

			<b>8. Well Construction and Abandonment Approval/Notice.</b> Notice or approval was obtained prior to commencing well construction or abandonment activities. Documentation is in project files. (State regulations)	
			<b>9. Well Decommissioning Forms.</b> Notice was submitted to agency after well was decommissioned. (State regulations)	
			<b>10. Well Construction Standards.</b> Well construction standards have been met. (State regulations)	
			<b>11. Well Contractor Licensing.</b> Contractor performing well construction/abandonment is properly licensed. Documentation of licensing is contained in project files. (State regulations)	



PESM INSPECTION CHECKLIST— DRINKING WATER, SOLE SOURCE AQUIFER, WELLHEAD PROTECTION AND WATER WITHDRAWAL

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

**Wellhead Protection.** *(Applies when project is located near water wells or "well fields" supplying public water.)*

			<p><b>12. Wellhead Protection Program.</b> States list wellhead areas that must be protected against contamination or degradation. The state list has been examined to determine if the project areas is listed. (State regulations)</p>	
			<p><b>13. Wellhead Restrictions.</b> If the impacted area is within a wellhead protection area, all restrictions are being complied with. (State regulations)</p>	

**Water Withdrawal.** *(Applies if groundwater is being withdrawn.)*

			<p><b>14. Groundwater Withdrawal Permit.</b> A withdrawal permit has been obtained if the volume of groundwater being withdrawn exceeds the state-determined level. Terms/conditions of permit are complied with. (State regulations)</p>	
			<p><b>15. Sole Source Aquifer Protection Standards.</b> Groundwater withdrawal must comply with state/local aquifer protection standards if the underlying aquifer has been designated as a sole source aquifer. (State/local regulations)</p>	

--End of Checklist--

**PESM INSPECTION CHECKLIST— FIELD CONSTRUCTION AND ROAD IMPACTING ACTIVITIES**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

*This checklist applies to all projects involved in field construction activities.*

<b>Utilities</b> (Applies if project involves the construction, extension, or hookup or shutoff of utilities.)		
		<p><b>1. Utilities.</b> Project involves the construction, hook-up or shut-off and extension of the following utilities. <i>Circle all that apply.</i></p> <ul style="list-style-type: none"> <li>a. Electric</li> <li>b. Phone</li> <li>c. Water</li> <li>d. Sewer</li> <li>e. Gas</li> <li>f. Other: _____</li> </ul>
		<p><b>2. Permit/Approval.</b> Permit/approval from local government, state utility siting commission, state agency, or federal base personnel was obtained prior to commencing construction, extension, hook-up, or shut-off activities. Permit/approval is located in the on-site project files or conspicuously posted, if required. (State/local regulations, Base requirements)</p>
		<p><b>3. Inspection.</b> Regulatory agency has conducted an inspection of the activities. <i>In the adjacent column note the date of the inspection(s) and the results.</i></p>
<b>Zoning/Land Use</b>		
		<p><b>4. Zoning.</b> Project constitutes an approved use for the zoned area. If not, a conditional use permit or request for re-zoning has been obtained. (State/Local regulations) <i>Note: This issue normally will apply to larger project in which landfills are being constructed, or other larger facilities are being developed.</i></p>
		<p><b>5. Building Code.</b> Project involves the construction or placement of temporary or permanent buildings, equipment, or structures. State/local agency or base personnel responsible for reviewing/permitting these structures has been consulted. Permits and/or reviews have been obtained, if necessary. Buildings/structures comply with federal, state, and local building codes. (State/Local regulations) <i>If an inspection was conducted note the date and results.</i></p>
		<p><b>6. UFC.</b> Project involves the construction or placement of temporary or permanent buildings, equipment, or structures. State/local agency or base personnel responsible for reviewing fire safety has been consulted. Permits/approvals/reviews have been obtained, if necessary. Buildings/structures comply with federal, state, and local fire codes. (State/local regulations) <i>If an inspection was conducted note the date and results.</i></p>



PESM INSPECTION CHECKLIST— FIELD CONSTRUCTION AND ROAD IMPACTING ACTIVITIES

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>7. Airport/FAA Approval.</b> Project involves the construction or placement of temporary or permanent buildings, equipment, or structures which will be constructed adjacent to an airport or exceed 200 feet in height. FAA Certification has been obtained for the project or a determination has been made that the project is exempt. Project files contain the FAA certification or exemption determination (14 CFR 77).</p>	
		<p><b>8. Noise.</b> Project generates noise emissions (e.g., drilling rigs, construction equipment, etc.). Project is in compliance with state or local noise control standards. If restrictions have been placed on hours of operation, project operating logs demonstrate compliance with these restrictions. (State/Local regulations).</p>	
		<p><b>9. Certification of Drawings.</b> As-builts, specifications, or drawings have been stamp/sealed by PE or certified by other professional, as applicable, in accordance with state/local regulation.</p>	
		<p><b>10. Demolition Activities.</b> Project involves the demolition of structures or equipment.</p>	
		<p>a. <b>Pre-demolition Notice/License.</b> Notice is maintained in project files or posted conspicuously, if required.</p>	
		<p>b. <b>Hazardous substances.</b> A pre-demolition determination regarding the presence of hazardous substances (PCB, Mercury, Lead and Others) associated with building structures, processes and equipment has been made. Proper removal and segregation of these hazardous substances occurs before demolition.</p>	
		<p>c. <b>Asbestos Determination.</b> A determination regarding the presence of asbestos has been made. Proper notifications have been made (40 CFR 61, State/Local agencies)</p>	
		<p>d. <b>Waste Characterization.</b> Debris and other wastes have been characterized and are being properly managed and disposed of.</p>	

**Miscellaneous**

		<p><b>11. Excavation Activities.</b> Dig-safe/ "hot dig" permits/approvals have been obtained. Permits are maintained in the project files. (State/Local regulations)</p>	
		<p><b>12. Well Drilling/Construction/Maintenance/Abandonment.</b> Project involves the drilling/abandonment of wells.</p>	



PESM INSPECTION CHECKLIST— FIELD CONSTRUCTION AND ROAD IMPACTING ACTIVITIES

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A	<b>REQUIREMENTS</b>
			<b>COMMENTS/NOTES</b>

			<p>a. <b>Drilling Permit/Pre-Drill Notification/Start Card.</b> Permit/approval/notification was obtained in a timely manner and is maintained in the project files. (State/Local regulations).</p>	
			<p>b. <b>Licensed Operator.</b> Documentation of Driller or Professional Geologist licensing/certification is maintained in project files. (State/Local regulations)</p>	
			<p>c. <b>Well Construction/Abandonment Standards.</b> Well was constructed/abandoned in accordance with regulatory standards/guidance. (State/Local regulations)</p>	
			<p>d. <b>Post-Abandonment Notification.</b> Notification was submitted in a timely manner and a copy is maintained in the project files. (State/Local regulations)</p>	
			<p><b>13. Clean Fill Certification/Testing.</b> Project files contain analytical testing or letter from supplier (which may be the client if from project site) that soil is clean. (State/Local regulations; GMP)</p>	
			<p><b>14. Soil Erosion Control.</b> Project involves excavation, grading or other land disturbing activities associated with construction projects.</p>	
			<p>a. Stormwater Permit. Project is complying with General or Individual Permit for Stormwater Discharges from Construction Projects as required by State/Local regulations. <i>Complete "Wastewater/Stormwater Discharge/UIC" checklist</i></p>	
			<p>b. Soil Erosion and Sediment Control Plan. Project prepared Plan and effectively implements erosion controls, inspections and maintenance requirements.</p>	
			<p>c. Grading Permit/Plan. Activities are being conducted in compliance with the permit. Permit is maintained in the project files.</p>	
			<p><b>15. Stormwater Pollution Prevention (SWPP).</b> Project has prepared a SWPP Plan to comply with the Industrial or Construction SWPP requirements (State/Local regulation) to prevent sediment and chemical contamination from migrating off the project site boundary.</p>	
			<p><b>16. Spill Prevention Control and Countermeasures Plan (SPCC).</b> Projects storing oils in quantities subject to federal regulations (40 CFR 112) have prepared and implemented an SPCC Plan and/or registered tanks (State/Local regulation). <i>Complete oil and hazardous substances checklist.</i></p>	



PESM INSPECTION CHECKLIST— FIELD CONSTRUCTION AND ROAD IMPACTING ACTIVITIES

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

			<b>17. Dust Control.</b> Project involves land disturbance activity that generates fugitive dust and all reasonable measures (or other local standard) are being used to minimize fugitive emissions. (State/Local regulations)	
			a. Planning. Project has plans, specifications and or procedures for the control of fugitive dust	
			b. Inspections. Project is observing and taking action when visual dust is observed. Responsibility for dust control and visual monitoring is assigned and understood.	
			c. Control Measures. Project has equipment and materials on site to effectively control fugitive dust from land disturbance activities. Controls are implemented in active and inactive (but not fully stabilized) construction areas.	
			d. Effectiveness. At time of inspection fugitive dust was observed to be minimal and controls used to minimize dust were observed (e.g., water tank truck).	
			<b>18. Stream Crossing.</b> If applicable, the USACE § 9 permit has been obtained. State may also require permit. <i>Complete "Wetlands/Streams/Floodplains" checklist.</i>	
			<b>19. Land Surveying.</b> Licensed/registered Professional Land Surveyor performed the surveying and stamped/sealed appropriate documentation. (State/local regulations)	

**Activities That Impact Roads/Traffic** (*Applies if roads or traffic will be impacted by project activities.*)

			<b>20. Road Alteration/Curb Cuts.</b> Opening/access permit or approval has been obtained from the local or state agency prior to commencing construction. (State/local regulations)	
			<b>21. Heavy/Large Loads.</b> Permit/approval has been obtained from state/local agency authorizing shipment. Time restrictions and weight limits for shipment are being complied with. (State/local transportation regulations)	
			<b>22. Traffic Impact Analysis.</b> If required, the analysis was conducted and approved by the local regulatory agency. (Local regulations)	
			<b>23. Road Crossing/Easements.</b> For public road crossings, right-of-way permit was obtained from state/local agency. For private road crossing, right-of-way permit or easement was obtained from private landowner. Permits/approvals are maintained in the project files. (State/local regulations)	



PESM INSPECTION CHECKLIST— FIELD CONSTRUCTION AND ROAD IMPACTING ACTIVITIES

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A	<b>REQUIREMENTS</b>
			<b>COMMENTS/NOTES</b>

			<p><b>24. Traffic Control.</b> Flag signals, barricades, safety lighting, warnings, etc., are used for vehicle crossings, loading/unloading, or parking. Sufficient vehicle parking has been allocated. (State/local regulations, Base requirements)</p>	
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**Materials Transportation** (Includes the activities such as classification, packaging and shipment of DOT-regulated Hazardous Materials. See 49 CFR 172.101 Hazardous Materials Table)

			<p><b>25. Hazardous Materials (HM) Transportation.</b> Project plans identify hazardous materials transported over public roadways by the project and address DOT requirements. <i>Complete oil/hazardous substances and hazardous waste (as applicable) checklists.</i></p>	
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			<p>a. <b>Fuel Transport.</b> If Project uses “fuel trucks” (i.e., tanks on back of a pickup truck) for diesel fuel transport along <u>roads that are accessible by the public and</u> the tanks have a capacity of &gt; 119 gallons (e.g. DOT definition of “bulk package”), the tanks must be placarded on all 4 sides with a Class 3 Flammable Liquid placard &amp; it must display the appropriate 4-digit DOT Identification Number (49 CFR 172.101).</p>	
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			<p><b>--End of Checklist--</b></p>	
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**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

*This checklist applies when client (or Tetra Tech EC, Inc., if applicable) is storing wastes for longer than 90 days, creating, treating, or disposing of hazardous wastes on-site. Project may include either conducting work at a client's already permitted facility or obtaining a permit. Therefore, reference to the term "facility" throughout this checklist may either include the entire project or the client's facility. However, if the client already has a RCRA permit, the inspection is limited only to those areas of the client's facility which are impacted by the project activities. Other checklists may be required for areas of concern not included under this permit (i.e., Wastewater Discharge, Hazardous Waste: Storage Treatment Disposal in less than 90 days, Air Quality, etc.)*

<b>General Requirements</b> (Please complete each line in this section.)		
	<p><b>1. ESS or Designated Waste Management Role. Discuss Role of ESS or designated individual with regards to waste management at the Site.</b></p> <p>a. How is waste management handled. Is it working effectively?</p> <p>b. What types of problems have been encountered?</p> <p>c. Is ESS or designated individual receiving regulatory support/oversight from ESQ Specialists, as needed?</p> <p>d. Does ESS or designated individual have the required training and knowledge? Note – for permitted or interim status facility management, the designated individual should be trained and experienced to a much higher level than is typical on less than 90 day facilities at most Tt project sites.</p>	
	<p><b>2. Permit Applications/Interim Status and Final Part B Permits.</b> Copies of Part A and B permit applications and final Part B permits are located on-site. Verify the following: (40 CFR 270)</p> <p>a. Permit is current.</p> <p>b. Existing physical facilities are consistent with contents in permit and application.</p> <p>c. Part A and B application and permit, as applicable, accurately reflect existing TSD project activities.</p> <p>d. Project is in compliance with applicable permit requirements. Note: Each part of the permit that affects TTEC scope of work must be reviewed and evaluated for compliance as part of this inspection</p>	
	<p><b>3. EPA Identification Number.</b> Facility has an EPA Identification number to store/treat/dispose/transport/offer waste for transport. (40 CFR 264.11 and 265.11)</p>	
	<p><b>4. Waste Determination.</b> Waste has been determined to be hazardous or state-regulated hazardous waste prior to treatment, storage or disposal. (40 CFR 264.13 and 265.13)</p>	
	<p><b>5. Waste Analysis Plan.</b> Written waste analysis plan has been developed.</p>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p>a. <b>Contents.</b> The waste analysis plan includes:</p> <ul style="list-style-type: none"> <li>• All wastes generated and received at the project.</li> <li>• Parameters for which each waste will be analyzed.</li> <li>• Test methods used to test for these parameters.</li> <li>• Sampling method used to obtain representative samples.</li> <li>• Frequency with which initial analysis will be reviewed or repeated.</li> <li>• Provisions for retesting waste when the process or operation generating the waste changes.</li> <li>• Procedures used to inspect and analyze each hazardous waste shipment received. (40 CFR 264.13 and 265.13)</li> </ul>	
	<p>b. <b>Recordkeeping.</b> Records are kept that confirm waste received matches analyses, waste movement are kept within the facility, and analysis regarding restricted waste are maintained.</p> <p>c. <b>Updates.</b> WAP is updated to reflect requirements applicable to restricted wastes. (40 CFR 265.13(b)(6) and 268.7(c) and (d))</p>	
	<p><b>6. Waste Minimization.</b> Waste minimization practices are being implemented in accordance with a written plan. (40 CFR 262.41(a)(6)-(8); 58 Fed. Reg. 31114)</p>	
	<p><b>7. Inspection.</b> A written schedule has been developed and is being complied with to inspect monitoring equipment, safety equipment, security devices, and operating and structure equipment.</p> <p>a. A copy of the plan is kept at the project site.</p> <p>b. Areas subject to spills are inspected daily.</p> <p>c. Deterioration/malfunctions are remedied in a timely manner.</p> <p>d. All inspections are documented in a log.</p> <p>All inspections must show deficiencies, responsibility for correcting deficiencies, and dates on which those deficiencies were corrected.</p>	
	<p><b>8. Location Requirements.</b> Project involves the construction of a TSD unit. Location standards specified in 40 CFR 264.18 and 265.18 are being complied with.</p>	
	<p><b>9. Construction Quality Assurance Program.</b> For new surface impoundments, waste piles, or landfills (units, lateral expansions, and replacement units constructed after January 29, 1992), a construction quality assurance program was developed and implemented in accordance with 40 CFR 264.19 and 265.19.</p>	
<p><b>Closure/Post-Closure</b> (<i>Applies if the project involves closure or post-closure care for any hazardous waste management unit.</i>)</p>		
	<p><b>10. Closure Plan.</b> Closure is being conducted pursuant to an approved-closure plan. ESS should be able to describe closure requirements and how they are being met. (40 CFR 264.112 and 265.112)</p>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>11. Amendment to Plan.</b> Written notice was provided to EPA/state requesting modification to the closure plan and Part B permit because changes in operating plans or facility design affect the closure plan, there is a change in the expected year of closure, or a partial or final closure is being conducted and unexpected events require modification to the approved plan. A copy of the notification should be included in the project files.	
	<b>12. Notification.</b> Notification was provided to EPA/state 60 days prior to conducting closure of a surface impoundment, waste pile, or landfill and at least 45 days prior to closure of a tank, container storage area or incinerator. A copy of the notification should be included in the project files. (40 CFR 264.112 and 265.112)	
	<b>13. Time Allocation.</b> Within 90 days of receiving the last volume of waste, all hazardous wastes are treated, removed from unit or dispose on-site in accordance with the closure plan. The partial/final closure of the unit must be completed within 180 days of receiving the last volume of waste unless an extension has been obtained from EPA/state. Documentation of compliance should be included in the project files. (40 CFR 264.113 and 265.113)	
	<b>14. Disposal.</b> All contaminated equipment, structures and soil are being properly disposed of or decontaminated unless standards specified for closure of individual units are complied with. Hazardous waste generator requirements, as applicable, are being complied with during closure. (40 CFR 264.114 and 265.114)	
	<b>15. Certification.</b> Within 60 days of completion of closure of surface impoundment, waste pile, land treatment, and landfill unit, or completion of final closure of a facility, certification was sent to EPA/state certifying that it was closed in accordance with approved plan. Certification was signed by independent PE and owner/operator of facility. Documentation of compliance should be included within project files. (40 CFR 264.115 and 265.115)	
	<b>16. Survey Plat.</b> Survey plat indicating location and dimensions of landfill cells or other hazardous waste disposal units prepared and certified by professional land surveyor was submitted in timely fashion to local zoning authority and EPA/state. (40 CFR 264.116 and 265.116)	
	<b>17. Post-Closure Care/Plans/Notices and Certifications.</b> Post-closure performance standards, plan requirements, amendment/permit modification requirements, notifications to regulatory agencies and certification of completion are being complied with. (40 CFR 264.117 - .120 and 265.117 - .120)	
	<b>18. State-Specific Requirements.</b> Closure meets state-specific requirements. (State Hazardous Waste Regulations) See Work Plan/WMP for details on requirements.	
<b>Container Storage</b> ( <i>Applies to storage of containers for greater than 90 days.</i> )		
	<b>19. Marking.</b> Containers are clearly marked with the words "Hazardous Waste".	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>20. Condition.</b> Containers are in good condition (e.g., no severe rusting, apparent structural defects). (40 CFR 264.171 and 265.171)	
	<b>21. Compatibility.</b> Waste is compatible with container. (40 CFR 264.172 and 265.172)	
	<b>22. Management.</b> Containers are closed at all times, except when adding or removing wastes, and containers are handled/stored in a manner to prevent rupture/leaking. (40 CFR 264.173 and 265.173)	
	<b>23. Stacking Drums.</b> Containers stored on top of each other have pallets between them and are not stored more than 2 high. (GMP)	
	<b>24. Drum Log.</b> A log is kept of all drums contained in the storage area. (GMP)	
	<b>25. Location.</b> Containers holding ignitable/reactive waste are stored at least 50 feet from property boundary. (40 CFR 264.177 and 265.176)	
	<b>26. Secondary Containment--Final Status.</b> Storage area has a secondary containment system which: <ul style="list-style-type: none"> <li>a. Is impervious: free from cracks or gaps and impervious enough to contain leaks, spills, and precipitation.</li> <li>b. Base is sloped (or otherwise designed) to drain and remove liquids resulting from leaks, spills, or precipitation.</li> <li>c. Containers are elevated or protected from contact with accumulated liquids.</li> <li>d. Has adequate capacity to contain 10% of volume of containers or the volume of the largest container, whichever is greater.</li> <li>e. Run-on into the containment system is prevented or system has sufficient capacity to contain any runoff that might enter system.</li> <li>f. Liquids within containment system are removed as soon as practicable. (40 CFR 264.175)</li> </ul>	
	<b>27. Inspections.</b> Containers and storage area are inspected at least weekly and logs are kept of these inspections. (40 CFR 264.174 and 265.174)	
	<b>28. Incompatibility.</b> If incompatible wastes are stored in same container, they comply with precautions specified in 40 CFR 264.17(b) or 265.17(b) and if waste is placed in container that previously held incompatible waste, documentation exists that container was washed by drum recycler before reuse. (40 CFR 264.177 and 265.177)	
	<b>29. Separation.</b> Incompatible wastes/materials are separated from each other or protected from each other by dike, berm, wall or other device. (40 CFR 264.177 and 265.177)	
	<b>30. Closure.</b> Upon closure, storage area meets 40 CFR 264.111 or 265.111 decontamination/closure requirements. (40 CFR 264.179 and 265.179)	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>31. Air Emissions.</b> Containers comply with management standards specified in 40 CFR Part 265.1030, -.1050, and -.1080.</p> <ul style="list-style-type: none"> <li>a. Subpart AA: Applies to process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air/steam stripping of hazardous wastes with organic concentrations of 10 ppm or greater. Operator must calculate emissions and operate equipment within those specified emissions.</li> <li>b. Subpart BB: Applies to equipment that contains or contacts hazardous waste with organic concentrations of 10 ppm or greater. Refer to subpart for standards for various equipment.</li> <li>c. Subpart CC: Applies to tanks, surface impoundments, and containers used to contain hazardous waste. (ie, hazardous waste is stored in DOT specification containers; hazardous waste tanks meet specific design criteria (note CERCLA and RCRA corrective action exemptions); emissions controls for surface impoundments)</li> </ul>	
	<p><b>32. State-Specific Requirements.</b> Storage area meets state-specific requirements. (State Hazardous Waste Regulations) See WMP for additional state requirements.</p>	
<b>Satellite Accumulation</b>		
	<p><b>33. Satellite Accumulation Area.</b> A SSA is being used to manage small quantities of hazardous waste being generated at or near the point of generation. If so, complete the applicable SAA section in the <i>Hazardous Waste: Storage Treatment Disposal in Less than 90 Days Checklist</i></p>	
<b>Tanks</b>		
	<p><b>34. Existing Tanks.</b> If wastes are being stored in existing tanks that do not have secondary containment, there is a written integrity assessment certified by an independent, registered PE that attests to the tank's integrity, within the project files.. (40 CFR 264.191(a) and 265.191(a))</p>	
	<p><b>35. New Tanks Installed as Part of Project.</b> Project involves the installation of a tank that stores/treats hazardous waste, and the following has been performed:</p> <ul style="list-style-type: none"> <li>a. <b>Integrity Assessment.</b> There is a written assessment reviewed/certified by independent, registered PE of tank's integrity on-site. (40 CFR 264.192(a) and 265.192(a))</li> <li>b. <b>Installation Inspection.</b> There is a written assessment by a qualified installation inspector or registered PE that tank is properly installed on-site. (40 CFR 264.192(b) - (g) and 265.192(b) - (g))</li> </ul>	
	<p><b>36. Marking.</b> Tanks are clearly marked with "Hazardous Waste".</p>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<p><b>37. Containment System.</b> Applies to a new tank, existing tank storing F020-F023, F026/F027, or other specified existing tanks, unless variance obtained.</p> <ul style="list-style-type: none"> <li>a. <b>General Requirement.</b> Containment system is capable of detecting/collecting releases and accumulated liquids until collected material is removed. (40 CFR 264.193(b)(3) and 265.193(b)(2))</li> <li>b. <b>Leak Detection.</b> Containment system has leak detection system that is designed/operated to detect failure of either primary or secondary containment structure or any release of waste in system within 24 hours, or earliest practicable time. (40 CFR 264.193(c) and 265.193(c))</li> <li>c. <b>Removal of Releases.</b> All spills, leaks, precipitation are removed from containment system within 24 hours. (40 CFR 264.193(c) and 265.193(c))</li> <li>d. <b>Specific Design.</b> Containment is: a liner, vault, double-walled tank or other EPA/state-approved device that meets specified design requirements (e.g., suitable base, sloped, leak detection system). (40 CFR 264.193(d) and (e) and 265.193(d) and (e))</li> <li>e. <b>Ancillary Equipment.</b> <i>Ancillary equipment is provided with secondary containment. (40 CFR 264.193(f) and 265.193(f))</i> Note: Not applicable to above ground piping/welded flanges, joints, and connections/seamless or magnetic coupling pumps and valves/pressurized aboveground piping with automatic shut-off devices that are visually inspected daily.</li> <li>f. <b>Existing tanks not yet subject to containment requirement.</b> If existing tank is being utilized which is not yet subject to containment requirement there is written assessment to leak test tank or tank integrity performed annually by registered PE kept on-site. (40 CFR 264.193(i) and 265.193(i))</li> </ul>	
	<p><b>38. Overfill/Spill Control.</b> Tank system includes spill prevention controls; overfill prevention controls and maintenance of freeboard in uncovered tanks to prevent overtopping. (40 CFR 264.194 and 265.194)</p>	
	<p><b>39. Inspection.</b> Daily inspections are performed of overfill/spill control; aboveground points of tank; monitoring/leak detection; and tank integrity for signs of ruptures, leaks, corrosion, and surrounding area. Cathode protection systems are inspected bimonthly (and 6 months after installation). Records are kept of inspections. (40 CFR 264.195 and 265.195)</p>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>40. Spills/Releases.</b> If a spill has occurred from tank/containment system, the following must be performed: (40 CFR 264.196 and 265.196)</p> <ul style="list-style-type: none"> <li>a. <b>Waste/Released Material.</b> Waste is removed from tank as necessary to prevent further release and released material is removed from containment area within 24-hours/in timely manner. (40 CFR 264.195(a) and (b) and 265.195(a) and (b))</li> <li>b. <b>Release to Environment.</b> A visual inspection/removal of contamination was conducted and Environmental Compliance Spill/Release procedure was implemented. (40 CFR 264.196(c) and 265.196(c))</li> <li>c. <b>Notification.</b> If release to environment occurred, proper verbal and written notification was conducted. (40 CFR 264.196(d) and 265.196(d))</li> <li>d. <b>Repair.</b> If after the release the tank system required major repair, PE certification was sent to EPA/state. (40 CFR 264.198(e) and 265.198(e)) <i>Note: Major repair includes installation of internal liner, repair of ruptured containment system, etc.</i></li> </ul>	
	<p><b>41. Closure.</b> At closure, the standards in 40 CFR 264.197 or 265.197 and Subpart G were met which include removing/decontaminating waste residue, contaminated containment system, contaminated soils, structures, and equipment. (40 CFR 264.197 and 265.197)</p>	
	<p><b>42. Ignitable/Reactive.</b> If ignitable/reactive waste are stored in tank, 1) waste is treated, rendered, or mixed before placement so that it is no longer ignitable/reactive and meets 40 CFR 265.17(b) <b>OR</b> 2) waste is stored/treated so that it is protected from material/conditions that may cause ignition/reaction <b>OR</b> 3) tank system is used solely for emergencies <b>AND</b> NFPA requirements for storage of such wastes are met. (40 CFR 264.198 and 265.198)</p>	
	<p><b>43. Incompatible Wastes.</b> Incompatible wastes/materials are not placed in same tank system. (40 CFR 264.199 and 265.199)</p>	
	<p><b>44. Air Emissions.</b> Storage tanks comply with management standards specified in 40 CFR Part 264 or 265, Subpart AA (air emissions for process vents), BB (emissions standards for equipment leaks), and CC (air emissions for surface impoundments, tanks, and containers, if applicable). (40 CFR 264.178 and 265.178)</p>	

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<p><b>45. Waste Analysis and Treatment -- Interim Status.</b> Tank system is used: 1) to treat chemically or to store a hazardous waste that is substantially different from waste previously treated or stored in the tank; or 2) treat chemically a hazardous waste with a substantially different process than any previously used in that tank system. The following is being performed:</p> <ul style="list-style-type: none"> <li>a. Waste analyses and trial treatment or storage tests (e.g., bench-scale or pilot-plant scale tests); OR</li> <li>b. Written, documented information was obtained on similar waste under similar operating conditions to show that the proposed treatment or storage will meet the requirements of § 265.194(a). (40 CFR 265.200)</li> </ul>	
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	<p><b>46. State-Specific Requirements.</b> Tank system meets state-specific requirements (State Hazardous Waste Regulations). See WMP for requirements.</p>	
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**Containment Buildings**

	<p><b>47. Enclosed.</b> Building is completely enclosed (floor/walls and roof) and self-supported, and can support the waste and daily operating activities. (40 CFR 264.1100(a) and 265.1100(a))</p>	
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	<p><b>48. Barrier.</b> Building has a primary barrier that is designed to be sufficiently durable to withstand the movement of personnel and equipment. Barrier is free of significant cracks, gaps, corrosion or other deterioration that could cause release of waste. (40 CFR 264.1101(a)(4) and (c) and 265.1101(a)(4) and (c))</p>	
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	<p><b>49. Compatibility.</b> Surfaces are chemically compatible with wastes that come into contact with them. (40 CFR 264.1101(a)(2) and 265.1101(a)(2))</p>	
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	<p><b>50. Amount of Waste.</b> Level of waste within containment walls does not exceed height of wall. (40 CFR 264.1101(c) and 265.1101(c))</p>	
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	<p><b>51. Decontamination.</b> Building has decontamination area and procedures to prevent tracking waste out of building. (40 CFR 264.1101(c) and 265.1101(c))</p>	
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	<p><b>52. Fugitive Dust Control.</b> Fugitive dust is controlled so that openings (doors, windows, vents, cracks, etc.) exhibit no visible emissions during normal operating conditions including when vehicles enter and exit unit. If particulate collection devices are used (fabric filter, electrostatic precipitator) these devices are operated and maintained. (40 CFR 264.1101(c) and 265.1101(c))</p>	
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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<p><b>53. Liquids Management.</b> If containment building is used to store/treat wastes with free liquids, the following requirements are met: (40 CFR 264.1101(b) and 265.1101(b))</p> <ul style="list-style-type: none"> <li>a. <b>Primary Barrier</b> is designed to prevent the migration of hazardous constituents into the barrier.</li> <li>b. <b>Liquid Collection/Removal.</b> Liquid collection system minimizes accumulation of liquids on primary barrier— Primary barrier is sloped to drain liquids to collection system and liquids/waste are collected/removed to minimize hydraulic head on containment system at earliest practicable time.</li> <li>c. <b>Secondary Containment.</b> The secondary containment system includes a secondary barrier designed and constructed to prevent migration of hazardous constituents into barrier and leak detection system capable of detecting failure of primary barrier and collecting accumulated wastes/liquids. <i>(Note: Leak detection system requirement is met if bottom slope is 1% or more and constructed of granular drainage material with hydraulic conductivity of <math>1 \times 10^{-2}</math> or more and 12 inches thick or constructed of synthetic/geonet drainage materials with transmissivity of <math>3 \times 10^{-5} \text{ m}^2/\text{sec}</math> or more)</i></li> <li>d. <b>Treatment.</b> If treating in building, treatment area must be designed to prevent release of liquids, wet materials, or liquid aerosols to other portions of building.</li> <li>e. <b>Chemically Resistant.</b> Secondary containment system is constructed of materials that are chemically resistant to waste and liquids managed and of sufficient strength and thickness.</li> </ul>	
	<p><b>54. PE Certification.</b> On-site files contain PE certification that containment building is designed in accordance with 40 CFR 264 or 265.1101(a) through (c). (40 CFR 264.1101(c)(2) and 265.1101(c)(2)).</p>	
	<p><b>55. Release.</b> If condition detected that could cause or has caused a release of waste, the following has been conducted: (40 CFR 264.1101(c)(3) and 265.1101(c)(3))</p> <ul style="list-style-type: none"> <li>a. <b>Repair.</b> Condition was promptly repaired and any cleanup was conducted.</li> <li>b. <b>Recordkeeping.</b> Condition/release was recorded in operating record.</li> <li>c. <b>Notification.</b> Within 7 days EPA was notified and within 14 working days written plan of steps taken to repair/cleanup was submitted.</li> <li>d. <b>PE Certification.</b> After repairs were performed, EPA was provided with PE certification that repairs/cleanup were conducted in accordance with written plan.</li> </ul>	

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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<b>56. Inspection.</b> Building is inspected once every 7 days and results are recorded in project log book/inspection log. (Inspection should include monitoring/leak detection equipment data, containment building, surrounding area for signs of release/deterioration) (40 CFR 264.1101(c)(4) and 265.1101(c)(4))	
	<b>57. Areas With and Without Secondary Containment.</b> If building contains areas with and without secondary containment, each area is designed and operated to meet specified requirements, measures are taken to prevent release of liquids/wet materials into areas without secondary containment, and operating log provides written description of procedures used to maintain integrity of areas without secondary containment. (40 CFR 264.1101(d) and 265.1101(d)).	
	<b>58. Closure.</b> Upon leaving the project site, contaminated containment systems, contaminated sub-soils, and structures/equipment contaminated with waste or leachate are removed or decontaminated. Requirements for closure specified in Subpart G and H are being met. Post-closure care requirements are being met if contaminated sub-soils could not be practically removed or decontaminated. (40 CFR 264.1102 or 265.1102)	
	<b>59. Recordkeeping.</b> The following records are kept: a. Certification by PE that building meets design requirements. b. Operating log which includes containment building operations and reported leaks or spills. c. Regulatory agency correspondence. d. Operating procedures to maintain integrity of areas without secondary containment. (40 CFR 264.1101 and 265.1101)	
	<b>60. State-Specific Requirements.</b> Containment building meets state-specific requirements. (State Hazardous Waste Regulations) See WMP for requirements.	

**Surface Impoundments**

	<b>61. Permit.</b> Surface impoundment is operating in accordance with conditions of permit. (40 CFR 270)	
	<b>62. Construction or Expansion.</b> Project involves the construction or replacement of portions of a surface impoundment. The unit is designed and constructed with two or more liners and a leachate collection and removal system between such liners OR an EPA/state-approved alternative design. (40 CFR 264.221(c) and 265.221(a) - e)) <i>Note: This requirement applies to construction, lateral expansions or replacement of existing units which commenced after January 29, 1992 For interim status units, additional exemptions/variances may apply for replacement units.</i>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>63. Existing Units.</b> Project involves non-construction activities at an existing surface impoundment. The unit :</p> <ul style="list-style-type: none"> <li>a. Contains a liner which is designed, constructed and installed to prevent the migration of waste out of the unit. <i>Applies to final status.</i> (40 CFR 264.221(a))</li> <li>b. Has 2 feet of freeboard to prevent overtopping of the dike by overfilling, wave action or a storm, unless alternative design is certified by qualified engineer. <i>Applies to interim status.</i> (40 CFR 265.221(f) and (g))</li> <li>c. Designed, constructed, maintained and operated to prevent overtopping by overfilling due to normal or abnormal activities, wind and wave action, rainfall, runoff, malfunctions of level controllers, alarms and other equipment and human error. <i>Applies to final status.</i> (40 CFR 264.221(g))</li> <li>d. Has a containment system (e.g., earthen dike, covered with grass, rock, or shale) that shows no signs of erosion. (40 CFR 264.221(h) and 265.223)</li> <li>e. Has additional design requirements as specified in the Part B permit. <i>Applies to final status.</i> (40 CFR 264.221(i))</li> </ul>	
	<p><b>64. Inspections.</b> The following inspections are conducted. Records are maintained at the project site.</p> <ul style="list-style-type: none"> <li>a. During and after installation and construction, liners and cover systems are inspected. <i>Applies to final status only.</i></li> <li>b. Freeboard level is checked daily for interim status facilities and weekly for final status facilities.</li> <li>c. Weekly and after storm events, evidence of deterioration, malfunctions, or improper operation of overtopping control systems, sudden drops in the level of the impoundment contents, and severe erosion or other signs of deterioration of dikes and containment devices are checked.</li> <li>d. Leak detection systems are monitored and amount of liquid removed from sump is recorded at least monthly. (40 CFR 264.226 and 265.226)</li> </ul>	
	<p><b>65. Response Action.</b> For new or expansion units, an approved response plan has been developed which describes the actions to be taken if action leakage rate has been exceeded. If flow rate into the leak detection system exceeded the action leakage rate for any sump, EPA was notified in writing within 7 days; a preliminary written assessment was sent to EPA within 14 days; results of determination regarding the location/size/cause of leak, determination whether waste should continue to be received, and long- and short-term actions was submitted to EPA within 30 days after notification. (40 CFR 264.223 and 265.223)</p>	
	<p><b>66. Certification -- Final Status.</b> Prior to issuance of permit and after extended period, certification was obtained from qualified engineer regarding the integrity of the dike system. (40 CFR 264.226(c))</p>	

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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>67. Removal from Service -- Final Status.</b> If level of liquids in impoundment suddenly dropped and cause was not due to flow into or out of impoundment, or the dike leaked, the unit was removed from service in accordance with 40 CFR 264.227(b). Notification to EPA within 7 days was conducted and prior to reinitiating service the steps specified in 40 CFR 264.227(d) were complied with. (40 CFR 264. 227)</p>	
	<p><b>68. Closure/Post-Closure.</b> Project activities involve closure of a surface impoundment. At closure, all waste residues, contaminated containment system components, contaminated sub-soils, and structures/equipment contaminated with waste and leachate are being removed or decontaminated OR free liquids are being eliminated by removing or solidifying the remaining wastes and residues and covering the surface impoundment. Post-closure care will be conducted if waste residues or contaminated materials are left in place at final closure. Closure plan, cost estimate and financial responsibility requirements specified in Subpart G are also being complied with. (40 CFR 264.228 and 265.228)</p>	
	<p><b>69. Ignitable/Reactive Wastes.</b> Ignitable/reactive wastes are not placed in the surface impoundment unless:</p> <ul style="list-style-type: none"> <li>a. Waste and impoundment satisfy 40 CFR 268 requirements; AND</li> <li>b. Waste is treated, rendered or mixed before or immediately after placement in the impoundment so that mixture or dissolution of material no longer meets definition of ignitable or reactive and 40 CFR 264.17(b) or 265.17(b) are complied with; OR</li> <li>c. Waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react; OR</li> <li>d. Surface impoundment is used solely for emergencies. (40 CFR 264.229 and 265.229)</li> </ul>	
	<p><b>70. Incompatible Wastes.</b> Incompatible wastes/materials are not placed in the same surface impoundment unless 40 CFR 264.17(b) or 265.17(b) requirements are met. (40 CFR 264.230 and 265.230)</p>	
	<p><b>71. Dioxin-containing Wastes -- Final Status.</b> Waste codes F020-F023, F026, and F027 are not placed in a surface impoundment unless the impoundment is operated in accordance with a management plan approved by EPA/state. (40 CFR 264.231)</p>	
	<p><b>72. Waste Analysis and Trial Tests -- Interim Status.</b> If surface impoundment is being used to chemically treat a hazardous waste which is substantially different from waste previously treated OR chemically treat hazardous waste with a substantially different process than previously used, EITHER waste analyses and trial treatment tests were conducted prior to treatment OR written documented information on similar treatment of similar waste under similar operating conditions to demonstrate compliance with 40 CFR 265.17(b) has been obtained. (40 CFR 265.225)</p>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>73. Air Emissions Standards.</b> Air emission standards specified in Subpart CC are being complied with if the surface impoundment is used to manage volatile organic compounds. This requirement applies after June 1996. (40 CFR 264.232 and 265.231)	
	<b>74. State-Specific Requirements.</b> Surface impoundment meets state-specific requirements. (State Hazardous Waste Regulations)	
<b>Waste Piles</b>		
	<b>75. Permit.</b> Waste pile is operating in accordance with conditions of permit. (40 CFR 270)	
	<b>76. Protection From Wind.</b> Pile containing hazardous waste is protected from the wind. Are appropriate BMPs in place? (40 CFR 264.251(j) and 265.251)	
	<b>77. Waste Analysis.</b> Incoming shipments of waste are analyzed prior to adding to the pile to determine compatibility of the waste, unless waste being added is known to be compatible. (40 CFR 264.257 and 265.252)	
	<p><b>78. Construction or Expansion.</b> Project involves the construction or replacement of portions of a waste pile. Waste pile has:</p> <ul style="list-style-type: none"> <li>a. Double liner that meets the requirements of 40 CFR 264.251(c);</li> <li>b. Leachate collection and removal system;</li> <li>c. Run-on control system capable of preventing flow onto active portion of pile from at least 25-year storm;</li> <li>d. Run-off system to collect/control water volume from 24-hour, 25-year storm;</li> <li>e. Collection/holding systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity;</li> <li>f. Additional requirements specified in permit. (40 CFR 264.251 and 265.254)</li> </ul> <p><i>Note: This requirement applies to construction, lateral expansions or replacement of existing units which commenced after January 29, 1992.</i></p>	

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<p><b>79. Existing Waste Pile.</b> Unless an alternative design has been approved by EPA/state, waste pile has:</p> <ul style="list-style-type: none"> <li>a. Liner designed, constructed, and installed to prevent migration of wastes out of the pile. <i>Applies to final status.</i> (40 CFR 264.251(a))</li> <li>b. Impermeable base compatible with the waste which supports liner. (40 CFR 264.251 and 265.253(a)(1))</li> <li>c. Run-on diversion and control systems. (40 CFR 264.251(g) and 265.253(a))</li> <li>d. Leachate and runoff collection. (40 CFR 264.251 and 265.253) and</li> <li>e. Collection/holding systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity.</li> </ul> <p><i>Note: Existing pile must be constructed prior to January 29, 1992. If pile is at interim status facility and it is protected from precipitation and runoff by other means, and no liquids or waste containing free liquids are placed on pile, then these conditions do not apply.</i></p>		
	<p><b>80. Exemptions -- Final Status.</b> Waste pile is located indoors or otherwise protected from factors which produce leachate and runoff. Pile does not need to comply with the lining, leachate collection and groundwater protection requirements. Verify:</p> <ul style="list-style-type: none"> <li>a. Liquids are not placed in the waste pile (40 CFR 264.250(c)(1));</li> <li>b. The unit is protected from surface water runoff (40 CFR 264.250(c)(2));</li> <li>c. Wind dispersal is controlled by a means other than wetting; (40 CFR 264.250(c)(3)); and</li> <li>d. Pile does not generate leachate through decomposition or reactions (40 CFR 264.250(c)(4)).</li> </ul>		
	<p><b>81. Inspections.</b> The following inspections are conducted. Records are maintained at the project site.</p> <ul style="list-style-type: none"> <li>a. During and after installation and construction, liners and cover systems are inspected. <i>Applies to final status only.</i></li> <li>b. Weekly and after storm events, evidence of deterioration, malfunctions, or improper operation of run-on/run-off systems, proper functioning of wind dispersal control systems and presence of leachate in and proper functioning of leachate collection and removal systems are inspected. <i>Applies to final status only.</i></li> <li>c. Leak detection systems are monitored and amount of liquid removed from sump is recorded at least weekly. (40 CFR 264.254 and 265.260)</li> </ul>		

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>82. Response Action.</b> For new or expansion units, an approved response plan has been developed which describes the actions to be taken if action leakage rate has been exceeded. If flow rate into the leak detection system exceeded the action leakage rate for any sump, EPA was notified in writing within 7 days; a preliminary written assessment was sent to EPA within 14 days; results of determination regarding the location/size/cause of leak, determination whether waste should continue to be received, and long- and short-term actions was submitted to EPA within 30 days after notification. (40 CFR 264.253 and 265.259)</p>	
	<p><b>83. Closure/Post-Closure.</b> Project activities involve closure of a waste pile. At closure, all waste residues, contaminated containment system components, contaminated subsoils, and structures/equipment contaminated with waste and leachate are being removed or decontaminated. If after removal/decontamination all contaminated subsoils can not be practicably removed/decontaminated, post-closure care will be conducted. Closure plan, cost estimate and financial responsibility requirements specified in Subpart G are also being complied with. (40 CFR 264.258 and 265.258)</p>	
	<p><b>84. Ignitable/Reactive Wastes.</b> Ignitable/reactive wastes are not placed in a waste pile unless:</p> <ul style="list-style-type: none"> <li>a. Waste and impoundment satisfy 40 CFR 268 requirements; AND</li> <li>b. Waste is treated, rendered or mixed before or immediately after placement in the impoundment so that mixture or dissolution of material no longer meets definition of ignitable or reactive and 40 CFR 264.17(b) or 265.17(b) are complied with; OR</li> <li>c. Waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react. (40 CFR 264.256 and 265.256)</li> </ul>	
	<p><b>85. Incompatible Wastes.</b> Incompatible wastes/materials are not placed in the same waste pile unless 40 CFR 264.17(b) or 265.17(b) requirements are met.</p> <ul style="list-style-type: none"> <li>a. Pile that is incompatible with waste/materials stored nearby in containers, other piles, open tanks, or surface impoundments is separated from other materials or protected from them by dike, berm, wall or other device.</li> <li>b. Waste is not piled on same base where incompatible waste/materials were previously piled unless base was decontaminated sufficiently to meet 40 CFR 264.17(b) or 265.17(b) requirements. (40 CFR 264.257 and 265.257)</li> </ul>	
	<p><b>86. Dioxin-Containing Wastes -- Final Status.</b> Waste codes F020-F023, F026, and F027 are not placed in a waste pile unless it is operated in accordance with a management plan approved by EPA/state. Additional design requirements, if any, are being complied with. (40 CFR 264.259)</p>	
	<p><b>87. State-Specific Requirements.</b> Waste pile complies with state-specific requirements. (State Hazardous Waste Regulations)</p>	

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

**Drip Pads**

	<p><b>88. Design and Operation.</b> Drip pads are designed and operated as follows:</p> <ul style="list-style-type: none"> <li>a. Constructed solely of nonearthen materials (40 CFR 264.573(a)(1) and 265.443(a)(1));</li> <li>b. Has an intact curb or berm around the perimeter of the pad and pad is sloped to drain liquids into a collection system (40 CFR 264.573(a)(2) and (3) and 265.443(a)(2) and (3));</li> <li>c. Pad is either covered or capable of preventing runoff and runoff from a 24-hour, 25-year storm (40 CFR 264.573(e) and (f) and 265.443(e) and (f)).</li> <li>d. Collecting/holding units are emptied as soon as possible after storms. (40 CFR 264.573(h) and CFR 265.443(h));</li> <li>e. Pad has hydraulic conductivity of <math>1 \times 10^{-7}</math> cm/sec or less and is free of cracks and gaps, OR synthetic liner is below drip pad, leak detection system is above liner, and leak collection system is installed immediately above the liner. (40 CFR 264.573(a)(4), (b)(1) and (2) and 265.443(a)(4), (b)(1) and (2))</li> <li>f. Pad is operated/maintained to minimize tracking of waste/constituents off pad resulting from personnel or equipment activities. (40 CFR 264.573(k) and 265.443(j))</li> <li>g. After removal from treatment vessel, treated wood is held on pad until drippage has ceased; records are maintained to document. (40 CFR 264.573(k) and 265.443(k))</li> </ul>	
	<p><b>89. Construction of New Units.</b> Project activities involve the construction of a new drip pad. All of the requirements specified in #1 are complied with EXCEPT:</p> <ul style="list-style-type: none"> <li>a. Pad has hydraulic conductivity of <math>1 \times 10^{-7}</math> cm/sec or less and is free of cracks and gaps, OR synthetic liner is below drip pad, leak detection system is above liner, and leak collection system is installed immediately above the liner. (40 CFR 264.573(a)(4), (b)(1) and (2) and 265.443(a)(4), (b)(1) and (2)) OR</li> <li>b. Pad has a synthetic liner and leakage detection system constructed in accordance with 40 CFR 264.573(b) or 265.442(b).</li> </ul> <p><i>Note: New units are those which commenced construction after December 24, 1992.</i></p>	
	<p><b>90. Assessment and Certification.</b> Written independent professional engineering assessments and annual certifications have been conducted and are located in the on-site project files. (40 CFR 264.573(a)(4) and (g), 264.574(a) and 265.441, 265.443(a)(4) and (g))</p>	
	<p><b>91. Operating Record.</b> Past operating and waste handling practices are document in the facility records. (40 CFR 264.573(o) and 265.443(n).</p>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>92. Closure.</b> Based upon review of closure plan determine if all wastes will be removed and all contaminated equipment, sub-soils, and structures will be removed or decontaminated OR if the unit will be closed as a landfill. (40 CFR 264.575 and 265.445).</p>	
	<p><b>93. Inspection.</b> The following inspections have or are being conducted. Documentation is placed in on-site files.</p> <ul style="list-style-type: none"> <li>a. Liners and cover systems were inspected during and after installation (examine construction records to determine). (40 CFR 264.574(a) and 265.441(a))</li> <li>b. Drip pads are inspected weekly while in operation and after storm events to detect deterioration, malfunction, or leakage of run-on and runoff control systems, leak detection systems, and the drip pad surface. (40 CFR 264.574(b) and 265.444(b)).</li> <li>c. Drip pads are sufficiently clean to allow weekly inspections. Facility records must note the date and time of cleaning. (40 CFR 264.573(i) and 265.444(i))</li> </ul>	
	<p><b>94. Release.</b> If leak detected, the following has been conducted: (40 CFR 264.573(m) and 265.443(m))</p> <ul style="list-style-type: none"> <li>a. <b>Repair.</b> Condition was promptly repaired and any cleanup was conducted.</li> <li>b. <b>Recordkeeping.</b> Condition/release was recorded in operating record.</li> <li>c. <b>Notification.</b> Within 24 hours EPA was notified and within 10 days a written report of steps taken to repair/cleanup was submitted.</li> <li>d. <b>Certification.</b> Independent engineering certification was submitted upon completion of repairs and cleanup.</li> </ul>	
	<p><b>95. State-Specific Requirements.</b> Drip pads comply with state-specific requirements. (State Hazardous Waste Regulations)</p>	
<b>Landfills</b>		
	<p><b>96. Design and Operation.</b> Project involves construction of a new landfill, replacement landfill or lateral expansion of existing landfill that first received waste after November 8, 1984, that meets specific design and construction standards. Landfill constructed after January 29, 1992, that meets minimum technology requirements for</p> <ul style="list-style-type: none"> <li>a. Double liners;</li> <li>b. Leak detection; and</li> <li>c. Groundwater monitoring. (40 CFR 264.301, 264.90 - 100 and 265.301)</li> </ul>	
	<p><b>97. Written Procedures.</b> Procedures are in place to ensure that received waste is appropriate for landfilling and waste is placed in the proper landfill cell. (40 CFR 270.21)</p>	

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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<p><b>98. Runoff Collection/Control System.</b> Landfill has a runoff diversion and control system which is capable of managing a 24-hour, 25-year storm.</p> <ul style="list-style-type: none"> <li>a. The system is emptied as soon as practicable to maintain the required holding capacity.</li> <li>b. Collected runoff is analyzed to determine if it is hazardous waste.</li> <li>c. Collected runoff is properly managed according to characterization. (40 CFR 264.301(g), (h), and (j) and 265.301(b) - (c)).</li> </ul>		
	<p><b>99. Waste Location Documentation.</b> Operating record contains information on a map designating the exact location and dimensions (including depth of each cell with respect to permanent surveyed bench marks and the contents of each cell) and approximate locations of each hazardous waste type within each cell. (40 CFR 264.73(b)(1) and (2), 264.309 and 265.73(b)(1) and (2) and 265.309)</p>		
	<p><b>100. Inspection.</b> The following inspections have or are being conducted. Documentation is contained in project files.</p> <ul style="list-style-type: none"> <li>a. Liners and cover systems were inspected during and after installation (examine construction records to determine).</li> <li>b. Landfill is inspected weekly while in operation and after storm events to detect deterioration, malfunctions, or improper operation of run-on and run-off control systems; proper functioning of wind dispersal control systems, and presence of leachate in and proper functioning of leachate collection and removal systems.</li> <li>c. If landfill is required to have a leak detection system under 40 CFR 264.301(c) or (d) record of the amount of liquids removed from each leak detection system sump must be kept at least once each week during the active life and closure period. After final cover is installed, some exceptions apply if no liquids found in sumps. (40 CFR 264.303 and 265.303)</li> </ul>		
	<p><b>101. Response Action.</b> For new or expansion units, an approved response plan has been developed which describes the actions to be taken if action leakage rate has been exceeded. If flow rate into the leak detection system exceeded the action leakage rate for any sump, EPA was notified in writing within 7 days; a preliminary written assessment was sent to EPA within 14 days; results of determination regarding the location/size/cause of leak, determination whether waste should continue to be received, and long- and short-term actions was submitted to EPA within 30 days after notification. (40 CFR 264.304 and 265.304)</p>		

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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<p><b>102. Closure/Post-Closure.</b> Project activities involve closure of a landfill. At final closure, the owner or operator must cover the landfill or cell with a final cover designed and constructed to: provide long-term minimization of migration of liquids through the closed landfill; function with minimum maintenance; promote drainage and minimize erosion or abrasion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of any bottom liner system or natural sub-soils present. After final closure, all post-closure requirements contained in 264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period, are being complied with. If during the post-closure care period, liquid leaks into a leak detection system installed under 264.302, EPA was notified within seven days after detecting the leak. Closure plan, cost estimate and financial responsibility requirements specified in Subpart G are also being complied with. (40 CFR 264.310 and 265.310)</p>		
	<p><b>103. Reactive/Ignitable Wastes.</b> Reactive or ignitable waste are placed in landfill only if:</p> <ul style="list-style-type: none"> <li>a. It is treated, rendered, or mixed before or immediate after placement in the landfill so it is no longer reactive/ignitable; OR</li> <li>b. Ignitable waste is in non-leaking containers that are protected from sources of ignition (i.e., daily soil cover, segregation from heat-generating wastes, etc.). (40 CFR 264.17(b), 264.312(a) and (b) and 265.17(b) and 265.312(a) and (b))</li> </ul>		
	<p><b>104. Incompatible Wastes.</b> Incompatible wastes are placed in the same landfill cell only if wastes are managed to prevent:</p> <ul style="list-style-type: none"> <li>a. Extreme heat, fire or explosion;</li> <li>b. Uncontrolled toxic mists, dusts, fumes, or gases;</li> <li>c. Uncontrolled flammable vapors or gases;</li> <li>d. Damage to structural integrity of landfill; and</li> <li>e. Threat to human health and the environment. (40 CFR 264.17(b) and 265.17(b))</li> </ul>		
	<p><b>105. Bulk Liquids -- Final Status.</b> Bulk liquids are banned from disposal in landfills. Procedure is in place to prevent bulk or non-containerized liquid hazardous or non-hazardous waste or waste containing free liquids from being placed in landfill. Liquids are treated chemically or physically prior to placement in the landfill so that free liquids are no longer present. (40 CFR 264.314(b) and (e), 264.13)</p>		

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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

	<p><b>106. Containerized Liquids.</b> Containerized liquids are only placed in the landfill under the following conditions:</p> <ul style="list-style-type: none"> <li>a. Free-standing liquid has been removed;</li> <li>b. Waste has been mixed with absorbents or solidified so that free-standing liquid is no longer observed;</li> <li>c. Container is very small, such as an ampule;</li> <li>d. Container is designed to hold free liquids for use other than storage, such as a battery or capacitor; OR</li> <li>e. Container is a lab pack. (40 CFR 264.314(d) and 265.314(d))</li> <li>f. Absorbents used to treat free liquids are non-biodegradable. (40 CFR 264.314(e) and 265.314(f))</li> </ul>	
	<p><b>107. Empty Containers.</b> Empty containers are reduced in volume (i.e., shredded) prior to disposal in a landfill. Containers meet definition of "empty" prior to disposal. (40 CFR 264.315 and 265.315).</p>	
	<p><b>108. Dioxin-Containing Wastes – Final Status.</b> Waste codes F020-F023, F026, and F027 are not placed in a landfill unless it is operated in accordance with a management plan approved by EPA/state. Additional design requirements, if any, are being complied with. (40 CFR 264.317)</p>	
	<p><b>109. State-Specific Requirements.</b> Landfill complies with state-specific requirements. (State Hazardous Waste Regulations)</p>	

**Incinerators**

	<p><b>110. Exemption.</b> Incinerator is exempt from all requirements of this subpart except 40 CFR 264.341 (Waste analysis) and 264.351 (Closure) [40 CFR 265.351 for interim status] because waste meets requirements specified in 40 CFR 264.340(b) and (c) or 265.340(b) and (c).</p>	
	<p><b>111. Waste Analysis.</b> For final status facility, waste analysis of feed was provided as part of trial burn plan or with Part B application and during normal operation waste feed to incinerator is being analyzed as specified in the permit. For interim status unit, waste which has not been previously burned has been sufficiently analyzed so that steady-state (normal) operating conditions (including waste and auxiliary fuel feed and air flow) and pollutants which might be emitted have been determined. Minimum analysis includes: heat value of waste, halogen, sulfur, lead and mercury content. Waste analysis is placed in operating record. (40 CFR 264.341, 40 CFR 265.341)</p>	
	<p><b>112. Principal Organic Hazardous Constituents (POHCs) -- Final Status.</b> POHCs in the waste feed are being treated to meet performance standard of 40 CFR 264.343. During trial burn, POHCs are meeting trial burn requirements specified in 40 CFR 270.62. (40 CFR 264.342)</p>	
	<p><b>113. Performance Standards -- Final Status.</b> Incinerator is designed, constructed, and maintained so that, when operated in accordance with operating requirements specified below in #6, unit meets performance standards specified in 40 CFR 264.343.</p>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>114. Permit -- Final Status.</b> Incinerator is burning only wastes specified in permit and under operating conditions, unless burning is being conducted under trial burn approved under 40 CFR 270.62 or is subject to exemption specified in 40 CFR 264.340. A permit modification/new permit was obtained to burn other hazardous wastes, if applicable. (40 CFR 264.344)	
	<b>115. Operating Conditions -- Final Status.</b> Incinerator is operating in accordance with operating requirements specified in the permit which include: composition of the waste feed (including acceptable variations in the physical or chemical properties of the waste feed which will not affect compliance with the performance requirement); CO in the stack exhaust gas; waste feed rate; combustion temperature; appropriate indicator of combustion gas velocity; allowable variations in incinerator system design or operating procedures; and other operating requirements as are necessary to ensure that the performance standards are met. These standards apply to start-up and shutdown. Standards specified in 40 CFR 264.345 for controlling fugitive emissions and operation of automatic shutoff/cutoff systems are also being met. (40 CFR 264.345).	
	<b>116. Operating Conditions -- Interim Status.</b> During start-up and shut-down of an incinerator, hazardous waste is not being fed into unit unless the incinerator is at steady state (normal) conditions of operation, including steady state operating temperature and air flow. (40 CFR 265.345)	
	<b>117. Monitoring and Inspections -- Interim Status.</b> During hazardous waste burning, specified instruments are monitored at least every 15 minutes (waste feed gauge, auxiliary fuel feed gauge, CO gauge, air flow gauge, temperature, scrubber flow, scrubber pH gauge, and relevant level controls). Daily inspection is conducted of: a. Pumps, valves, conveyors, and pipes for leaks, spills, and fugitive emissions; b. Emergency shutdown controls; and c. System alarms. Inspections logs are kept in the project files (40 CFR 265.347 and 265.15)	
	<b>118. Monitoring and Inspections -- Final Status.</b> Continuous monitoring of combustion temperature, waste feed rate, and combustion gas velocity is being conducted. Pumps, valves, conveyors, and pipes are monitored daily for leaks, spills or fugitive emissions. Waste feed cut-off and associated alarms are monitored at least weekly. Inspections logs are kept in project files. (40 CFR 264.347)	
	<b>119. Closure.</b> All hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) from the incinerator site is removed at closure. (40 CFR 364.351 and 265.351)	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

**CONFIDENTIAL**

Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>120. Dioxin Containing Wastes -- Interim Status.</b> If unit is burning F020, F021, F022, F023, F026, or F027 wastes, a certification has been obtained demonstrating that unit meets the performance standards of 40 CFR 264, Subpart O. (40 CFR 265.352)	
	<b>121. Waste Residues and Treated Wastes.</b> Solid wastes generated from the treatment, storage or disposal of hazardous waste must be properly managed. Verify if any of the following have been generated: ash, scrubber liquids, refractory material, scrubber filters, etc.	
	<b>122. State-Specific Requirements.</b> Incinerator complies with state-specific requirements. (State Hazardous Waste Regulations)	
<b>Thermal Treatment Units.</b> <i>(This section applies to interim status facilities only.)</i>		
	<b>123. Operation.</b> Thermal unit is operated at steady-state conditions whenever waste is added to the unit, including startup and shutdown periods. For continuous feed processes, written procedures have been developed to ensure that process is operating at steady-state before adding hazardous waste. (40 CFR 265.373)	
	<b>124. Waste Analysis Plan.</b> A written waste analysis plan has been developed. Waste analysis is performed on hazardous waste not previously burned. Written procedures incorporate the analysis results into operating parameters that establish the steady-state conditions. Waste analysis plan includes: heat value, halogen content, sulfur content, concentration of lead, mercury and PCBs. Lead and mercury analysis are not required if facility has written, documented data that show elements are not present. Waste analysis is documented in the operating record. (40 CFR 265.375)	
	<b>125. Monitoring and Inspections.</b> Instruments related to combustion and emission control are monitored at least every 15 minutes (waste feed gauge, auxiliary fuel feed gauge, treatment process temperature gauge, process flow gauge, afterburner/temperature controls, O <sub>2</sub> and CO meters, process levels, etc.). Stack plume emissions are monitored at least hourly (for color and opacity). Daily inspection is conducted of: a. Pumps, valves, conveyors, and pipes for leaks, spills, and fugitive emissions; b. Emergency shutdown controls; and c. System alarms. Inspections logs are kept in the project files. (40 CFR 265.377 and 265.15)	
	<b>126. Contingency Planning.</b> Written contingency plan has been developed to ensure that corrective actions are initiated when operating conditions based upon combustion and emission control instruments or observation of emission plume change. Procedures are being followed. (40 CFR 265.377)	

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<b>127. Detonation of Explosives.</b> Project involves the open burning or detonation of waste explosives and detonation meets distance requirements specified in 40 CFR 265.382. Written procedure is in place to prohibit open burning of hazardous waste (except waste explosives).		
	<b>128. Closure.</b> At closure, all hazardous waste and hazardous waste residues (including, but not limited to, ash) are removed from the thermal treatment process or equipment. (40 CFR 265.381)		
	<b>129. Dioxin Containing Wastes -- Interim Status.</b> If unit is burning F020, F021, F022, F023, F026, or F027 wastes, a certification has been obtained demonstrating that unit meets the performance standards of 40 CFR 264, Subpart O. (40 CFR 265.382)		
	<b>130. Waste Residues and Treated Wastes.</b> Solid wastes generated from the treatment, storage or disposal of hazardous waste must be properly managed. Verify if any of the following have been generated: ash, scrubber liquids, refractory material, scrubber filters, etc.		
	<b>131. State-Specific Requirements.</b> Unit complies with state-specific requirements. (State Hazardous Waste Regulations). Refer to WMP for requirements.		
<b>Chemical, Physical, and Biological Treatments.</b> <i>(Applies to interim status facilities only.)</i>			
	<b>132. Operating Procedure.</b> Written procedure is in place that describes the types of wastes that are not permitted to be added to the treatment systems and specifies all operating and safety procedures. Chemical, physical, or biological treatment of hazardous waste complies with 40 CFR 265.17(b). Hazardous wastes or treatment reagents are not placed in the treatment process or equipment if they could cause the treatment process or equipment to rupture, leak, corrode, or otherwise fail before the end of its intended life. Where hazardous waste is continuously fed into a treatment process or equipment, the process or equipment is equipped with a means to stop the inflow (e.g., a waste feed cut-off system or by-pass system to a standby containment device). (40 CFR 265.401)		
	<b>133. Waste Analysis Plan.</b> A written waste analysis plan has been developed. If hazardous waste being treated is substantially different from any hazardous waste previously treated, or if a substantially different process than previously used is being used to chemically treat the waste, waste analysis and treatment tests are being performed OR written, documented information on similar treatments of similar wastes is kept in project files. (40 CFR 265.13, 265.402, 265.17 and 265.401(a))		

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<p><b>134. Inspections.</b> Daily inspections are being conducted of</p> <ul style="list-style-type: none"> <li>a. Discharge control and safety equipment; and</li> <li>b. Data gathered from monitoring equipment.</li> </ul> <p>Weekly inspections of construction materials used in the treatment process or equipment are conducted to detect signs of corrosion or leakage. Inspection logs are maintained in the project files documenting conduct of these inspections. (40 CFR 265.403, 265.15 and 265.73)</p>	
	<p><b>135. Incompatible Wastes.</b> Incompatible wastes are placed in the same treatment process only if wastes are managed to prevent:</p> <ul style="list-style-type: none"> <li>a. Extreme heat, fire or explosion;</li> <li>b. Uncontrolled toxic mists, dusts, fumes, or gases;</li> <li>c. Uncontrolled flammable vapors or gases;</li> <li>d. Damage to structural integrity of landfill; and</li> <li>e. Threat to human health and the environment. (40 CFR 265.17(b))</li> </ul> <p>If waste is placed in a treatment unit that previously held an incompatible waste, procedures are in place to ensure that equipment is properly washed prior to placing incompatible waste in unit. (40 CFR 265.406(b))</p>	
	<p><b>136. Reactive/Ignitable Wastes.</b> Reactive or ignitable waste are treated to prevent ignition or reaction.</p> <ul style="list-style-type: none"> <li>a. It is treated, rendered, or mixed before or immediately after placement in the treatment process so it is no longer reactive/ignitable;</li> <li>b. Treated in a manner that does not threaten human health or the environment; OR</li> <li>c. Treated so that it is protected from any material or condition that may cause the waste to ignite or react. (40 CFR 265.17(b), 265.405(a)(1) and (2))</li> </ul>	
	<p><b>137. Closure.</b> At closure, all hazardous waste and hazardous waste residues are removed from treatment processes or equipment, discharge control equipment, and discharge confinement structures. (40 CFR 265.404)</p>	
	<p><b>138. Waste Residues and Treated Wastes.</b> Residues from hazardous waste treatment process are hazardous waste unless specifically exempt. Verify that treatment residue is managed as hazardous waste or is delisted. (40 CFR 261.3(c) and (d), 260.22 and 265.404)</p>	
	<p><b>139. State-Specific Requirements.</b> Unit meets state-specific requirements. (State Hazardous Waste Regulations)</p>	

**Land Treatment Units**

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>140. Design and Operation.</b> Unit is designed and operated in accordance with permit conditions. Land treatment program has been established in accordance with 40 CFR 264.271 that is designed to ensure that hazardous constituents placed in or on the treatment zone are degraded, transformed, or immobilized within the treatment zone. For interim status unit, hazardous waste is not placed in or on a land treatment facility unless the waste can be made less hazardous or nonhazardous by degradation, transformation, or immobilization processes occurring in or on the soil. (40 CFR 264.273(a) and 265.272(a))</p>	
	<p><b>141. Treatment Demonstration. -- Final Status.</b> Treatment demonstration has been conducted for each waste that will be applied to the treatment zone in accordance with 40 CFR 264.272.</p>	
	<p><b>142. Waste Analysis -- Interim Status.</b> Before hazardous waste was placed in or on a land treatment facility, waste analysis was conducted in accordance with 40 CFR 265.273.</p>	
	<p><b>143. Run-on/Runoff Control.</b> Treatment zone is designed, constructed, operated and maintained to minimize runoff of hazardous constituents. Runon control system is capable of preventing flow onto the treatment zone during peak discharges from at least a 25-year storm. Runoff control system is capable of collecting and controlling at least water volume from a 24-hour, 25-year storm. Collection and holding facilities associated with runon/runoff system are managed to maintain the design capacity of the system. (40 CFR 264.273 and 265.272)</p>	
	<p><b>144. Wind Dispersal Control.</b> Treatment zone contains particulate matter and wind dispersal is being controlled. (40 CFR 264.273(f) and 265.272(e))</p>	
	<p><b>145. Inspections – Final Status.</b> Treatment unit is inspected weekly and after storms to detect deterioration, malfunctions, or improper operation of the runon/runoff control systems and improper functioning of wind dispersal control measures. Inspection logs are being maintained in the on-site project files. (40 CFR 264.273(g))</p>	
	<p><b>146. Monitoring.</b> If unit is conducting unsaturated zone monitoring such monitoring is being conducted in accordance with permit conditions or monitoring plan. (40 CFR 264.278 and 265.278)</p>	
	<p><b>147. Significant Increase of Hazardous Constituents -- Final Status.</b> If a significant increase in hazardous constituents below the treatment zone has occurred, the EPA/state was notified within 7 days and an application for a permit modification was submitted within 90 days of this increase. (40 CFR 264.278(g))</p>	

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>148. Reactive/Ignitable Wastes.</b> Reactive or ignitable waste are treated to prevent ignition or reaction.</p> <ul style="list-style-type: none"> <li>a. It is immediately incorporated into the soil so that they no longer meet the definition of ignitability or reactivity; OR</li> <li>b. It is managed to prevent ignition or reaction. (40 CFR 264.281 and 265.281)</li> </ul>	
	<p><b>149. Incompatible Wastes.</b> Incompatible wastes are treated in separate treatment zones or other adequate precautions are taken to prevent reactions from occurring. (40 CFR 264.282 and 265.282)</p>	
	<p><b>150. Treatment of Dioxins -- Final Status.</b> Waste codes F020 - F023 or F026 - F027 are treated and facility has a management plan approved by EPA/state for treatment of these wastes. (40 CFR 264. 283)</p>	
	<p><b>151. Recordkeeping.</b> Hazardous waste application dates and rates are included in the operating record required under 40 CFR 264.73 and 265.73. (40 CFR 264.279 and 265.279)</p>	
	<p><b>152. Closure.</b> Land treatment unit is being properly closed.</p> <ul style="list-style-type: none"> <li>a. Operations necessary to maximize degradation, transformation, or immobilization of waste and minimize run-on/runoff and wind dispersal will continue through closure.</li> <li>b. Vegetative cover is being established and maintained.</li> <li>c. Unsaturated zone monitoring is being continued.</li> <li>d. Soil pore monitoring is continued for 90 days after last waste application</li> <li>e. Closure has been certified by independent qualified soil scientist or independent registered professional engineer. (40 CFR 264.280 and 265.280)</li> </ul>	
	<p><b>153. State-Specific Requirements.</b> Land treatment unit complies with state-specific requirements. (State Hazardous Waste Regulations)</p>	
<b>Miscellaneous Units</b> ( <i>Applies to final status units only.</i> )		
	<p><b>154. Design and Operation.</b> Unit is designed and operated in accordance with permit conditions, including but not limited to:</p> <ul style="list-style-type: none"> <li>a. Prevention of migration of waste constituents in groundwater or subsurface environment;</li> <li>b. Prevention of migration of waste constituents in surface water, wetlands, or soil surface;</li> <li>c. Prevention of migration of waste constituents to air; and</li> <li>d. Procedures regarding monitoring and analysis, inspection, emergency response, spill reporting, and corrective action. (40 CFR 264.600 - 603)</li> </ul>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>155. Monitoring, Analysis, Inspection, Response, Reporting, and Corrective Action.</b> Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies have been developed and are being implemented to comply with 40 CFR 264.601, 264.15, 264.33, 264.75, 264.76, 264.77, and 264.101 as well as meet any additional requirements needed to protect human health and the environment as specified in the permit. (40 CFR 264.602)	
	<b>156. Closure.</b> Plan is in place for closure and if all contamination cannot be completely removed, post closure plan is in place. (40 CFR 264.603)	
	<b>157. State-Specific Requirements.</b> Miscellaneous unit complies with state-specific requirements. (State Hazardous Waste Regulations)	
<b>Boilers And Industrial Furnaces</b>		
	<b>158. Interim Status.</b> Project involves the construction or operation of a BIF which is operating under interim status. The unit complies with 40 CFR 266.103 and 266.104 requirements.	
	<b>159. Final Status.</b> Project involves the construction or operation of a BIF which is operating under a final status permit. The unit complies with 40 CFR 266.100, 270.22 and 270.66 requirements.	
<b>Groundwater Monitoring</b>		
	<b>160. Solid Waste Management Unit – Final Status.</b> Facility has SWMUs that are subject to the groundwater monitoring program. Sampling for each hazardous constituent or monitoring parameters as specified in the permit are being met. Groundwater monitoring plan which was approved by the state/EPA is being implemented. (40 CFR 264.90 - .101)	
	<b>161. Monitoring At Interim Status Facilities.</b> Project involves activities at a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste and is required to implement a groundwater monitoring program. The groundwater monitoring system is designed in accordance with 40 CFR 265.91, sampling and analysis is conducted in accordance with 40 CFR 265.92, groundwater quality assessment program meets 40 CFR 265.93 requirements, and reports/recordkeeping requirements specified in 40 CFR 265.94 are met. <i>Note: Facility may have obtained a waiver from these requirements if the criteria specified in 40 CFR 265.90(c) - (e) were met.</i>	
<b>Corrective Action Management Units Facilities (Applies to final status facilities only.)</b>		

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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p><b>162. Designated Area.</b> Area at the facility has been designated as CAMU. The permit or order specifies the areal configuration of the CAMU, requirements for remediation waste management (including design, operation and closure requirements) and requirements for groundwater monitoring. If a regulated unit is designated as a CAMU or a regulated unit is incorporated into a CAMU, Subpart F, G, and H requirements and the unit-specific requirements of part 264 or 265 that applied to that regulated unit will continue to apply to that portion of the CAMU after incorporation into the CAMU. (40 CFR 264.552)</p>	
	<p><b>163. Closure.</b> Closure of the CAMU will minimize the need for further maintenance and control to the extent necessary to protect human health and the environment. For areas where wastes remain in place, closure will minimize the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, to surface waters, or to the atmosphere. Closure may include excavation, removal, treatment or containment of wastes; and removal and decontamination of equipment, devices, and structures used in remediation waste management activities within the CAMU. Post-closure requirements are being implemented as necessary to protect human health and the environment, to include, for areas where wastes will remain in place, monitoring and maintenance activities, and the frequency with which such activities shall be performed to ensure the integrity of any cap, final cover, or other containment system. (40 CFR 264.552(e) and (f))</p>	
	<p><b>164. Documentation.</b> EPA has documented the rationale for designating the CAMU. (40 CFR 264.552(g))</p>	
	<p><b>165. Incorporation Into Permit.</b> CAMU has been incorporated into existing permit. Such incorporation has been approved by the EPA according to the procedures for Agency-initiated permit modifications under 40 CFR 270.41 or according to the permit modification procedures of 40 CFR 270.42. (40 CFR 264.552(h))</p>	
	<p><b>166. Temporary Unit.</b> Temporary tanks and container storage areas are being used for treatment or storage of hazardous remediation wastes. EPA has determined that a design, operating, or closure standard applicable to such units may be replaced by alternative requirements which are protective of human health and the environment. EPA has specified the length of time a temporary unit will be allowed to operate, (which is no longer than one year), and the design, operating, and closure requirements for the unit. The operational period of a temporary unit may be extended once for one year beyond that originally specified in the permit or order and such extension has been approved as agency-initiated permit modification or a Class II modification. (40 CFR 264.552)</p>	

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

<b>Training</b>		
	<p><b>167. General.</b> Personnel have completed program of classroom or on-the-job training that teaches them to perform their duties. Training has been conducted within 6 months after project start/untrained personnel are supervised. (40 CFR 264.16(a) and (b) and 265.16(a) and (b))</p>	
	<p><b>168. Annual Refresher.</b> Personnel have undergone annual refresher training. (40 CFR 264.16(c) and 265.16(c))</p>	
	<p><b>169. Personnel Records.</b> Records are maintained on-site which include: job title of each position at facility and name of person filling it; job description of each position; written description of type/amount of training for each position; and records documenting training. (40 CFR 264.16(d) and 265.16(d))</p>	
	<p><b>170. Training Records.</b> Training records are kept on-site until project closure. If employee leaves, records are kept for at least 3 years from date of last employment. (40 CFR 264.16(e) and 265.16(e))</p>	
<b>Preparedness and Prevention</b>		
	<p><b>171. Controlled Entry/Security.</b> The following security measures are installed at the hazardous waste portion of the project site. (40 CFR 264.14 and 265.14)</p> <ul style="list-style-type: none"> <li>a. Area is surrounded by a fence or natural barrier.</li> <li>b. Entrances are locked or monitored on a 24-hour basis.</li> <li>c. Signs with "Danger-Unauthorized Personnel Keep Out" are posted at each entrance and other locations as appropriate.</li> <li>d. Signs are legible from at least 25 feet and are written in English or other language predominant in the area.</li> </ul>	
	<p><b>172. Management of Project.</b> Project is managed to minimize the possibility of fire, explosion, or any sudden releases to the environment. (40 CFR 264.31 and 265.31)</p>	
	<p><b>173. Equipment.</b> Project site is equipped with:</p> <ul style="list-style-type: none"> <li>a. Internal communication or alarm system.</li> <li>b. Telephone or hand-held two-way radio capable of summoning help.</li> <li>c. Spill control, and decontamination equipment, and</li> <li>d. Portable fire extinguisher, fire control equipment, water to supply fire hoses, foam equipment or sprinklers (if flammable wastes on-site). (40 CFR 264.32 and 265.32)</li> </ul>	
	<p><b>174. Testing.</b> Equipment is tested/maintained to assure proper operation and records are kept of testing. (40 CFR 264.33 and 265.33)</p>	
	<p><b>175. Waste Handling Procedure.</b> Whenever waste is being poured, mixed, spread, or handled, all personnel have immediate access to internal alarm or emergency communication device. When only one employee is on-site, he/she has immediate access to communication device. (40 CFR 264.34 and 265.34)</p>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

**CONFIDENTIAL**

Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<b>176. Aisle space.</b> Proper aisle space is maintained to allow unobstructed movement of personnel, fire, spill control, and decon equipment. Three feet is considered GMP. (40 CFR 264.35 and 265.35)	
	<b>177. Local Arrangements.</b> Arrangements have been made with emergency response agencies. (40 CFR 264.37 and 265.37)	
	<b>178. Ignitable/Reactive/Incompatible Wastes.</b> The following is being performed: a. Waste is separated and confined from sources of ignition or reaction, sparks, spontaneous ignition, and radiant heat. b. Smoking and open flames are confined to specifically designated areas. c. "No Smoking" signs are posted in areas where ignitable or reactive wastes are handled. d. Incompatible wastes are always separated. e. Written procedures for avoiding commingling of incompatible wastes have been developed and are being implemented. f. Flammable/ignitable wastes are grounded. (40 CFR 264.17 and 265.17)	
	<b>179. Contingency Planning</b>	
	<b>180. Hazardous Waste Contingency Plan.</b> Facility has a HWCP or SPCC Plan which has been amended to include hazardous waste requirements. The plan includes requirements specified in 40 CFR 264.52 or 265.52. (40 CFR 264.51 and .52, and 265.51 and .52)	
	<b>181. Copies.</b> HWCP is maintained at the project site and submitted to local emergency response agencies, as appropriate. (40 CFR 264.53 and 265.53)	
	<b>182. Revision of HWCP.</b> HWCP is reviewed and amended immediately when: a. Regulations change, b. Plan failed in an emergency, c. Increased potential for emergency from changes in project/facility, d. List of emergency coordinators changes, and e. List of emergency equipment changes.	
	<b>183. Emergency Coordinator Responsibilities.</b> On-site emergency coordinator is familiar with HWCP, operations, location/characteristics of wastes, location of records, facility layout; is on-call or on facility (or has designated alternate); and is authorized to commit resources to implement HWCP. (40 CFR 264.55 and 265.55)	
	<b>184. Implementation of Plan.</b> During emergency, requirements/responsibilities of emergency coordinator, implementation of plan, and notification were properly conducted. (40 CFR 264.56 and 265.56)	

PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

**Off-site Transportation/Disposal**

	<b>185. Transporter.</b> Hazardous wastes are offered only to transporters with proper EPA Identification Numbers. (40 CFR 262.12(c))	
	<b>186. Prequalification.</b> Hazardous wastes are transported by and disposed only by prequalified transporters and disposal, treatment, or recycling facilities (EHS 1-4).	
	<b>187. Manifesting.</b> Completed manifests are used each time a regulated hazardous waste is transported off-site. (40 CFR 262.20-.23; 49 CFR 172.604). All required data has been inputted and manifest is properly signed by both the generator and transporter. If TtEC personnel sign the manifest, there is written authorization from the generator and this authorization has been reviewed by ESQ Dept.	
	<b>188. Packaging/Labeling/Placarding.</b> Prior to off-site transport each hazardous waste is: a. Packaged and labeled in accordance with DOT requirements. b. If 110 gallons or less, marked with commercial label designated "Hazardous Waste" and contact information. c. Marked with generator's name, address, and manifest document number. d. Placarded in accordance with DOT requirements. (40 CFR 262.30 - .32)	

**Receiving Offsite Waste**

	<b>189. Manifest/Shipping Paper Review.</b> All manifests and shipping papers are reviewed for waste received from offsite sources. Each manifest is signed and dated; discrepancies are noted; transporter is given one copy; copy is returned to generator within 30 days. (40 CFR 264.71 and 265.17)	
	<b>190. Discrepancies.</b> Significant discrepancies are reported on all shipments received: quantity variations greater than 10% for bulk waste; any variation in piece count for batch waste, and obvious differences of waste type. In addition, such discrepancies are reconciled with generator or transporter within 15 days OR if not, letter is sent to EPA. (40 CFR 264.72 and 265.72)	
	<b>191. Unmanifested Waste Reports.</b> If a facility accepts for treatment, storage, or disposal waste from off-site source without an accompanying manifest (and waste is not excluded from the manifest requirement), "Unmanifested Waste Report" (EPA form 8700-13B) was submitted to EPA within fifteen days after receiving the waste.	

PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<p><b>192. Restricted Waste Disposal.</b> If a facility accepts for treatment, storage, or disposal waste from off-site source which is restricted from land disposal, records are maintained of all notices and certifications pertaining to land disposal. (40 CFR 268.7(c)(1))</p> <p>a. <b>Recordkeeping.</b> Records are maintained of all notices and certifications pertaining to land disposal. (40 CFR 268.7(c)(1))</p> <p>b. <b>Sampling and Analysis.</b> Waste or extract of waste must be tested to ensure waste is in compliance with treatment standards. Verify:</p> <ul style="list-style-type: none"> <li>• Waste analysis plan contains frequency and analytical methods.</li> <li>• Operating record demonstrates waste analysis plan is being implemented.</li> <li>• Laboratory analysis demonstrates waste disposed of meets LDRs.</li> </ul>		
	<p><b>193. Receiving Off-site Waste.</b> If the project activities include receiving hazardous waste from a foreign source, a notice was filed with EPA at least 4 weeks prior to waste arrival. If project is receiving hazardous waste from off-site source, the facility owner informed generator in writing that facility has appropriate permits and will accept waste that is being shipped. (40 CFR 264.12 and 265.12)</p> <p>a. Written notice is maintained in project's operating record.</p> <p>b. Project is approved to handle specified waste type.</p>		
<b>Import/Export</b>			
	<p><b>194. Export.</b> Hazardous wastes are being exported outside the U.S. for treatment, storage or disposal. Notification of intended export was sent to EPA, EPA's acknowledged consent was sent to receiving country, and manifesting and reporting requirements are being met. (40 CFR 262.50 - .57)</p>		
	<p><b>195. Import.</b> Hazardous wastes are being imported to the facility for treatment, storage or disposal from a foreign country. Manifests have been properly completed for these wastes. (40 CFR 262.60)</p>		
<b>Onsite Transportation</b>			
	<p><b>196. Management Practices.</b> Onsite transportation of hazardous wastes between buildings is accomplished using good management practices to ensure against spills, releases, and accidents. Procedures exist to manage movement of hazardous wastes throughout the site, drivers are trained in spill response, provisions are made to secure waste in vehicles, and site contingency plan covers accidents during transport.</p>		
	<p><b>197. Crossing Public Roads.</b> Onsite transportation of hazardous wastes involves crossing public roads. If so, offsite transportation requirements must be complied with and facility must be permitted as a transporter. (40 CFR 263)</p>		

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**Recordkeeping.** *Note: These are generator requirements; Tetra Tech EC normally is not a generator, but assists clients in managing their wastes. However, Tetra Tech EC may keep some or all of these records depending upon contractual requirements. It is GMP to keep records if Tetra Tech EC is involved in off-site transport or disposal.*

	<p><b>198. Operating Record.</b> Operating record contains the following:</p> <ul style="list-style-type: none"> <li>a. Description, quantity and date of placement of each shipment of waste received. This information should cross-reference the manifest number.</li> <li>b. Location of waste at the facility.</li> <li>c. Records and results of waste analysis and trial tests.</li> <li>d. Report on incidents.</li> <li>e. Records/results of inspections in accordance with 40 CFR 264.17 and 265.17.</li> <li>f. Monitoring, testing, and analytical data.</li> <li>g. Copies of LDR notices and certifications.</li> <li>h. Records of quantities of waste placed in land disposal under extension of effective date of any LDR.</li> <li>i. Closure and, for disposal facilities, post-closure plans and cost estimates. Verify closure plan and post-closure plans are up-to-date, reflects all units currently operating, was amended if operating, design or closure plans have changed, and notices sent to EPA to amend plans, if applicable.</li> <li>j. Annual waste minimization program certifications. (40 CFR 264.73, 265.74, 268.7 and 268.8)</li> </ul>	
	<p><b>199. Generator Records If Waste Shipped Off-site.</b> Records are kept on-site for at least 3 years (or in project files if project ends earlier) of the following:</p> <ul style="list-style-type: none"> <li>a. Copy of signed manifests from TSDF which received waste.</li> <li>b. Copy of exception reports.</li> <li>c. Records to characterize wastes. (40 CFR 262.40)</li> </ul>	
	<p><b>200. Biennial/State Report.</b> Biennial Report has been prepared and submitted by March 1 of each even numbered year or according to timing and schedule of state requirement. Copy of report is kept for 3 years. (40 CFR 264.75, 265.75 and 262.41)</p>	
	<p><b>201. Facility Reports.</b> The following reports, if applicable, have been prepared, signed, and submitted:</p> <ul style="list-style-type: none"> <li>a. Any release from solid waste management unit.</li> <li>b. Fires and explosions.</li> <li>c. Groundwater detection monitoring program.</li> <li>d. Compliance monitoring program.</li> <li>e. Corrective action program.</li> <li>f. Surface impoundment, waste pile, land treatment, and land disposal unit monitoring.</li> <li>g. Certification of closure for hazardous waste surface impoundment, waste pile, land treatment, and landfill units. (40 CFR 264.77 and 265.77)</li> </ul>	

**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

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	<b>202. Exception Reports.</b> If copy of signed manifest from TSDF was not received within 35 days from off-site transport, transporter was contacted. If the manifest was not received within 45 days, exception report was filed with EPA (state). (40 CFR 262.43)		
	<b>203. LDR Certification/Notices/Waste Analysis.</b> Copies of all data to support characterization either based upon knowledge of waste or testing, notices, certifications, and demonstrations are kept on-site/in project files for at least 5 years. (40 CFR 268.7(a)(5))		
<b>Land Disposal Restrictions</b>			
	<b>204. Notice/Certification.</b> Initial Off-site shipment of waste has generator notice and certification that waste meets/does not meet LDRs (waste number, treatment standard under 40 CFR 268, five letter treatment code, if applicable, manifest number, and waste analysis data. (40 CFR 268.7(a) and (b))		
	<b>205. Variance/Extension/Exemption.</b> If hazardous waste is subject to exemption, variance, or extension from LDR requirements, notice is submitted to TSDF that waste is not prohibited from land disposal. (40 CFR 268.7(a)(3))		
	<b>206. Exemption.</b> If waste is determined to be exempt from RCRA subtitle C subsequent to the point of generation, a one-time notice stating this determination is placed in the project files. (40 CFR 268.7(a)(6))		
	<b>207. Compliance with LDRs.</b> Disposal of hazardous wastes meet treatment standards specified in 40 CFR 268.40 and applicable Universal Treatment Standards in 40 CFR 268.48, unless variance, exemption, or extension has been granted. (40 CFR 268)		
	<b>208. Debris.</b> Debris which contains a listed waste or is characteristically hazardous has: <ul style="list-style-type: none"> <li>a. Obtained a contained-in determination by EPA under 40 CFR 261</li> <li>b. Has been treated and meets the performance standards specified in 40 CFR 268.45 and is therefore no physical or chemical extraction longer regulated as hazardous.</li> <li>c. Meets the land disposal restrictions in 40 CFR 268.40 and applicable Universal Treatment Standards of 40 CFR 268.48.</li> <li>d. Residues from treatment of hazardous debris must be managed as a hazardous waste and meet 40 CFR 268 standards prior to land disposal.</li> </ul>		

**--End Checklist--**



**PESM INSPECTION CHECKLIST - HAZARDOUS WASTE: STORAGE/TREATMENT/DISPOSAL  
IN LESS THAN 90 DAYS**

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This checklist applies when client (or Tetra Tech EC, Inc., if applicable) qualifies as a large quantity generator. A large quantity generator is defined in the federal regulations as any one who generates 1) greater than 1,000 kg per month; 2) 1 kg of an acutely hazardous waste; or 3) 100 kg/month of soil or other material contaminated with an acutely hazardous waste. State regulations should be consulted for state-specific definitions.

**General Requirements**

	<p><b>1. ESS or Designated Waste Management Role.</b> Discuss Role of ESS or designated individual with regards to waste management at the site.</p> <ul style="list-style-type: none"> <li>a. How is waste management handled &amp; is it working effectively?</li> <li>b. What types of problems have been encountered?</li> <li>c. Is ESS or designated individual receiving regulatory support from ESQ Env. Compliance/Regulatory Specialists as needed?</li> <li>d. Does ESS or designated individual have the required training and knowledge?</li> </ul>	
	<p><b>2. Waste Classification.</b> Waste is characterized as hazardous or state-regulated hazardous waste.</p> <p>Waste containers that are stored pending sample results are labeled as "Hazardous Waste-Pending Analysis," are dated with an accumulation start date (ASD), and are in compliance with 90-day accumulation period while awaiting waste classification.</p>	
	<p><b>3. EPA Identification Number.</b> Generator has obtained EPA Identification number to store &amp; offer waste for transport. (40 CFR 262.12)</p>	

**Container Storage**

	<p><b>4. Storage Requirements.</b> Review weekly inspection forms for container &amp; storage area requirements and inventory/tracking. Perform field observations to document how the requirements are being met and check condition of containers, including marking and labeling requirements. (40 CFR 262.34 and 40 CFR 265.171-177)</p>	
	<p><b>5. Inspections.</b> Containers &amp; storage area are inspected at least weekly &amp; written records are kept of these inspections as well as corrective actions documentation. (40 CFR 265.174; GMP)</p>	
	<p><b>6. Incompatibility.</b> Check to see if incompatible wastes are stored without adequate separation or berms, as applicable. (40 CFR 265.177; GMP)</p>	



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	<p><b>7. Air Emissions.</b> Containers comply with management standards specified in 40 CFR Part 265.1030, -.1050, and -.1080 (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p> <p>a. If there are process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air/steam stripping of hazardous wastes with organic concentrations of 10 ppm or greater, the operator must calculate emissions &amp; operate equipment within those specified emissions (40 CFR 265 Subpart AA).</p> <p>b. If there is equipment that contains or contacts hazardous waste having organic concentrations of 10 ppm or greater, the Subpart BB standards are followed for various equipment. (40 CFR 265 Subpart BB).</p> <p>c. If there are tanks that contain hazardous waste, the tanks must meet specific design criteria in Subpart CC (<i>Note: Superfund sites &amp; RCRA Corrective Actions are exempt</i>). If haz. waste is stored in surface impoundments, there must be emissions controls per Subpart CC. (40 CFR 265 Subpart CC).</p>	
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	<p><b>8. State-Specific Requirements.</b> Storage area meets state-specific requirements, which may include secondary containment. <b>See the Site Health &amp; Safety Plan (or Project Waste Management Plan) for additional requirements.</b></p>	
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**Satellite Accumulation**

	<p><b>9. Designated Area and Marking.</b> A designated area has been established to accumulate waste (posted as such) &amp; area is marked with caution signage or tape on the floor.</p>	
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	<p><b>10. Quantity and Location.</b> A total of less than 55 gallons of haz. waste (or 1 quart of acutely haz. waste) is being accumulated at the location where the waste is generated and is within control of the person generating the waste. (40 CFR 262.34(c))</p> <p>Ex.: NAPL removed from a monitoring well is accumulated in a 55-gal. drum &amp; stored next to the well, and drum contains less than 55 gallons.</p> <p>Ex.: Five gallon pails of spent solvent haz. waste are stored in a flammable cabinet in the lab where waste was generated, and the total stored is less than 55 gallons.</p>	
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	<p><b>11. Marking.</b> Containers are marked with the words "Hazardous Waste".</p> <p>NOTE: An <b>Accumulation Start Date</b> is <b>not</b> placed on the container until the total of haz. waste accumulated is equal to or more than 55 gallons of haz. waste (or 1 qt. of acutely haz. waste).</p>	
	<p><b>12. Timing.</b> Waste is dated when a total of 55 gallons of haz. waste (1 qt of acutely haz. waste) is generated and moved to a less-than-90 days or RCRA permitted storage area within 3 days.</p> <p>NOTE: If site does not have either a Less-Than-90-Days Storage Area or a RCRA Permitted haz. waste storage area, then the haz. waste must be <b>shipped off-site</b> within 3 days.</p>	
	<p><b>13. State-Specific Requirements.</b> Satellite accumulation area meets state-specific requirements. <b>See Site H&amp;S Plan</b> (or Waste Mgmt. Plan) for additional requirements.</p>	
	<p><b>14. Container Management.</b> Containers meet the same condition, compatibility, and requirements for handling as less than 90-day storage areas (<b>see #4 through #8 above</b>).</p>	

**REMEDIATION WASTE STOCKPILES (NOTE: This is not the same as a "waste pile" which is a permitted temporary waste storage area similar to a surface impoundment – these are covered in the checklist for hazardous waste permitted Facilities.)**

Not all remediation waste will be hazardous waste but RCRA has specific allowances for stockpiling of remediation waste that is hazardous *in situ* (versus in a container, tank, drip pad, containment building) without triggering LDRs or minimum technology requirements (MTRs) if the waste is managed in accordance with the Area of Contamination (AOC) policy. Remediation wastes are generated during state or federal cleanup actions (e.g., CERCLA or state CERCLA programs). Remediation waste may be debris or soil.

Note: Stockpiles of contaminated remediation waste (hazardous or not) on projects sites requires diligence and attention to BMPs because wind and rain create challenges for maintaining stockpile integrity and the spread of contamination can occur. Also, not all remediation sites have space for stockpiling within the AOC, so if direct dig and haul options exist; usually clients prefer that option.

	<p><b>15.</b> Is the remediation waste stockpile located within the AOC (contiguous contaminated area)?</p>	
	<p><b>16.</b> Stockpiles of haz. waste are tracked in a waste log to include at a minimum:</p> <ul style="list-style-type: none"> <li>a. Date of generation (accumulation start date)</li> <li>b. Dates sampled (if applicable)</li> <li>c. Characterization of waste</li> <li>d. Off-site shipment dates.</li> </ul>	
	<p><b>17.</b> Stockpiles of hazardous waste are shipped off-site within 90 days of the accumulation start date.</p>	



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		18. Stockpiles are designed & maintained appropriately (e.g. placed on poly sheeting, bermed, and <b>covered when not in use or at the end of each day. Covers should be anchored appropriately to avoid wind lifting cover &amp; exposing waste or rain to enter into the bermed area.</b>	
		19. Stockpiles are inspected at least weekly and inspections are documented. BMP – even non hazardous waste stockpiles should be inspected weekly – e.g., EHS 3-3 weekly inspection checklist.	

**Hazardous Waste Tanks (NOTE: DOES NOT APPLY TO TANKS THAT ARE PART OF A “PROCESS” (e.g., Wastewater Treatment collection/treatment tanks for treatment of contaminated groundwater))**

		20. <b>New Tanks Installed as Part of Project.</b> Project involves the installation of a tank that stores/treats hazardous waste, and the following has been performed:	
		a. <b>Integrity Assessment.</b> There is a written assessment reviewed/certified by an independent, registered PE of tank's integrity & document is kept on-site. (40 CFR 265.192(a))	
		b. <b>Installation Inspection.</b> There is a written assessment by qualified installation inspector or registered PE that tank is properly installed & document is kept on-site. (40 CFR 265.192(b) - (g))	
		21. <b>Marking.</b> Tanks are clearly marked with the words "Hazardous Waste" and accumulation start date is clearly visible. (40 CFR 262.34(a))	
		22. <b>Accumulation Time.</b> Waste is stored in tanks for 90 days or less, unless an extension has been obtained from the State (or EPA, if state is not authorized to implement RCRA haz. waste program). (40 CFR 262.34(b))	
		23. <b>Containment System.</b> Applies to a new tank, existing tank storing F020-F023, F026/F027, or other specified existing tanks, unless a variance was obtained.	
		a. <b>General Requirement.</b> Containment system is capable of detecting/collecting releases & accumulated liquids until collected material is removed. (40 CFR 265.193(b)(2))	
		b. <b>Leak Detection.</b> Containment system has leak detection system that is designed/operated to detect failure of either primary or secondary containment structure or any release of waste in system within 24 hours, or earliest practicable time. (40 CFR 265.193(c))	



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			<p>c. <b>Removal of Releases.</b> All spills, leaks, precipitation are removed from containment system within 24 hours. (40 CFR 265.193(c))</p>	
			<p>d. <b>Specific Design.</b> Containment is: a liner, vault, double-walled tank or other EPA/state-approved device that meets specified design requirements (e.g., suitable base, sloped, leak detection system). (40 CFR 265.193(d) and (e))</p>	
			<p>e. <b>Ancillary Equipment.</b> Ancillary equipment is provided with secondary containment. (40 CFR 265.193(f))</p> <p>Note: Not applicable to above ground piping/welded flanges, joints &amp; connections/seamless or magnetic coupling pumps and valves/pressurized aboveground piping with automatic shut-off devices that are visually inspected daily.</p>	
			<p>f. <b>Existing Tanks not yet Subject to Containment Requirement.</b> If existing tank is being utilized which is not yet subject to containment requirement, there is written assessment to leak test tank or tank integrity performed annually by registered PE &amp; document is kept on-site. (40 CFR 265.193(i))</p>	
			<p><b>24. Overfill/Spill Control.</b> Tank system includes spill prevention controls, overfill prevention controls and maintenance of freeboard in uncovered tanks to prevent overtopping. (40 CFR 265.194)</p>	
			<p><b>25. Inspection.</b> Daily inspections are performed of overfill/spill control; aboveground points of tank; monitoring/leak detection; and surrounding area. Cathodic protection systems are inspected bimonthly (and 6 months after installation). Records are kept of inspections. (40 CFR 265.195)</p>	
			<p><b>26. Spills/Releases.</b> If a spill has occurred from tank/containment system, the following must have been performed: (40 CFR 265.196)</p>	
			<p>a. <b>Waste/Released Material.</b> Waste was removed from tank as necessary to prevent further release and released material removed from containment area within 24-hours/in timely manner. (40 CFR 265.195(a)(b))</p>	
			<p>b. <b>Release to Environment.</b> A visual inspection/removal of contamination was conducted and the site-specific Environmental Compliance Spill/Release procedure was implemented. (40 CFR 265.196(c); GMP)</p>	
			<p>c. <b>Notification.</b> If release to environment occurred, proper verbal and written notification to the State agency or agencies, and EPA were conducted. (40 CFR 265.196(d))</p>	



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		<p>d. <b>Repair.</b> If after the release the tank system required major repair, the PE certification was sent to EPA/state. (40 CFR 265.198(e))</p> <p>Note: "Major repair" includes installation of internal liner, repair of ruptured containment system, etc.</p>	
		<p><b>27. Closure.</b> At closure, the standards in 40 CFR 265.197 and Subpart G were met which include removing/decontaminating waste residue, contaminated containment system, contaminated soils, structures, and equipment. (40 CFR 265.197) (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p>	
		<p><b>28. Ignitable/Reactive.</b> If ignitable/reactive wastes are stored in tank, 1) waste is treated, rendered, or mixed before placement so that it is no longer ignitable/reactive and meets 40 CFR 265.17(b) <b>OR</b> 2) waste is stored/treated so that it is protected from material/conditions that may cause ignition/reaction <b>OR</b> 3) tank system is used solely for emergencies <b>AND</b> NFPA requirements for storage of such wastes are met. (40 CFR 265.198) (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p>	
		<p><b>29. Incompatible Wastes.</b> Incompatible wastes/materials are not placed in same tank system. (40 CFR 265.199)</p>	
		<p><b>30. Air Emissions.</b> If 40 CFR Part 265, Subpart AA, BB, or CC standards are applicable, tank system complies with these management standards. (40 CFR 265.202) (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p>	
		<p><b>31. Treatment in 90-Day or Less Tanks.</b> If tanks are used to treat waste to meet RCRA Land Disposal Restrictions (LDRs), a waste analysis plan has been developed, is maintained on-site, and was submitted to EPA/state 30 days prior to treatment. (40 CFR 262.34(a)(4)) (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p>	
		<p><b>32. State-Specific Requirements.</b> Tank system meets state-specific requirements. <b>See Project Waste Mgmt. Plan for requirements.</b></p>	
<p><b>Containment Buildings (APPLICABLE TO BULKY, NONLIQUID HAZARDOUS WASTES (e.g., lead-bearing materials from batteries) NOT AMENABLE TO ACCUMULATION, STORAGE, OR TREATMENT IN CONTAINERS OR TANKS.</b></p>			
		<p><b>33. Enclosed.</b> Building is completely enclosed (floor/walls and roof), self-supported and can support the waste and daily operating activities. (40 CFR 265.1100(a))</p>	



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		<p><b>34. Barrier.</b> Building has a primary barrier that is designed to be sufficiently durable to withstand the movement of personnel and equipment. Barrier is free of significant cracks, gaps, corrosion or other deterioration that could cause release of waste. (40 CFR 265.1101(a)(4) and (c))</p>	
		<p><b>35. Compatibility.</b> Surfaces are chemically compatible with wastes that come into contact with them. (40 CFR 265.1101(a)(2))</p>	
		<p><b>36. Amount of Waste.</b> Level of waste within containment walls does not exceed height of wall. (40 CFR 265.1101(c))</p>	
		<p><b>37. Decontamination.</b> Building has decontamination area and procedures to prevent tracking waste out of building. (40 CFR 265.1101(c))</p>	
		<p><b>38. Fugitive Dust Control.</b> Fugitive dust is controlled so that openings (doors, windows, vents, cracks, etc.) exhibit no visible emissions during normal operating conditions including when vehicles enter and exit unit.</p> <p>If particulate collection devices are used (fabric filter, electrostatic precipitator) these devices are operated and maintained.</p> <p>(40 CFR 262.1101(c))</p>	
		<p><b>39. Liquids Management.</b> If containment building is used to store/treat wastes with free liquids, the following requirements are met: (40 CFR 265.1101(b))</p>	
		<p>a. <b>Primary Barrier.</b> The primary barrier is designed to prevent the migration of hazardous constituents into the barrier</p>	
		<p>b. <b>Liquid Collection/Removal.</b> Liquid collection system minimizes accumulation of liquids on primary barrier -- Primary barrier is sloped to drain liquids to collection system and liquids/waste are collected/removed to minimize hydraulic head on containment system at earliest practicable time.</p>	
		<p>c. <b>Secondary Containment.</b> The secondary containment system includes a secondary barrier designed and constructed to prevent migration of hazardous constituents into barrier and leak detection system capable of detecting failure of primary barrier and collecting accumulated wastes/liquids. (<b>Contact ESQ Env. Compliance Specialist for assistance</b>).</p> <p>(Note: Leak detection system requirement is met if bottom slope is 1% or more and constructed of granular drainage material with hydraulic conductivity of <math>1 \times 10^{-2}</math> or more and 12 inches thick or constructed of synthetic/geonet drainage materials with transmissivity of <math>3 \times 10^{-5} \text{ m}^2/\text{sec}</math> or more)</p>	



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			d. <b>Treatment.</b> If treating in building, treatment area must be designed to prevent release of liquids, wet materials, or liquid aerosols to other portions of building.	
			e. <b>Chemically Resistant.</b> Secondary containment system is constructed of materials that are chemically resistant to waste and liquids managed and of sufficient strength and thickness.	
			<b>40. PE Certification.</b> On-site files contain PE Certification that containment building is designed in accordance with 40 CFR 265.1101(a) through (c). (40 CFR 265.1101(c)(2)).	
			<b>41. Release.</b> If condition detected that could cause or has caused a release of waste, the following has been conducted: (40 CFR 265.1101(c)(3))	
			a. <b>Repair.</b> Condition was promptly repaired and any cleanup was conducted.	
			b. <b>Recordkeeping.</b> Condition/release is recorded in operating record.	
			c. <b>Notification.</b> Within 7 days notify EPA and within 14 working days provide written plan of steps taken to repair/cleanup.	
			d. <b>PE Certification.</b> After repairs performed, provide EPA with PE certification that repairs/cleanup conducted in accordance with written plan.	
			<b>42. Inspection.</b> Building is inspected once every 7 days and results are recorded in project log book/inspection log. (40 CFR 265.1101(c)(4))  (Inspection should include monitoring/leak detection equipment data, containment building and surrounding area for signs of release/deterioration).	
			<b>43. Areas With and Without Secondary Containment.</b> If building contains areas with and without secondary containment: <ul style="list-style-type: none"> <li>• Each area is designed and operated to meet specified requirements,</li> <li>• Measures are taken to prevent release of liquids/wet materials into areas without secondary containment; and</li> <li>• Operating log provides written description of procedures used to maintain integrity of areas without secondary containment.</li> </ul> (40 CFR 265.1101(d)).	
			<b>44. Closure.</b> Upon leaving the project site, plans are in place to ensure storage area meets 40 CFR 265.111 decontamination/closure requirements. (40 CFR 265.179) <b>(Contact ESQ Env. Compliance Specialist for assistance).</b>	



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		<b>45. Accumulation Time.</b> Waste is stored in building for 90 days or less, unless an extension has been obtained. Project operating record/log book documents that unit is emptied at least once every 90 days or procedures are being used to ensure waste volume remains in unit no more than 90 days. (40 CFR 262.34(a)(1))	
		<b>46. Recordkeeping.</b> The following records are kept:	
		a. Procedure to ensure that each waste volume remains in the unit for no more than 90 days, <b>OR</b>	
		b. Written description of waste generation and management practices for facility showing that they are consistent with respecting 90 day limit and documentation that procedures are complied with. (40 CFR 264.34(a)(1)).	
		<b>47. State-Specific Requirements.</b> Containment building meets state-specific requirements. ( <i>See Project Waste Mgmt. Plan for requirements</i> ).	

**Training**

		<b>48. General.</b> Personnel have completed waste management training that teaches them to perform their duties (general and function specific to their tasking). Training has been conducted within 6 months after project start & untrained personnel are supervised. (40 CFR 265.16(a) and (b)). This training is in addition to HAZWOPER requirements and if persons are involved with a DOT related hazardous material function, must also have DOT/HAZMAT Security training.	
		<b>49. Annual Refresher.</b> Personnel have undergone annual waste management refresher training. (40 CFR 265.16(c)). DOT/HM Security is every 2 years ( <i>Tt policy because our training includes air shipment module which is more stringent than DOT rail, highway, vessel modes</i> ).	
		<b>50. Personnel Records.</b> Records are maintained on-site which include: job title of each position at facility and name of person filling it; job description of each position; written description of type/amount of training for each position; records documenting training. (40 CFR 265.16(d))	
		<b>51. Training Records.</b> Training records are kept on-site until project closure. If employee leaves, records are kept for at least 3 years from date of last employment. (40 CFR 265.16(e))	

**Preparedness and Prevention**



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Yes No N/A	<b>REQUIREMENTS</b>		<b>COMMENTS/NOTES</b>

		<p><b>52. Management.</b> Project is managed to minimize the possibility of fire, explosion, or any sudden releases to the environment. (40 CFR 265.31)</p>	
		<p><b>53. Testing.</b> Emergency equipment is tested/maintained to assure proper operation and records are kept of testing. (GMP; 40 CFR 265.33)</p>	
		<p><b>54. Waste Handling Procedure.</b> Whenever waste is being poured, mixed, spread, or handled, all personnel have immediate access to internal alarm or emergency communication device.</p> <p>When only one employee is on-site, he/she has immediate access to communication device.</p> <p>(40 CFR 265.34)</p>	
		<p><b>55. Local Arrangements.</b> Arrangements have been made with emergency response agencies. (40 CFR 265.37)</p>	
<p><b>Contingency Planning (NOTE: THESE REQUIREMENTS MAY BE COVERED IN THE SITE-SPECIFIC HEALTH &amp; SAFETY PLAN)</b></p>			
		<p><b>56. Hazardous Waste Contingency Plan.</b> Facility has a HWCP (or SPCC Plan which has been amended to include hazardous waste requirements). The plan includes requirements specified in 40 CFR 265.52. (40 CFR 265.51 and .52) <b>(Contact ESQ Env. Compliance Specialist for assistance).</b></p>	
		<p><b>57. Copies.</b> HWCP is maintained at the project site and was submitted to local emergency response agencies, as appropriate. (40 CFR 265.53)</p>	
		<p><b>58. Revision of HWCP.</b> HWCP is reviewed and amended immediately when:</p> <ul style="list-style-type: none"> <li>a. regulations change,</li> <li>b. plan failed in an emergency,</li> <li>c. increased potential for emergency from changes in project/facility,</li> <li>d. list of emergency coordinators changes, and</li> <li>e. list of emergency equipment changes.</li> </ul> <p>(40 CFR 265.54)</p>	



PESM INSPECTION CHECKLIST - HAZARDOUS WASTE: STORAGE/TREATMENT/DISPOSAL  
IN LESS THAN 90 DAYS

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>59. Emergency Coordinator Responsibilities.</b> On-site emergency coordinator is familiar with HWCP, operations, location/characteristics of wastes, location of records, facility layout; on-call or on-facility (or has designated alternate); is authorized to commit resources to implement HWCP. (40 CFR 265.55)</p>	
		<p><b>60. Implementation of Plan.</b> During emergency, requirements/responsibilities of emergency coordinator, implementation of plan, and notification were properly conducted. (40 CFR 265.56)</p>	

**Offsite Transportation/Disposal**

		<p><b>61. Transporter.</b> Hazardous wastes are offered only to transporters with proper EPA Identification Numbers. (40 CFR 262.12(c))</p>	
		<p><b>62. Prequalification.</b> Hazardous wastes are transported by and disposed only by pre-approved qualified transporters and disposal, treatment or recycling facilities. (Contact Project Procurement staff or Project ESQ Env. Compliance Specialist to verify these vendors were approved prior to waste shipment). See Procedure EHS1-4.</p>	
		<p><b>63. Manifesting.</b> Completed manifests are used each time a regulated hazardous waste is transported off-site. All required data has been inputted and manifest is properly signed by both the generator &amp; transporter. (40 CFR 262.20-.23; 49 CFR 172.604)</p> <p><b>If TtEC personnel sign manifest, there is written authorization from the generator and this authorization has been reviewed by both the ESQ and Legal Departments.</b></p>	
		<p><b>64. Packaging/Labeling/Placarding.</b> Prior to off-site transport each hazardous waste is:</p> <ul style="list-style-type: none"> <li>a. Packaged &amp; labeled in accordance with DOT requirements.</li> <li>b. If 110 gallons or less, marked with commercial label designated "Hazardous Waste" and contact information</li> <li>c. Marked with generator's name, address, and manifest document number</li> <li>d. Placarded in accordance with DOT requirements.</li> </ul> <p>(40 CFR 262.30 - .32)</p>	

**Onsite Disposal** (If hazardous waste is being disposed at client's facility, or onsite disposal is part of remedial activity, complete the "Hazardous Waste: RCRA Permitted Facility" checklist.)



PESM INSPECTION CHECKLIST - HAZARDOUS WASTE: STORAGE/TREATMENT/DISPOSAL  
IN LESS THAN 90 DAYS

**CONFIDENTIAL**

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

**Recordkeeping** *Note: These are generator requirements; Tetra Tech normally is not a generator, but assists clients in managing their wastes. However, Tetra Tech may keep some or all of these records depending upon contractual requirements. It is imperative to keep records if Tetra Tech is involved in off-site transport or disposal.*

	<p><b>65. Records.</b> Records are kept on-site for at least 3 years (or in project files if project ends earlier) of the following:</p> <ul style="list-style-type: none"> <li>a. copy of generator-signed manifest</li> <li>b. copy of exception reports</li> <li>c. copy of Biennial Hazardous Waste Report (or state equivalent)</li> <li>d. records to characterize wastes.</li> </ul> <p>(40 CFR 262.40)</p>	
	<p><b>66. Biennial/State Report.</b> Biennial Haz. Waste Report has been prepared and submitted by March 1 of each even numbered year or according to timing and schedule of state requirement. (40 CFR 262.41)</p> <p><i>Note: Determine what Tetra Tech scope of work is. At a minimum, Tetra Tech should provide client with notice that Biennial Report is required.</i></p>	
	<p><b>67. Exception Reports.</b> If copy of signed manifest from TSDf is not received within 35 days from off-site transport, transporter was contacted. If the manifest was not received within 45 days, an Exception Report was submitted to the EPA (or State). (40 CFR 262.43)</p>	
	<p><b>68. LDR Certification/Notices/Waste Analysis.</b> Copies of all data to support characterization (either based upon knowledge of waste or testing), notices, certifications, demonstrations are kept on-site/in project files for at least 5 years. (40 CFR 268.7(a)(5))</p>	

**Land Disposal Restrictions**

	<p><b>69. Notice/Certification.</b> LDR Notification forms are submitted with the first off-site shipment of each particular RCRA hazardous waste to a TSDf, <b>OR</b> generator has provided Certification form that waste is not prohibited from land disposal and waste meets LDR treatment standards. (40 CFR 268.7(a))</p>	
	<p><b>70. Exemption.</b> If waste is determined to be exempt from RCRA Subtitle C subsequent to the point of generation, a one-time notice stating this determination is placed in the project files. (40 CFR 268.7(a)(6))</p>	



EHS 3-3 ATTACHMENT C



PESM INSPECTION CHECKLIST— LEAD-BASED PAINT ABATEMENT/ASSESSMENT/SAMPLING

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

This checklist applies to projects where lead-based paint abatement, assessment, or sampling is being conducted

General Requirements			
		<p><b>1. Scope of Activities.</b> Project involves the following activities. Please circle those that are applicable.</p> <ul style="list-style-type: none"> <li>a. Assessment</li> <li>b. Sampling</li> <li>c. Abatement</li> <li>d. Other: _____</li> </ul>	
		<p><b>2. Certifications.</b> Check on that the following certifications are in order:</p> <p><b>Training Programs:</b> Contractor(s) who performs lead-based paint abatement, assessment, sampling, etc., has been trained under a current certification program that took effect on 6/23/2008.</p> <p><b>Firms:</b> Ensure that the contractor firm has applied for certification on or after 10/23/2009. <b>[Note:</b> On or after April 22, 2010, no firm may perform, offer, or claim to perform renovations without certification from EPA under §745.89 in target housing or child-occupied facilities.]</p> <p><b>Individuals:</b> Ensure that on or after 4/22/2010, all renovations are directed by renovators certified in accordance with §745.90(a) and performed by certified renovators or individuals trained in accordance with §745.90(b)(2) in target housing or child-occupied facilities.</p> <p><b>Note:</b> There are some exceptions to the above. Check with ESQ if any of the certifications are lacking.</p>	
		<p><b>3. Permits.</b> Notification submitted or permit issued prior to commencement of lead-based paint abatement, assessment, sampling, etc., activities. Verify that permits have been obtained and that project is operating in compliance with the terms/conditions of such permits. (State/local regulations)</p> <p><b>Note:</b> On or after April 22, 2010, all renovations must be performed in accordance with the work practice standards in §745.85 and the associated recordkeeping requirements in §745.86(b)(6) and (b)(7) in target housing or child-occupied facilities.</p>	

EHS 3-3 ATTACHMENT C



PESM INSPECTION CHECKLIST— LEAD-BASED PAINT ABATEMENT/ASSESSMENT/SAMPLING

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p><b>4. Cleanup Standards.</b> Ensure that project is complying with federal/state cleanup requirements. (Federal/State/local regulations)</p> <p><b>Note:</b> Federal clearance levels are found in §745.227.</p>	
	<p><b>5. Record-keeping.</b> Ensure that all records and certifications pertaining to the renovation or remediation are being retained for a period of three years following completion of the renovation. Specific record-keeping requirements are listed in §745.86</p>	
	<p><b>6. OSHA.</b> OSHA specifies requirements for workers conducting lead-abatement activities. Review SHSP implementation requirements. Discuss with ESS how requirements are being met at the Site.</p>	

**Waste Generation/Management/Disposal** *(If hazardous wastes are being generated, also refer to Hazardous Waste: Storage Treatment Disposal in Less than 90 days Checklist)*

	<p><b>7. Recognized Test Kits.</b> Ensure that only EPA recognized test kits for lead are being used at the project site.</p> <p><b>Note:</b> This regulation took effective June 23, 2008.</p>	
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EHS 3-3 ATTACHMENT C



PESM INSPECTION CHECKLIST— LEAD-BASED PAINT ABATEMENT/ASSESSMENT/SAMPLING

**CONFIDENTIAL**

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p><b>8. Waste Characterization.</b> Waste has been characterized in accordance with hazardous or special waste requirements. EPA suggests the use of the guidance, "Applicability of RCRA Disposal Requirements to Lead-Based Paint Abatement Wastes," (EPA 747-R-93-0006). The following are EPA's recommendations for characterizing various waste streams. State and local regulations also need to be evaluated. All items must either be tested to determine if they are hazardous or generator knowledge must be used to characterize.</p> <ul style="list-style-type: none"> <li>a. <b>Bulk Items (Wood, Plaster, Doors, etc.).</b> Generally hazardous when the lead level in the paint exceeded 4 mg/cm<sup>2</sup>. This threshold is not EPA policy.</li> <li>b. <b>Paint Chips/Dust/Debris.</b> May be hazardous or non-hazardous.</li> <li>c. <b>HEPA Filters/ HEPA Vacuum Debris.</b> May be hazardous or non-hazardous.</li> <li>d. <b>Stripping Sludge/Unfiltered Liquid Waste.</b> May be hazardous or non-hazardous.</li> <li>e. <b>Disposable Work Clothes.</b> Generally considered non-hazardous.</li> <li>f. <b>Respirator Filters.</b> Generally considered non-hazardous.</li> <li>g. <b>Filtered Wash-water.</b> Generally considered non-hazardous.</li> <li>h. <b>Plastic Sheeting and Tape.</b> Generally considered non-hazardous, unless a heat gun is used for paint removal or if enclosure or encapsulation abatement methods are used.</li> </ul>	
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--End of Checklist--



PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

*This checklist applies when petroleum, oil, or hazardous substances are stored, used, or handled on the project site or transported on- or off-site.*

General Requirements			
		<p><b>1. Oil/Water Separators.</b> Project involves the maintenance/pumping/ inspection of oil water separators. Proper waste management procedures are being implemented depending upon final disposition of pumped out product, sludges, etc. <i>Complete applicable EHS 3-3 Solid or Hazardous Waste Checklists.</i></p>	
		<p><b>2. State Regulations.</b> State/local regulations specify requirements for oil storage, handling or disposal which are more stringent than requirements specified in this checklist. <i>Check the Site Health and Safety Plan to determine if State/local regulations are applicable.</i></p>	
		<p><b>3. Fire Marshall Approval.</b> Project involves aboveground storage of oil (or other hazardous substance). State/local fire department may require approval of the design, location, handling procedures, etc. for oil storage. Check the Site Health and Safety Plan to see if these criteria have been met.</p>	
		<p><b>4. Uniform Fire Code Requirements.</b> Storage of hazardous materials in certain amounts must comply with UFC requirements which include: permitting, incompatibility, posting, security, construction/maintenance requirements for tanks, containers, cylinders, pipe/valve/fittings criteria, placard, plan requirements, drainage, secondary containment, ventilation, etc. Specific requirements apply to storage/handling/use of oxidizers, reactive/water-reactive materials, cryogenic, highly toxic and toxic materials, corrosives, carcinogens, irritants, sensitizers, radioactive materials, organic peroxides, toxic and highly toxic compressed gases, and flammable solids/gases/liquids. The local fire department has informed project how to comply with these requirements. ESS has documented in project file any local requirements and requirements are being met.</p>	
		<p><b>5. Oil Product Handling/Disposition.</b> Project involves the storage/disposition of oil product. The method by which the oil will be dispositioned will dictate the management/disposal requirements. <i>Complete waste checklists as appropriate. For example, the "Hazardous Waste Storage, Treatment and/or Disposal in Less than 90 Day Checklist", or the "Solid Waste Checklist."</i></p>	

**PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

**Spill Prevention Control and Countermeasure Plan (SPCC Plan)** *Applies when oil is stored, transported or handled in the following quantities: Total aboveground storage is 1,320 gallons or more. Since requirement applies to "facilities," discuss with client the quantities of oil stored at its facility to ensure total "facility" volumes (including project site) are properly calculated. NOTE: The December 2008 Amendments have streamlined requirements for some facilities, however the effective date has been delayed – check with ESQ Dept. to find out current date. See Zip Bulletin 260 or check with ESQ Environmental Compliance Specialist for assistance. (Note: Requirements regulating completely buried tanks (which are already subject to all UST requirements) have been vacated.)*

		<p><b>6. Development.</b> SPCC plan has been developed and project was constructed and is operating in compliance with its requirements. (40 CFR 112)</p>	
		<p><b>7. Contents.</b> SPCC plan states that it meets all plan requirements as stated in 40 CFR 112.</p>	
		<p><b>8. Certification.</b> Plan has been certified by a PE and contains appropriate management approvals, unless it meets the conditions for "self certification." (40 CFR 112.7); See ZIP Bulletin 260</p>	
		<p><b>9. Project Drainage.</b> Facility drainage meets the following standards:</p> <ul style="list-style-type: none"> <li>a. For diked storage areas, drainage is restricted by valves, which are preferably manual open/close variety, and pumps/ejectors are manually activated and inspected.</li> <li>b. Undiked areas drain into ponds, lagoons or catchments basins which are designed not to flood.</li> <li>c. If treatment units are used, drainage is designed to gravity flow or flow into back-up pumping systems.</li> <li>d. Drainage is engineered to prevent oil from reaching navigable waters.</li> </ul> <p>(40 CFR 112.7(e)(1))</p>	
		<p><b>10. Containment/Diversionary Structures.</b> Appropriate containment/ diversionary structures are at project site which may include: dikes, berms, retaining walls, curbing, culverts, gutters, drainage systems, weirs, booms, other barriers, spill diversion ponds, retention ponds, and sorbent materials. (40 CFR 112.7(c)).</p>	
		<p><b>11. Spill Control/Cleanup Equipment.</b> Spill control materials are located on project site and may include: sorbent materials, oil retention booms, sand bags/temporary curbing devices, fuel recovery pumps/collection hoses, fuel recovery tank trucks, and protection equipment for project staff. (40 CFR 112.7(c))</p>	
		<p><b>12. Drainage Water Quality.</b> Discuss spill history with ESS and determine if any oil spills to containment systems/drainage areas/anywhere on project site have occurred? Determine if procedures followed were in compliance with SPCC Plan and TtEC requirements.</p>	

**PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<p><b>13. On-shore Bulk Storage.</b> Bulk storage tank system complies with standards which include tank structure compatibility, secondary containment/alternative drainage, specific drainage requirements, periodic testing/inspections, tanks alarms, pumps and level sensors. (40 CFR 112.7(e)(2)) <i>Note: Check regional EPA definition of "bulk" storage which normally includes any aboveground storage greater than 12,000 gallons.</i></p>	
	<p><b>14. Testing.</b> Periodic integrity testing (including tanks supports/foundations/ internal heating systems, etc.) is being conducted. In addition, piping systems are pressure tested once per year. Project files document testing results. (40 CFR 112.7(e)(2) and (3))</p>	

	<p><b>15. Loading/Unloading.</b> Loading and unloading procedures meet DOT requirements; project personnel are in continuous attendance during loading/unloading; if no catchment basin, quick drainage system is used, and lower most drain and all outlets are inspected for leaks after tank filling. (40 CFR 112.7(e)(8))</p>	
	<p><b>16. Security.</b> Appropriate security is maintained at project site. (40 CFR 112.7(e)(9))</p>	
	<p><b>17. Recordkeeping.</b> The following records are maintained:</p> <ul style="list-style-type: none"> <li>a. Copy of SPCC plan is kept at project site if it is normally attended more than 8 hours per day; otherwise it is kept at the nearest field office.</li> <li>b. Inspection records are kept for at least 3 years, including: written inspection procedures, inspections which are signed and dated by inspector, and notes describing repairs.</li> </ul> <p>(GMP; 40 CFR 112.7(e)(8))</p>	
	<p><b>18. Amendments.</b> Material change in project design, construction, operation, or maintenance that alters potential for oil spill has occurred and the SPCC Plan has been amended. (40 CFR 112.5)</p>	
	<p><b>19. Review.</b> SPCC Plan has been reviewed within last 5 years. If revisions were required, such revisions were made within 6 months of review. (40 CFR 112.5).</p>	
	<p><b>20. Designated Project Staff.</b> A designated person is responsible for overall spill prevention. This person conducts workplace safety evaluations and inspections. (40 CFR 112.7(e)(10))</p>	



PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>21. Release.</b> Has more than 1,000 gallons spilled in a single incident or "harmful quantity" been discharged in 2 incidents within 12 months? Reporting to EPA/state has been conducted. (40 CFR 112.4) <i>Note: In addition, CWA requires immediate notification/written notification for releases to waters of the US that causes a sheen. Notifications are made to the National Response Center Hotline (800-424-8802) and the State's Spill Hotline.</i></p>	
		<p><b>22. Training.</b> Project staff involved with management/handling of oil take part in periodic training in spill prevention/response. (40 CFR 112.7(e)(10))</p>	
		<p><b>23. Inspections.</b> Inspections are conducted daily in accordance with SPCC plan.</p>	
		<p><b>24. Release of Accumulated Containment Liquids.</b> Confirm with ESS procedures for releasing accumulated storm water from secondary containment surrounding tank. Is it documented on daily inspection documentation?</p> <ul style="list-style-type: none"> <li>a. Water is inspected for visible signs of contamination prior to release</li> <li>b. Water is removed daily, or as necessary to prevent excessive accumulation</li> </ul>	
<p><b>Facility Response Plan</b> (<i>Applies if storage of greater than 1 million gallons of oil and certain location criteria/lack of secondary containment exists or involves transfer of oil over water from vessel to vessel.</i>) For example, oil refineries and terminals.</p>			
		<p><b>25. Develop/Submit Facility Response Plan.</b> Facility response plan was developed in accordance with 40 CFR 112.20 and <b>submitted</b> to EPA in a timely manner for the project activities. (40 CFR 112.20)</p>	
		<p><b>26. No Substantial Harm.</b> Project meets criteria of storage capacity/location but has requested an exemption because it believes "no substantial harm" will occur. (40 CFR 112.20(e))</p>	



PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

<b>Hazardous Materials Storage</b> <i>(Applies to storage of virgin hazardous materials, not hazardous and non-hazardous wastes)</i>			
		<p><b>27. OSHA Hazardous Communication.</b> Health and Safety Inspection has been conducted which addressed OSHA Hazardous Communication requirements. (29 CFR 1910.1200)</p>	
		<p><b>28. Hazardous Chemical Inventory Reporting.</b> (EPCRA Section 312) Project site handles/stores:</p> <ul style="list-style-type: none"> <li>a. 10,000 pounds or more of a hazardous chemical; OR</li> <li>b. 500 pounds or the threshold planning quantity (TPQ) (whichever is less) of an extremely hazardous substance (EHS);</li> <li>c. Then project must submit a list of hazardous substances/copies of MSDS to state commission, local committee, and local fire department.</li> </ul> <p>(40 CFR 370)</p>	
		<p><b>29. Toxic Chemical Release Reporting.</b> (EPCRA Section 313) Project involves work at a facility that manufactures or processes 25,000 pounds of a toxic chemical or uses 10,000 pounds of a toxic chemical, the client's facility is SIC code 20 - 39, AND it employs more 10 or more full-time employees. A Toxic Chemical Inventory Release Report must be submitted by March 1 of each year. (40 CFR 372) <i>Note: Site often only provides information to client for their reporting purposes. If Section 313 reporting is applicable, ensure project files reflect actions taken.</i></p>	
		<p><b>30. Emergency Planning and Response.</b> (EPCRA Section 301-303).Project stores extremely hazardous substances on-site above TPQ. State commission was notified within 60 days of commencing on-site work. The information provided to commission is up-to-date. (40 CFR 355.30) <i>Note: OSHA also has emergency planning requirements which should have been addressed in H&amp;S inspection.</i></p>	
		<p><b>31. Release.</b> (EPCRA 304) Has a release of a hazardous substance occurred on the project site? If so, was the National Response Center and state/local agencies contacted verbally and in writing as required? (40 CFR 302 and 355, state/local regulations)</p>	



PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**Hazardous Materials Transportation** (This section applies if DOT "hazardous materials", which may include hazardous wastes, are being transported on "public roads." Requirements are GMP for transport on private/in-facility roads.)

	<b>32. Shipping Papers/Manifests.</b> Discuss procedures for receipt and review of shipping papers with ESS. Ensure shipping papers are completed, reviewed, and approved by Tetra Tech EC personnel/client for shipment of samples, project-specific chemicals, etc	
	<b>33. Packaging/Labeling/Marking.</b> Based upon the classification of the hazardous material, the proper DOT packaging/labeling/markings is being chosen and the materials are being packaged by an employee/subcontractor who has been properly DOT trained. (40 CFR 172)	
	<b>34. Training.</b> Tetra Tech EC employees/subcontractor employees performing DOT functions have been trained at least every 3 years. (Bi-annually for IATA Shipments). Documentation of training is located at the project site. (40 CFR 172, Subpart G)	
	<b>35. Placarding.</b> Placards are being offered to transporter prior to shipment offsite. (40 CFR 172.500)	
	<b>36. Transportation in Tetra Tech EC Vehicle.</b> Project involves the transportation of hazardous materials (e.g., samples, supplies) on public roads in company vehicles. TTEC Shipping Paper was used to transport hazardous materials. Packaging, labeling, and training requirements also being complied with. <i>Note: Materials of Trade Exemption may apply.</i>	
	<b>37. International Shipments.</b> Project involves shipment of hazardous materials across international boundaries or through international waters. Shipment complied with International and/or other foreign country transportation and environmental requirements.	
	<b>38. Prequalification.</b> Review transporters used at project site and ensure all were pre-qualified prior to use. (See EHS 1-4)	



PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p><b>39. DOT HM Security Plan.</b> Project is required to have an HM Security Plan if project ships hazardous waste or hazardous materials in bulk containers having any of the following <u>capacities</u>:</p> <ul style="list-style-type: none"> <li>• 17.3 cubic yards for solids (Ex.: 20 cubic yard capacity roll-off container, end dump, dump truck, etc.); or</li> <li>• 3,500 gallons for liquids (Ex.: 5,000 gallon capacity tanker truck); or</li> <li>• Shipment is required by DOT regulations to be placarded (Ex.: More than 1,000 pounds of HM, except for Class 9).</li> </ul> <p>(49 CFR 172 Subpart 800)</p>	
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--End of Checklist--



PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

*This checklist applies if project involves the management, generation or disposal of PCBs 50 ppm or greater (this includes PCB containing electrical equipment/transformers, PCB liquids, soils/rags from cleanup of 50 ppm PCB spill, and containers storing such materials). Exemptions as outlined in this checklist may apply for management/cleanup of PCBs conducted under CERCLA and spills which occurred prior to 1978 when the anti-dilution provisions of TSCA became effective. This checklist does not address state-specific requirements for PCBs less than 50 ppm. State regulations must be consulted for those requirements.*

General Requirements			
			1. <b>PCBs 50 ppm or greater.</b> Liquid, transformer, capacitor, rags, debris, soil or other article/environmental media have been determined to contain PCBs at concentration 50 ppm or greater. (40 CFR 761.1(a))
			2. <b>PCBs Resulting from Spill/Concentration Less than 50 ppm.</b> Determination has been made that materials/environmental media contaminated by PCBs resulted from a spill that occurred after 1978 and the material spilled contained 50 ppm or greater PCBs. (40 CFR 761.1(a))
			3. <b>PCBs Resulting from Spill/CERCLA Activity.</b> Project is being conducted under CERCLA/IRP and a determination has been made that materials/environmental media contains 50 ppm or greater PCBs. (EPA Superfund Guidance -- PB90-274432 and OSWER 9355.4-01)
			4. <b>Awaiting Analytical.</b> PCB wastes are being stored awaiting analytical regarding PCB concentration.
<b>Storage 30 Days or Less</b> (Applies if PCBs are stored at project site for 30 days or less.)			
Note: See General Requirements for additional requirements applicable to less than 30-day storage areas.			
			5. <b>Designated Area.</b> A designated area has been established for accumulation of PCB wastes. (GMP)
			6. <b>Accumulation Time.</b> Waste tracking log shows PCB wastes are stored in designated area for 30 days or less. (40 CFR 761.65(c)(1))
			7. <b>PCB Article/Type of Wastes.</b> Only the following PCB wastes are stored:
			a. Non-leaking PCB articles/PCB equipment.
			b. Leaking PCB articles/equipment if placed in non-leaking container with sufficient absorbent.
			c. PCB Containers containing non-liquid PCBs (soil/rags/debris).
			d. Liquid PCBs between 50 and 500 ppm stored in containers. A Spill Prevention Control and Countermeasure Plan has been prepared in accordance with 40 CFR 112 and each container bears notation that liquids in drums do not exceed 500 ppm PCBs. (40 CFR 761.1.65(c)(1))



PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

			e. Non-leaking/structurally undamaged PCB Large High Voltage Capacitors/PCB-Contaminated Electrical Equipment that have not been drained of free-flowing fluid are stored on pallets next to greater than 30 day storage facility and storage area has immediately available unfilled storage space to 10 percent of volume of capacitors/equipment stored outside. (40 CFR 761.65(c)(1))	
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**1-Year Storage Facility** (*Applies if PCBs are stored at project site for less than 1 year, but greater than 30 days*)  
*Note: See General Storage Requirements for additional requirements applicable to greater than 30-days, but less than 1-year storage areas.*

			<b>8. Accumulation Time.</b> Waste tracking log indicates PCB wastes are disposed of within 1 year of being placed into storage.	
			<b>9. Roof and Walls.</b> Storage facility has adequate roof and walls to prevent rain water from reaching PCBs and PCB Items. (40 CFR 761.65(b))	
			<b>10. Curbing.</b> Floor has continuous curbing with minimum six inch high curb.	
			<b>11. Containment.</b> Floor/curbing have containment volume equal to at least two times the internal volume of the largest PCB Article/PCB Container stored therein or 25% of all PCB Articles/Containers, whichever is greater.	
			<b>12. Impervious Material.</b> Floor/curbing are constructed of continuous smooth and impervious materials to prevent/minimize penetration of PCBs.	
			<b>13. Floodplain.</b> The facility is not located at a site that is below the 100-year flood water elevation.	

**General Storage Requirements** (*Applies to storage of PCBs in both: 1) Less than 30-day and 2) Greater than/equal to 30 days, but less than 1-year storage areas*)

			<b>14. Marking Storage Area.</b> Storage area is clearly marked with "Caution-PCB" sign. (40 CFR 761.40(a)(10))	
			<b>15. Marking Containers.</b> PCB Containers/Article Containers are clearly marked with "Caution-PCB" mark and Out of Service Date (i.e., the date the item was removed from service or waste was generated) is clearly visible. (40 CFR 761.40(a) and 761.65(c)(1))	
			<b>16. Management.</b> Storage area is managed so that PCB Articles/Containers can be located by date they entered storage.	



PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		17. <b>Decontamination of Equipment.</b> Movable equipment used to handle PCBs/PCB Items in storage facility that comes in direct contact with PCBs has been decontaminated by swabbing surfaces contacted with PCBs with a solvent that contains less than 50 ppm PCBs/solubility 5 percent or more by weight prior to removal from area. (40 CFR 761.65(c)(4) and 761.79)	
		18. <b>Inspection.</b> All PCB Articles/Containers are checked for leaks at least once every 30 days. Inspection forms are maintained in on-site project files. (40 CFR 761.65(c)(5))	
		19. <b>Leaking Articles/Containers.</b> Leaking PCB Articles and PCB Containers and contents are transferred immediately to properly marked non-leaking containers. Spilled material is cleaned up immediately and PCB-contaminated material is disposed in incinerator or chemical waste landfill. (40 CFR 761.65(c)(5) and 761.60(a)(4))	
		20. <b>Container Requirements.</b> PCBs are contained in DOT Specification Containers. (49 CFR 172.101, GMP)	
		21. <b>One-Year Disposal Requirement.</b> PCB Articles/Containers are removed from storage and disposed of within one year from the date when they were first placed in storage. (40 CFR 761.65(a))	

**PCB Stockpile Storage** (*Applies to soils and other solid PCB wastes stored in stockpiles*)

		22. <b>Accumulation Time.</b> Waste tracking log indicates PCB waste stockpiles are stored less than 180 days.	
		23. <b>Type of Wastes.</b> Only solid, non-flowing PCB solids may be stored in stockpiles.	
		24. <b>Containment.</b> The stockpile is covered when not in use to control dispersal by wind or water. Water is not used to prevent wind dispersal.	
		25. <b>Leachate.</b> No leachate is generated as a result of storage in the stockpile	
		26. <b>Liner.</b> Stockpiled waste is placed on a liner that prevents PCBs from migrating into soil or groundwater.	
		27. <b>Storm Water Protection.</b> Adequate run-on controls are present to withstand a 25 year storm event. Water ??	

**Decontamination**

		28. <b>Container Decontamination.</b> PCB containers are decontaminated by 1) flushing internal surface of container at least 3 times with a solvent that contains less than 50 ppm PCBs/solubility 5 percent or more by weight prior to removal from area; 2) each rinse is at least 10 percent of the container's volume; and 3) rinse/solvent/residue is disposed of in accordance with 40 CFR 761.60. (40 CFR 761.79)	
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PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		29. <b>Staging Area.</b> Decontamination is conducted in engineered staging area where all rinsates/solvents/residues are collected in a sump or other containment system.	
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**Disposal**

		30. <b>All PCBs.</b> PCB-contaminated items, and materials are disposed of in an EPA-approved incinerator, high efficiency boiler, or chemical waste landfill, as required under 40 CFR 761.60.	
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**PCB Spill Cleanup Policy** (*Applies if PCB from current or recent spill is being cleaned up (e.g., contaminated soil, concrete pads, buildings, containers, etc.)*)

		31. <b>Historical Spills.</b> If spill occurred prior to May 4, 1987, it is a historical spill and cleanup is complying with case-by-case cleanup criteria established by EPA. Project files contain documentation outlining the cleanup criteria. (40 CFR 761.120(a)(1))	
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		32. <b>Current Spills.</b> If spill occurred after May 4, 1987 (except those specified in 3 below), it is a current spill and is meeting the requirements of 40 CFR 761.125(a) and (b), unless EPA has specified more/less stringent cleanup criteria. (40 CFR 761.120(a)(3), (b), and (c))	
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		33. <b>Notification/Recordkeeping.</b> EPA was notified as soon as possible (no later than 24 hours) if the spill directly contaminated surface water, sewer, drinking water, grazing lands, or exceeded 10 pounds. National Response Center was also contacted if spill exceeded 1 pound. Cleanup was begun immediately in accordance with the PCB Spill Cleanup Policy. (40 CFR 761.125)	
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		34. <b>Recordkeeping.</b> Records and certifications specified in 40 CFR 761.125(a) are maintained in the project files. Records of spill/decontamination procedure were developed and are being maintained in project files. (40 CFR 761.125(a) and (b)(5))	
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**Recordkeeping Note:** *These are generator requirements; Tetra Tech EC normally is not a generator, but assists clients in managing their wastes. However, Tetra Tech EC may keep some or all of these records depending upon contractual requirements. It is GMP to keep records if Tetra Tech EC is involved in off-site transport or disposal. Confirm that ESS understands and has documented who's responsibility it is to maintain documentation.*

		<p>35. <b>Records. Project files contain the following records:</b></p> <ul style="list-style-type: none"> <li>a. Written annual document log regarding disposition of each PCB item prepared by July 1 for the previous year;</li> <li>b. Signed manifests; and</li> <li>c. Certificates of Disposal (40 CFR 761.180(a)).</li> </ul> <p>These records are kept for at least 3 years after project stops storing PCBs.</p>	
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PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p><b>36. Exception Reports.</b> If copy of signed manifest from disposer is not received within 35 days from off-site transport, transporter was contacted. If the manifest was not received within 45 days, exception report was filed with EPA. (40 CFR 761.215)</p>	
		<p><b>37. One-Year Exception Report.</b> If waste is transferred to disposer within 9 months of date of removal from service and generator has not received within 13 months a Certificate of Disposal or the Certificate of Disposal confirms waste was disposed of more than 1 year after the date of removal from service, a one-year exception report was filed with EPA. (40 CFR 761.215)</p>	
		<p><b>38. Cleanup/Decontamination Report.</b> If project involves cleanup of a current spill, record/certification of cleanup/decontamination is being maintained for 5 years. (40 CFR 761.125(b)(3) and (c)(5))</p>	

**Off-Site Transportation/Disposal**

		<p><b>39. EPA Notification Number.</b> If the project involves storage of PCBs for more than 30 days or storage of bulk liquid PCBs in large non-DOT containers, the client has obtained an EPA Notification number. (40 CFR 761.202 and .205) <i>Note: Generators who do not store PCBs for greater than 30 days may use either their EPA Identification number under RCRA or the generic number "40 CFR Part 761".</i></p>	
		<p><b>40. Transporter/Disposer.</b> Transporters and disposers used for the project PCB wastes have EPA Notification numbers. (40 CFR 761.202(b))</p>	
		<p><b>41. Manifesting.</b> Completed hazardous waste manifests are used each time a PCB waste is transported off-site. The following information is included based upon the type of PCB waste. (40 CFR 761.207)</p> <ul style="list-style-type: none"> <li>a. Bulk PCBs: identify waste, date of removal from service (Out of Service Date), and weight of PCBs.</li> <li>b. PCB Article Container/Container: unique identifying number; type of waste, date of removal from service, and weight.</li> <li>c. PCB Article not in Container: serial number/identification; date of removal from service, and weight of PCB waste in the article.</li> </ul>	
		<p><b>42. Certificate of Disposal.</b> Certificate of Disposal was received by generator within 30 days of the date that PCB waste was disposed of.</p>	

--End of Checklist--



PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

*This checklist applies when project generates, manages, transports, or disposes of solid waste (except hazardous waste or TSCA-regulated PCB waste), including Investigation Derived Waste, special waste, unexploded/exploded ordnance, chemical warfare agents, and used oil.*

General Requirements												
		1. <b>Waste Determination.</b> Waste has been characterized. (State/local regulations, TTEC Environmental Field Procedures)										
		2. <b>Waiting Analytical.</b> Wastes being stored awaiting waste determination.										
Investigation Derived Waste												
		<p>3. <b>WMP Plan.</b> A Waste Management (WMP) Plan has been developed which identifies how IDW and other solid waste is to be characterized, managed and disposed of based upon suspected/ known contamination. IDW Plan requirements are being fully complied with. (GMP; CERCLA guidance). Circle which types of IDW are being generated.</p> <table border="0"> <tr> <td>Soil cuttings</td> <td>Treatment residues</td> <td>Disposable Sampling Equipment</td> </tr> <tr> <td>Purge water</td> <td>Deconwater</td> <td>PPE</td> </tr> <tr> <td colspan="3">Other: _____</td> </tr> </table>	Soil cuttings	Treatment residues	Disposable Sampling Equipment	Purge water	Deconwater	PPE	Other: _____			
Soil cuttings	Treatment residues	Disposable Sampling Equipment										
Purge water	Deconwater	PPE										
Other: _____												
		4. <b>Suspected Hazardous Waste.</b> IDW, which is suspected of being hazardous is containerized and managed as hazardous waste until proven otherwise. (Note: If hazardous, refer to Hazardous Waste checklist for requirements. This checklist is not required.)										
		5. <b>Container/Stockpile Labeling.</b> Drums awaiting analytical results are labeled with "source/location of contents"; "contents/quantity"; "date of sampling"; "Analysis Pending", and any other requirement identified in the (WMP) Plan. If contents of drum are known, it is labeled in accordance with regulatory requirements.										
		6. <b>Containers are being managed in accordance with BMPs. (containers closed, inspected, tracked)</b>										
Special Waste/Solid Waste <i>(Special Waste may include petroleum-contaminated waste, soils that exceed state/federal cleanup levels but are not hazardous, PCB wastes not regulated under TSCA, etc. Solid waste may include construction debris, demolition debris, decontamination wastewater, non-hazardous soil, scrap metal, etc. Check state/local regulations for definitions.)</i>												
		7. <b>Stockpiles.</b> Waste is being stored in stockpiles in compliance with liner, size, covering, etc. requirements. (State/local regulations)										



PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p><b>8. Container Management.</b> Waste is being stored in containers that meet condition, compatibility, closure/covering, and marking/labeling requirements. Containers are handled so as to prevent rupture/leaking. ESS demonstrates appropriate understanding of proper storage and handling.</p>	
		<p><b>9. Labeling.</b> Waste is labeled in accordance with the WMP. ESS understands WMP requirements for labeling.</p>	
		<p><b>10. Inspections.</b> Documented inspections are in maintained in the project files. If no regulatory requirements exist, waste and accumulation areas are inspected at least weekly. ESS demonstrates understanding of good container management procedures:</p> <ul style="list-style-type: none"> <li>a. containers kept closed, except when adding/removing wastes,</li> <li>b. containers handled/stored to prevent leaking/rupturing and allow for inspection,</li> <li>c. accumulation/storage areas are kept free of precipitation, debris, etc.</li> </ul>	
		<p><b>11. Drum/Waste Logs.</b> Drum/Waste logs are reviewed and were noted to be up-to-date.</p>	
		<p><b>12. Treatment.</b> Waste is being treated on-site. Regulations may require that a treatment plan be submitted for approval from the regulatory agency, permit be obtained, specified treatment goals be met, records be kept, reports submitted, etc. <i>Note: Complete "Air Quality" and "Wastewater/Stormwater Discharges/UIC" checklists, if applicable. (State/local regulations)</i></p>	
		<p><b>13. Accumulation Time.</b> Waste is moved off-site within time-period required by regulation (if applicable) or, if available, an extension is obtained from the regulatory agency. Extension documentation is maintained in project files. (State/local regulations)</p>	
		<p><b>14. On-Site Disposal.</b> Waste is being disposed of on-site in accordance with state/local regulations. Permit, if required, has been obtained and project activities are in compliance with its terms/conditions. (State/local regulations)</p>	
		<p><b>15. Transportation.</b> Transportation of waste complies with state/local solid waste and transportation requirements. Transportation vehicles are inspected in accordance with regulatory requirements. <i>Note: If hazardous materials being transported off-site, complete "Oil and Hazardous Substance Management" checklist.</i></p>	
		<p><b>16. Off-Site Disposal.</b> Off-site landfills which receives waste is pre-qualified under TTEC procedures. (State/local regulations)</p>	



PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<b>17. Recordkeeping.</b> All required records are maintained in project files. These records may include inspection logs, sampling results, off-site disposal manifests/trip-tickets, agency correspondence, etc. (State/local regulations)	
		<b>18. State-Specific Requirements.</b> Waste management, transportation and disposal comply with other state/local regulatory requirements. (See WMP for state requirements)	

**Medical/Infectious Wastes** *Note: Compliance with 40 CFR 259 has been vacated by EPA. Medical/infectious waste is primarily regulated by states. Refer to WMP to determine if plan requirements are being followed for medical/infectious waste. The checklist items below are common to many state requirements and are considered BMPs. Note: DOT often regulates medical/infectious waste as a class 6.2 hazardous material due to potential for disease transmission.*

		<b>19. WMP.</b> WMP addresses medical/infectious waste management. ESS understands medical waste management requirements including transportation requirements.	
		<b>20. Segregation.</b> Medical/infectious wastes are segregated.	
		<b>21. Packaging.</b> Medical/infectious waste is packaged in accordance with regulatory requirements which may include using rigid, leak-resistant packaging that is impervious to moisture, sufficiently strong to prevent tearing, and sealed to prevent leakage.	
		<b>22. Storage.</b> Medical /infectious waste is stored in a secure, protected area in a way that maintains integrity of packaging. Waste is maintained in a nonputrescent state.	
		<b>23. Labeling.</b> Untreated medical waste is affixed with label "Medical Waste" or "Infectious Waste" or "Biohazard symbol." Treated medical waste need not be labeled.	
		<b>24. Disposal/Transportation.</b> ESS follows and understands labeling, marking, packaging, manifesting requirements for shipping medical /infectious waste.	
		<b>25. Disposal.</b> Disposal facility was prequalified under TTEC procedures to dispose of medical/infectious waste.	

**USDA Soil Permits**

		<b>26. Quarantine State/Area.</b> Project activities involve the interstate shipment or receipt of soils from on- or off-site sources and project is located within a quarantine state/area. These states include, but are not limited to, AL, AR, FL, GA, LA, MI, NC, SC, OK, PR, TN, TX. (7 CFR 301.80 , .81, .85, and .90)	
		<b>27. Certificate/Permit.</b> Certificate or permit has been obtained for the interstate shipment unless specific conditions are met allowing transport without a permit/certificate.	



PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<b>28. Attachment of Certificate/Permit To Container/Shipping Paper.</b> Certificate/permit is attached to outside of container holding soils or attached to bill of lading/shipping paper.	
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**On-Site Landfill**

		<b>29. Design.</b> Landfill meets design requirements specified in regulations or alternative design has been approved by state/local agency. Design requirements may include liner, cover, leachate collection/gas collection, location criteria, etc. (40 CFR 258, State/local regulations)	
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		<b>30. Permitting/Licensing.</b> Permit/license has been obtained to construct/operate landfill. Construction/operation complies with conditions of permit. (State/local regulations)	
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		<b>31. Operation.</b> Landfill is operating in compliance with permit including, if applicable, O&M Plan, inspection, waste acceptance, monitoring, reporting, and recordkeeping requirements. (40 CFR 258, State/local regulations)	
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		<b>32. Stormwater.</b> individual NPDES Stormwater permit has been obtained or coverage under a multi-sector/general permit has been obtained. <i>Complete "Wastewater/Stormwater Discharges/UIC" checklist to evaluate compliance.</i>	
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**Unexploded Ordnance/Ordnance Explosive Waste/Chemical Warfare Material**

		<b>33. Site-Specific UXO Work Plan.</b> A site-specific workplan has been developed for the project.	
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		<b>34. UXO Team On-site.</b> UXO team is on-site to oversee all operations which have potential for UXO/OEW.	
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		<b>35. Management.</b> OEW and CWM may be RCRA regulated material. <i>Complete "Hazardous Waste" checklists, as appropriate.</i>	
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**Used Oil** *Note: State regulations may require that used oil be managed as a hazardous waste. If so, skip this section and complete the "Hazardous Waste" checklist.*

		<b>36. Testing.</b> Used oil has been tested and determined: <ul style="list-style-type: none"> <li>a. Not to be mixed with a listed hazardous waste.</li> <li>b. If mixed with a characteristically hazardous waste, it does not exhibit a characteristic of hazardous waste.</li> <li>c. Not contain more than 1,000 ppm total halogens unless it is documented that it does not contain a hazardous waste. (40 CFR 279.10, State regulations)</li> </ul>	
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PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

	<p><b>37. Prohibitions.</b> Used oil is:</p> <ul style="list-style-type: none"> <li>a. Not managed in a surface impoundment or waste pile.</li> <li>b. Used as dust suppressant without state/EPA approval.</li> <li>c. Burned in units, except industrial furnace, boiler, utility boiler, used oil fired space heater or hazardous waste incinerator. (40 CFR 279.12, State regulations)</li> </ul>	
	<p><b>38. Storage.</b> Used oil is stored as follows:</p> <ul style="list-style-type: none"> <li>a. In tank/container/unit subject to regulation under 40 CFR 264/265.</li> <li>b. Container/tank is in good condition.</li> <li>c. Labeled with words "Used Oil."</li> <li>d. Fill pipe connecting to UST is labeled with "Used Oil". (40 CFR 279.22, State regulations)</li> </ul> <p><i>Note: Storage may also need to comply with SPCC plan requirements under 40 CFR 112 or UST requirements under 40 CFR 280. Complete "Oil and Hazardous Substances Management" and "UST/AST Installation and Closure" checklists, as appropriate.</i></p>	
	<p><b>39. Oil-Fired Space Heaters.</b> Used oil is burned in generator's (client's) space heater which has rated capacity of no more than 0.5 mmBtu/hr. (40 CFR 279, State regulations)</p>	
	<p><b>40. Off-Site Shipment.</b> Used oil is being shipped by a transporter with an EPA Identification number or under tolling agreement where reclaimed oil is returned to project site/client's facility. (40 CFI 279.24, State regulations)</p>	
	<p><b>41. Off-Site Disposal.</b> Used oil is transported to a facility that has been approved for used oil recycling/disposal and prequalified under TTEC procedures.</p>	
	<p><b>42. DOT Compliance.</b> Used oil is transported in accordance with DOT requirements including shipping papers, packaging, marking, labeling, and placarding. <i>Complete "Oil and Hazardous Substances Management" Checklist to evaluate compliance.</i> (49 CFR 171-178)</p>	

--End of Checklist--

**PESM INSPECTION CHECKLIST— WASTEWATER/STORMWATER DISCHARGES/UIC**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A
<b>REQUIREMENTS</b>		
<b>COMMENTS/NOTES</b>		

*This checklist applies when wastewater/stormwater is discharged to surface water, ground, or groundwater, or if any fluids are emplaced in an Underground Injection Well.*

<b>Surface Wastewater Discharges</b>			
		<p><b>1. Point Source Discharge.</b> If the discharge constitutes a "point source" discharge into waters of the U.S., an NPDES permit has been obtained. (40 CFR 122.1(b)) <i>Note: Reference to NPDES permit in this section includes state-authorized NPDES permit.</i></p>	
		<p><b>2. Exemption.</b> Certain point source discharges to waters of the U.S. are exempt from NPDES permitting, for instance, discharges to POTW or privately owned treatment works. See exclusions in 40 CFR 122.3. Project's discharge is exempt from obtaining an NPDES permit.</p>	
		<p><b>3. § 401 Water Quality Certification.</b> If NPDES program is not delegated to a state and EPA issues the permit, state has issued a Clean Water Act § 401 Certification. Project activities are conducted in compliance with these terms/conditions. (40 CFR 121, State/local regulations)</p>	
		<p><b>4. Permit Conditions.</b> The permit is valid. The permit terms and conditions have been reviewed and the project is operating in compliance with all terms and conditions of the permit. <i>Note: For CERCLA activities, for which a "permit" does not need to be obtained, project files contain documentation specifying effluent limits, control technology, monitoring, and if applicable, reporting/recordkeeping requirements. Project is being performed in compliance with these requirements.</i></p>	
		<p>a. <b>Effluent Limits.</b> Based upon review of discharge monitoring reports (DMR) and permit conditions, verify that permit discharge limits are being met.</p>	
		<p>b. <b>Bypass/No Effluent Exceedance.</b> Effluent bypass has occurred which did not cause effluent limitations to be exceeded. Verify that bypass was: essential to maintenance to assure efficient operation; unavoidable to prevent loss of life, personal injury, severe property damage; no feasible alternatives to bypass; exercise of reasonable engineering judgment; or adequate back-up equipment could not have been installed to prevent bypass that occurred during normal periods, equipment downtime, or preventative maintenance. [40 CFR 122.41(m)]</p>	



PESM INSPECTION CHECKLIST— WASTEWATER/STORMWATER DISCHARGES/UIC

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p>c. <b>Bypass/Effluent Exceedance.</b> Bypass has occurred and effluent limitations were exceeded. Notification was provided to regulatory agency.</p> <ul style="list-style-type: none"> <li>- If planned bypass, 10-day prior notice and approval was obtained.</li> <li>- If unanticipated bypass occurred, 24-hour notice was provided. [40 CFR 122.41(m)(3) and (4)]</li> </ul>	
		<p>d. <b>Upset.</b> Upset occurred and permittee can identify cause for upset. At time of upset project was operating properly, all remedial measures required by agency were complied with. [40 CFR 122.41(n)]</p>	
		<p>e. <b>Maintenance/Operation.</b> Project site and treatment/control systems are being properly operated and maintained Project files contain documentation demonstrating compliance. [40 CFR 122.41(e)]</p>	
		<p><b>5. Treatment Unit.</b> Wastewater is treated at the project site prior to discharge. The following requirements are being complied with (if applicable).</p>	
		<p>a. <b>Training.</b> Personnel who maintain/operate water pollution control unit are trained. (State/local regulations) <i>Note: This requirement usually applies to large treatment plants.</i></p>	
		<p>b. <b>Operation/Maintenance Log.</b> Operation/maintenance logs comply with requirements in state/local regulations and/or permit. Operation logs document when unit is non-operational due to maintenance/equipment failure, etc., or not operable, as well as showing when unit is operating properly.</p>	
		<p>c. <b>Sludge/Treatment Residue/Filters.</b> Management and disposal of sludge, treatment residue, and filters are complying with federal/ state solid, hazardous or special waste regulations.</p>	
		<p>d. <b>Operating/Startup/Shutdown Procedures.</b> Operating and start-up/shutdown procedures required under permit are being complied with including requirements for maintenance, inspections, alarm response, etc. (Permit conditions)</p>	
		<p><b>6. Notification/Discharge Limit Exceedances.</b> If NPDES permit limit was exceeded, regulatory agency was notified orally (within 24 hours) and written notification was submitted within 5 days. Notification was also made in monthly monitoring report. [40 CFR 122.41(l)(6) and (7)]</p>	



PESM INSPECTION CHECKLIST— WASTEWATER/STORMWATER DISCHARGES/UIC

CONFIDENTIAL

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>7. Monitoring.</b> Monitoring requirements specified in NPDES permit and 40 CFR 122, Subpart C are being met. Sampling is being conducted in accordance with 40 CFR 136 unless alternative method has been approved.</p>	
		<p>a. <b>Recordkeeping.</b> Adequate documentation is being maintained of sampling date/time/location; analyses dates; individuals performing sampling/analysis; analytical methods/techniques used; and analytical results.</p>	
		<p>b. <b>DMR.</b> Monitoring results are reported and submitted on a DMR, and signed by responsible party. [40 CFR 122.41 and 122.22(b)]</p>	
		<p>a. <b>Notification.</b> Regulatory agency was notified as soon as project personnel knew or had reason to believe that:</p> <p>b. Activity has occurred or will occur that will result in discharge on a routine or frequent basis of any “toxic pollutant” for which the permit does not establish a limit and it exceeds “notification levels” in 40 CFR 122.44(f).</p> <p>c. - Activity has occurred or will occur that would result in any discharge on a non-routine or infrequent basis of “a toxic pollutant” not limited in the permit, if discharge will exceed “notification levels” specified in 40 CFR 122.44(f).</p>	
		<p><b>8. Best Management Plan.</b> If permit requires a BMP, project site has the plan &amp; implements the requirements. This may be applicable if the project site uses, manufactures, stores, handles, or discharges any toxic pollutant listed in CWA §307(a)(1) or pollutant listed in CWA §311.</p>	
		<p><b>9. Discharge of Toxic Pollutants.</b> Project discharges aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, or PCBs which have effluent standards or any other toxic pollutant listed in CWA §307(a)(1).</p> <p>a. Specified toxic pollutant effluent limits are being met.</p> <p>b. Regulatory agency has been notified within 60 days from date of promulgation of toxic pollutant standard.</p> <p>c. Reporting is being conducted in compliance with 40 CFR 129.5(d)(2).</p>	



PESM INSPECTION CHECKLIST— WASTEWATER/STORMWATER DISCHARGES/UIC

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>10. Permit Modification.</b> Regulatory agency has been notified as soon as practicable of any of the following events and the permit has been modified.</p> <ul style="list-style-type: none"> <li>a. Any significant changes in operation.</li> <li>b. Planned physical alterations/additions to project if it constitutes a "new source" under 40 CFR 122.29(b).</li> <li>c. Alteration/addition could significantly change the nature or increase quantity of pollutants discharged.</li> <li>d. Change affects pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1). [(40 CFR 122.41(l)(1)]</li> </ul>	
		<p><b>11. Permit Transfer.</b> If transfer of NPDES permit to new permittee has occurred, the permit was revoked/reissued/modified, unless former permittee notified regulatory agency at least 30 days prior to transfer, notice described agreement between former/new permittee containing specific date of transfer/coverage/liability, and regulatory agency did not notify former permittee of intention to revoke/reissue/modify permit. (40 CFR 122.61)</p>	
		<p><b>12. Permit Renewal.</b> Permit will expire within 6 months. An application for NPDES permit was submitted at least 180 days prior to expiration of existing permit. (40 CFR 122.21(a))</p>	
		<p><b>13. Recordkeeping.</b> The following records are being kept for at least 3 years:</p> <ul style="list-style-type: none"> <li>a. All data used to complete permit applications and any supplemental information. [40 CFR 122.21(p)]</li> <li>b. Discharge monitoring reports.</li> <li>c. Notification required for routine/non-routine discharge of toxic pollutants not specified in permit under 40 CFR 122.44(f).</li> <li>d. Reports required by the permit. [40 CFR 122.44(i)(2)]</li> <li>e. Equipment calibration/maintenance records/original strip chart recordings for continuous monitoring instrumentation.</li> <li>f. Quality assurance records.</li> </ul>	
		<p><b>14. State-Specific Requirements.</b> Discharge is in compliance with state-specific permit/regulatory requirements. (State regulations)</p>	
<p><b>Discharge To Publicly Owned Treatment Works/Federally Owned Treatment Works</b> (<i>Applies when project discharges to POTW/FOTW.</i>)</p>			
		<p><b>15. Permit/Approval.</b> Pre-discharge permit/approval has been obtained authorizing the discharge of wastewater to the POTW/FOTW. <i>Note in adjacent column, if the discharge permit/approval is batch, one-time approval or is sufficient for life of the project.</i> (40 CFR 403.5)</p>	



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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>16. Waste Acceptance Criteria.</b> Wastewater complies with the acceptance criteria of the receiving POTW/FOTW. Documentation exists in project files signed by FOTW/POTW that they have reviewed analytical data and wastewater meets their acceptance criteria. <i>Note: This may be part of permit/approval described above. (40 CFR 403.5)</i></p>	
		<p><b>17. Treatment Unit.</b> Wastewater is treated at the project site prior to discharge. The following requirements are being complied with (if applicable). [40 CFR 122.21(j)(6)(iii)(B)]</p>	
		<p>a. <b>Training.</b> Personnel who maintain/operate water pollution control unit are trained. (State/local regulations) <i>Note: This requirement usually applies to large treatment plants. (USC 33:26:1341)</i></p>	
		<p>b. <b>Operation/Maintenance Log.</b> Operation/maintenance logs comply with requirements in state/local regulations and/or permit. Operation logs document when unit is non-operational due to maintenance, equipment failure, etc., or not operating, as well as when unit is operating properly. (40 CFR 403.12)</p>	
		<p>c. <b>Sludge/Treatment Residue/Filters.</b> Management and disposal of sludge, treatment residue, and filters are complying with federal/state solid or hazardous or special waste regulations.</p>	
		<p>d. <b>Operating/Startup/Shutdown Procedures.</b> Operating and start-up/shutdown procedures required under permit are being complied with including requirements for maintenance, inspections, alarm response, etc. (Permit conditions)</p>	



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	<p><b>18. General Pretreatment Standards.</b> Discharge to POTW complies with general pretreatment standards. [40 CFR 403.5(b)]</p> <p>The following is prohibited from discharge:</p> <ul style="list-style-type: none"> <li>a. Fire/explosion hazards or waste streams with flashpoint below 140°F.</li> <li>b. Pollutants that will result in toxic gases/vapors/fumes in POTW in quantity to cause acute worker health/safety problems.</li> <li>c. Trucked/hailed pollutants except at discharge points designated by POTW.</li> <li>d. Pollutants that will cause corrosive damage to POTW or pH less than 5.0 unless POTW is designed to handle such discharges.</li> <li>e. Petroleum oil, non-biodegradable cutting oil, oil products of mineral oil origin, or solid or viscous pollutants that will obstruct flow/cause operation interference or pass-through.</li> <li>f. Heat in amounts that will inhibit biological activity or in such quantities that temperature at POTW influent exceeds 104°F unless POTW approves.</li> <li>g. Any pollutant, including oxygen-demanding pollutants, at flow rate or concentration that will cause interference with POTW.</li> </ul>	
	<p><b>19. Categorical Pretreatment Standards.</b> Discharge is subject to categorical pretreatment standards for industrial facilities which specify concentrations of pollutants that may be discharged to POTW, and monitoring, analysis, reporting, and recordkeeping requirements. (40 CFR 403, Appendix C; 40 CFR 403.6 and .12)</p>	
	<p><b>20. No dilution.</b> Process water or other methods are not used to dilute discharge as partial or complete substitute for treatment to achieve compliance with waste acceptance criteria/pretreatment standards. [40 CFR 403.6(d)]</p>	
	<p><b>21. No Hazardous Waste.</b> No hazardous waste is discharged to POTW. [Good Management Practice (GMP)]</p>	
	<p><b>22. Reports/Recordkeeping.</b> Reports/records required under permit/ approval and local/state regulations are being submitted/maintained. Reporting may be required prior to discharge, when upset occurs, etc. Records that may need to be maintained in project files include: copy of permit application, approval/permit, sampling/analysis, treatment unit maintenance/calibration, etc. (State/local regulations/permit)</p>	



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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<b>23. State/Local-Specific Requirements.</b> Discharge complies with state/local agency permit and regulatory requirements. (State regulations)	
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**Discharge to Private Treatment Works** (*Applies if wastewater is discharged to treatment system owned by a private party.*)

		<b>24. Contract.</b> A contract has been signed by our client and owner of treatment system allowing discharge of wastewater to private treatment works.	
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		<b>25. State Permit.</b> State permit is required to discharge to private treatment works. Project is in compliance with terms/conditions of permit, including discharge limitation, pretreatment requirements, monitoring, inspections, solid waste management plans, spill contingency plans, etc. (State regulations)	
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**Discharge to Ground/Groundwater**

		<b>26. Permit.</b> State/local agency requires that permit be obtained for the discharge of wastewater to the ground/groundwater. Verify that the project is in compliance with terms and conditions of the permit and regulations. (State/local regulations) <i>Note: For CERCLA activities for which a "permit" does not need to be obtained, project files contain documentation specifying effluent limits, control technology, monitoring, and if applicable, reporting/recordkeeping requirements. Project is being conducted in compliance with these requirements.</i>	
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		a. <b>Effluent Limits.</b> Based upon review of monitoring reports and permit conditions verify that permit discharge limits are being met.	
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		b. <b>Maintenance/Operation.</b> Project site and treatment/control systems are being properly operated and maintained. O&M plan has been developed (if required) and is being complied with. Operation logs document when unit is non-operational due to equipment failure, maintenance, etc., not operating, or operating properly.	
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		c. <b>Other Plans.</b> Permit/regulations require development of other plans (e.g., solid waste management plan, spill contingency plan). These plans have been developed and are being complied with.	
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		<b>27. Treatment Unit.</b> Wastewater is treated at the project site prior to discharge. The following requirements are being complied with (if applicable):	
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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

			a. <b>Training.</b> Personnel who maintain/operate water pollution control unit are trained. (State/local regulations) <i>Note: This requirement usually applies to large treatment plants.</i>	
			b. <b>Operation/Maintenance Log.</b> Operation/maintenance logs comply with requirements in state/local regulations and/or permit.	
			c. <b>Sludge/Treatment Residue/Filters.</b> Management and disposal of sludge, treatment residue, and filters comply with federal/state solid, hazardous, or special waste regulations.	
			d. <b>Operating/Startup/Shutdown Procedures.</b> Operating and start-up/shutdown procedures required under permit are being complied with including requirements for maintenance, inspections, alarm response, etc. (Permit conditions)	
			<b>28. Monitoring.</b> Monitoring requirements specified in permit and regulations are being met. (State/local regulations/permit)	
			a. <b>Recordkeeping.</b> Adequate documentation is being maintained of sampling date/time/location; analyses dates; individuals performing sampling/analysis; analytical methods/techniques used; and analytical results.	
			b. <b>Monitoring Reports.</b> Monitoring results are reported and submitted in a timely fashion.	
			c. <b>Notification.</b> Regulatory agency was notified as soon as project personnel knew or had reason to believe exceedance occurred or other permit condition was violated.	
			<b>29. Permit Renewal.</b> Permit will expire within 6 months, and an application for permit has been submitted in a timely fashion. (State/local regulations)	
			<b>30. Reports/Recordkeeping.</b> Reports/records required under permit/ approval and local/state regulations are being submitted/maintained. Reporting may be required prior to discharge, when upset occurs, etc. Records that may need to be maintained in project files include copy of permit application, approval/permit, sampling/analysis, treatment unit maintenance/calibration, etc. (State/local regulations/permit)	



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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

**Stormwater Discharges**

	<p><b>31. Applicability.</b> Project activities involve discharge of stormwater and</p> <ul style="list-style-type: none"> <li>a. Involve construction activities (i.e., clearing, grading, excavation, land disturbing) that impact greater than 5 acres under a common plan [40 CFR 122.26(a)(9)(B) &amp; (b)(15)], OR</li> <li>b. Involve construction activities (i.e., clearing, grading, excavation, land disturbing) that impact equal to or greater than 1 acre; also includes disturbance of less than 1 acre of total land area that is part of a larger common plan that will ultimately disturb more than 1 acre. (does not apply if waiver received – see 122.26(b)(15)(i)(A) &amp; (B)), OR</li> <li>c. Constitute an “industrial activity” (common types of remediation projects that are “industrial” are: landfill closures/construction; RCRA TSD facilities, etc.). [40 CFR 122.26(b)], OR</li> <li>d. Involve construction activities impacting less than 5 acres at a client’s facility which has an existing NPDES stormwater permit.</li> <li>e. Construction activities that result in land disturbances less than 1 acre based on the potential for contribution to a violation of a water quality standard or a significant contribution of pollutants to water of the U.S.A. [122.26(b)(15)(ii)].</li> </ul>	
	<p><b>32. Permit.</b> Coverage under a general permit, individual, group, or multi-sector permit has been obtained. For general/multi-sector permit, NOI was submitted in a timely fashion per federal/state regulations. For individual permits, permit was obtained prior to discharge commencing. <i>Note: Project may constitute an “industrial activity” at a client’s facility which already has an NPDES permit. In such cases, the client has been consulted regarding modifications to individual permit, NOI, and/or Stormwater Pollution Prevention Plan (SWPPP) to include project activities. (40 CFR 122.26)</i></p> <p><i>Note: For CERCLA activities, although NOI/permit does not need to be obtained, project files must contain documentation showing that “substantive” requirements have been identified and project is in compliance with these requirements. These requirements include effluent limits, BMPs, development of SWPPPs, monitoring, and if applicable reporting/recordkeeping.</i></p>	
	<p><b>33. Permit Conditions.</b></p> <ul style="list-style-type: none"> <li>a. <b>Discharge of Non-Stormwater.</b> Non-stormwater is not combined with stormwater.</li> </ul>	



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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p>b. <b>Release of Reportable Quantity of a Hazardous Substance.</b> If hazardous substance was released above RQ, NRC/other agencies were notified, SWPPP was modified in accordance with permit terms (normally about 2 weeks), and written notice was provided to regulatory agency within specified timeframe. [40 CFR 122.26(c)(1)(iii)]</p>	
		<p>c. <b>SWPPP Development.</b> SWPPP was developed in a timely fashion. State may require submittal of a certification that SWPPP was developed.[40 CFR 122.26(d)(1)(v) &amp; (d)(2)]</p>	
		<p>d. <b>EPCRA § 313 Sources.</b> If project is located at a client's facility which is subject to EPCRA § 313 TRI reporting, other permit requirements such as monthly Discharge Monitoring Reports may apply. [Check facility's stormwater permit.]</p>	
		<p><b>34. Stormwater Pollution Prevention Plan.</b> Under general, individual, or multi-sector permits, SWPPP has been developed which identifies the following. SWPPP has been reviewed and project is in compliance with its terms. [40 CFR 122.26(d)(2)(iv)]</p> <ul style="list-style-type: none"> <li>a. Pollution prevention team,</li> <li>b. Describes potential pollutant sources,</li> <li>c. Identifies Best Management Practices,</li> <li>d. Housekeeping/preventative maintenance,</li> <li>e. Spill prevention/response procedures,</li> <li>f. Inspections,</li> <li>g. Employee training,</li> <li>h. Recordkeeping/reporting,</li> <li>i. Sediment/erosion control,</li> <li>j. Management of runoff, and</li> <li>k. Comprehensive site evaluation, including schedule.</li> </ul>	
		<p><b>35. Amendment of SWPPP.</b> SWPPP has been amended if there is a change in design, construction, operation, or maintenance at project site which has a significant effect on potential for discharge of pollutants OR if plan has been ineffective.</p>	
		<p><b>36. Monitoring.</b> Monitoring is being conducted in compliance with permit and SWPPP. (Permit condition/SWPPP)</p>	
		<p><b>37. Reporting.</b> Reporting to regulatory agency is being conducted in accordance with permit conditions. This may include monitoring results/DMRs, certifications, notifications, etc. (Permit conditions)</p>	
		<p><b>38. Recordkeeping.</b> Copy of permit/NOI and SWPPP is maintained at project site. Inspection results, monitoring records, correspondence with regulatory agencies, and any other records required to be kept under the permit are maintained in the project files. (Permit conditions)</p>	



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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>39. State-Specific Requirements.</b> Some states require that Stormwater Management Plan be submitted to state for review and approval for excavation activities, waste pile/stockpile management, etc. If permit is required, verify that project is in compliance with all terms and conditions of permit. (State regulations)</p>	
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**Discharge to Underground Injection Wells** (*Applies if project discharges wastewater to UIC or injection gallery.*)

		<p><b>40. Permit/Authorization by Rule.</b> Discharge to injection well has an operating permit or is authorized by rule and the UIC is registered with the regulatory agency. The permit was obtained prior to construction of the well. (40 CFR 144.11, State/local regulations) <i>Note: Injection well is any dug hole which is deeper than it is wide into which fluids (may include oxygen) are emplaced.</i></p>	
		<p><b>41. Inventory Information.</b> UIC is authorized by rule and an inventory form has been submitted to EPA/state delegated agency. (40 CFR 144.26, State/local regulations)</p>	
		<p><b>42. Closure Notification.</b> Upon closure of well, UIC inventory form is submitted in a timely fashion (normally within 30 days of closure). Closure complies with EPA/State guidance. If required, agency reviewed/approved cleanup plan. (State/local regulations)</p>	
		<p><b>43. Authorized by Rule -- Existing Class I, II, or III Wells.</b> Project site discharges to an existing Class I, II, or III well authorized by rule. A plugging/abandonment plan has been developed in accordance with 40 CFR 144.28(c), operating requirements under 40 CFR 144.28(f), monitoring requirements under 40 CFR 144.28(g) are being met, and notification, reporting, and recordkeeping requirements specified in 40 CFR 144.28(b), (h), (j), (k), (l) and (l) are being met. <i>See definitions for Well Classification in 40 CFR 144.6.</i></p>	
		<p><b>44. Authorized by Rule -- Class IV Well.</b> Project site discharges to or involves the closure of a Class IV well which is authorized to discharge for up to 6 months after UIC program was approved/promulgated. Well is closed/plugged as approved by EPA, and EPA was notified 30 days prior to abandonment (40 CFR 144.23). <i>Note: 6 month date is 1985. Most projects involving Class IV wells will involve the closure of the well, otherwise a permit must be obtained.</i></p>	



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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>45. Authorized by Rule -- Class V Well.</b> Project involves discharge or closure of a Class V well which is authorized by rule until further requirements under future regulations become applicable. Well authorization expires if EPA requires issuance of permit or upon closure of well. (40 CFR 144.24) <i>Note: To date, EPA has not issued requirements to permit Class V wells.</i></p>	
		<p><b>46. Permitting.</b> Project site discharges to a permitted well.</p>	
		<p>a. <b>Permit Acquisition.</b> Permit has been obtained by the "operator" prior to construction. (40 CFR 144.31)</p>	
		<p>b. <b>General Permitting Requirements.</b> General permit requirements are being complied with for operation/maintenance (e.g., operating training, laboratory QA/QC, effective performance, funding, operation backup facilities); monitoring, reporting, recordkeeping and abandonment. (40 CFR 144.51)</p>	
		<p>c. <b>Class I, II or III Wells.</b> Mechanical integrity of well has been established and is being maintained. (40 CFR 144.51(q) and 146.8)</p>	
		<p>d. <b>Well-specific Requirements.</b> Operation/maintenance, effluent limits, monitoring, and recordkeeping/reporting are in compliance with permit terms and conditions. (40 CFR 144.55)</p>	
		<p>e. <b>Corrective Action.</b> If permit contains corrective action requirements, project is in compliance with those conditions. (40 CFR 144.55)</p>	
		<p><b>47. Class I Nonhazardous Well.</b> Project discharges to a Class I nonhazardous well that meets:</p> <p>a. Criteria and standards for construction specified in 40 CFR 146.12.</p> <p>b. Operating, monitoring, and reporting specified in 40 CFR 146.13.</p>	
		<p><b>48. Class II Wells.</b> Project discharges to a Class II well that meets:</p> <p>a. Criteria and standards for construction specified in 40 CFR 146.22.</p> <p>b. Operating, monitoring, and reporting specified in 40 CFR 146.23.</p>	
		<p><b>49. Class III Wells.</b> Project discharges to a Class III well that meets:</p> <p>a. Criteria and standards for construction specified in 40 CFR 146.32.</p> <p>b. Operating, monitoring, and reporting specified in 40 CFR 146.33.</p>	



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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**50. Class I Hazardous Waste Injection Well.** Project discharges hazardous waste into a Class I injection well that meets the following criteria:

- a. Waste is not prohibited from discharge or a waiver has been obtained under 40 CFR 148.1 and 148.10-.17.
- b. Siting under 40 CFR 146.61.
- c. Manifesting, notification, identification, maintenance of operating records, reporting, personnel training, certification of closure in accordance with 40 CFR 264 requirements.
- d. Corrective action requirements, if applicable, under 40 CFR 146.64.
- e. Construction requirements under 40 CFR 146.65 and .66.
- f. Operating requirements under 40 CFR 146.67.
- g. Continuous recording devices for monitoring compliance in accordance with 40 CFR 146.67.
- h. Testing and monitoring requirements under 40 CFR 146.68.
- i. Reporting requirements under 40 CFR 146.69.
- j. Well closure plan/post-well closure plan in accordance with 40 CFR 146.71 and .72.
- k. Land disposal restrictions in accordance with 40 CFR 148 and 268.

-- End of Checklist--

**PESM INSPECTION CHECKLIST— WETLANDS/STREAMS/FLOODPLAINS**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A
<b>REQUIREMENTS</b>		
<b>COMMENTS/NOTES</b>		

*This checklist applies to all projects that could potentially impact wetlands, streams, and floodplains.*

<b>Wetlands</b> (This section applies if wetlands are <b>suspected to be</b> located adjacent to or within the project site.)		
		<p><b>1. Delineation.</b> Wetlands have been delineated by client or Tetra Tech EC, Inc. wetlands biologist. If wetlands are found to be adjacent to or within project site, the wetlands are staked so that project mitigation measures are effective. (E.O. 11990, State/local regulations)</p>
		<p>a. <b>Non-Jurisdictional Wetlands.</b> Jurisdictional status of wetlands has been determined and supporting documentation is in file. <i>Note: documentation may be in the form of 1) a Jurisdictional Determination from the Army Corps of Engineers or State Agency, or 2) included in as part of an Army Corps of Engineers or State Permit.</i></p>
		<p><b>2. Buffer.</b> Protective buffers have been identified and area staked so that project mitigation measures are effective. Regulatory agency approved buffers &amp; documentation in file. (State/local regulations)</p>
		<p><b>3. CWA § 404 Permit.</b> If a permit was required, project activities are in compliance with the terms/conditions of the permit. (33 CFR 320-330; 40 CFR 230, state/local regulations) <i>Note: For activities conducted at CERCLA sites, coordination with EPA is required instead of Army Corps of Engineers. Project files were reviewed to verify that sufficient documentation exists to demonstrate that project underwent EPA review for wetlands impact/avoidance/mitigation. In addition, project files document that proper notification was made by EPA/client/Tetra Tech EC to state, USFWS, NMFS, State Fish and Game, SHPO, local agency.</i></p>
		<p>a. <b>Mitigation.</b> If mitigation was required, a plan was developed and approved by the regulatory agency. Project activities are being conducted in compliance with the plan.</p>
		<p>b. <b>Notification to USFWS, NMFS, State Fish and Game, SHPO, Local Agency.</b> Notification was made to these agencies and project file contains their documented response to demonstrate that project will not have an adverse impact on threatened/endangered species, cultural resources, and meets local wetlands requirements OR if agencies require mitigation, such measures are being taken.</p>
		<p>c. <b>Specific Conditions/Terms.</b> Terms and conditions of the individual or Nationwide Permit were reviewed and project is in compliance with all terms/conditions.</p>

**PESM INSPECTION CHECKLIST— WETLANDS/STREAMS/FLOODPLAINS**

**CONFIDENTIAL**

Project:	Inspector:	Date:		
Yes	No	N/A	REQUIREMENTS	COMMENTS/NOTES
			<p><b>4. Exemption.</b> Certain discharges of dredged or fill material are exempt from permitting. See exemptions in 33 CFR 320. If project activities are exempt from permitting, the EHS Plan or Work Plan contains exemption rationale.</p>	
			<p><b>5. CWA § 401 Water Quality Certification.</b> § 401 WQC was obtained from state authorizing work in wetlands. Project is in compliance with terms and conditions of that certification. (40 CFR 121, State/local regulations)</p>	
			<p><b>6. Temporary Water Quality Modification.</b> If project activities will cause the temporary exceedance of water quality criteria (normally due to excavation activities -- turbidity), state/local agency may require that a temporary water quality modification be obtained. If applicable, project activities are complying with the terms and conditions of the approval. (State/local regulations)</p>	
			<p><b>7. Coastal Zone Management (CZM) Certification.</b> If wetland also located within a coastal zone, CZM Act Certification was obtained from local/state agency. If applicable, project files contain documentation and activities are complying with the terms of the CZMA. (CZMA, State/local regulations)</p>	
<p><b>Stream Bed/Bank Disturbance</b> (<i>Applies if project activities involve filling, dredging, altering, or otherwise impacting water quality in or near stream or river.</i>)</p>				
			<p><b>8. USACE § 10 or CWA § 404 permit.</b> Project activities involve dredging, filling, or land disturbing activity within “navigable waters” or “waters of the U.S.” (normally below “high water mark”) of stream/river. USACE § 10/CWA § 404 permit has been obtained. Project is in compliance with terms and conditions of permit. (33 CFR 320-330, 40 CFR 230)</p>	
			<p><b>9. State Fisheries.</b> Project activities involve dredging, filling, land disturbing activity, or otherwise is impacting water quality within regulated area of stream bed (normally “high water mark”). Permit/approval has been obtained from state fish/game which specifies requirements for the protection of fish. Project is in compliance with terms and conditions of the permit (e.g., erosion control, monitoring, etc.). (State/local regulations)</p>	
			<p><b>10. Shoreline Protection.</b> Project activities are located within protected shoreline area in the state and constitute a regulated activity. A Shoreline Protection permit has been obtained and project is in compliance with terms and conditions of the permit. (State/local regulations) <i>Note: If project is located within shoreline but does not constitute a “regulated activity,” explain in adjacent column.</i></p>	

**PESM INSPECTION CHECKLIST— WETLANDS/STREAMS/FLOODPLAINS**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes	No	N/A
<b>REQUIREMENTS</b>		
<b>COMMENTS/NOTES</b>		

			<p><b>11. Temporary Water Quality Modification.</b> If project activities will cause the temporary exceedance of water quality criteria (normally due to excavation activities -- turbidity), state/local agency may require that a temporary water quality modification be obtained. If applicable, project activities are complying with the terms and conditions of the approval. (State/local regulations)</p>	
			<p><b>12. CWA § 401 Water Quality Certification.</b> If a federal permit/approval was obtained, § 401 WQC was obtained from the state authorizing work in wetlands. Project activities are complying with the terms of the certification. (40 CFR 121, State/local regulations)</p>	
			<p><b>13. Coastal Zone Management Certification.</b> Project activities are located within a designated coastal zone. CZMA Certification was obtained from local/state agency. Project files contain documentation, and activities are being conducted in compliance with the certification. (CZMA, State/local regulations)</p>	
			<p><b>14. Riparian Zones.</b> If project activities will cause the removal of near-stream vegetation, activities may require authorization or compliance with State regulations or local ordinances. The riparian zone width depends on the environmental resources being protected. Permit/approval has been obtained, if applicable. Project files contain documentation and activities are in compliance with permit conditions. (State/local regulations)</p>	

**Floodplain/Flood Control** (*Applies when project will potentially impact floodplains or is located in a flood control area*)

			<p><b>15. Floodplain.</b> Project is located within a floodplain as determined through evaluation of FEMA maps or state generated floodplain maps. The project is avoiding/minimizing impacts to floodplains. Measures used to avoid/minimize impacts are documented in project files and have been reviewed/approved by applicable regulatory agency. Permit/approval has been obtained, if applicable. Field activities are in compliance with terms/conditions of permit/approval. (E.O. 11988, State/local regulations)</p>	
			<p><b>16. Flood Control.</b> Project activities involve excavation or other land disturbing activities in an area which has potential for flood problems. An evaluation has been made of pre- and post-construction flows, and measures to minimize runoff (e.g., stormwater detention/retention) are being implemented.</p>	

**--End of Checklist--**

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR DEPARTMENT OF ENERGY PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

*This checklist applies to projects where radioactive material and/or types of radiation are present.*

<b>Determination of License Type</b>			
		1. DOE requires that persons/company conducting work with radioactive material be licensed for specific amounts and types of radioactive material. Is there a license? (DOE)	
		2. Is there a documented Radiation Protection Program (RPP)? (10 CFR 835.101(a))	
		3. Is the RPP content commensurate with the nature of the activities performed and shall include formal plans and measures for applying the ALARA process to occupational exposures? (835.101(c))	
		4. Does the RPP specify the existing and/or anticipated operational tasks that are intended to be within the scope of the RPP? (835.101(d))	
		5. If the RPP was updated, was a revision submitted to DOE? (835.101(g))	
<b>Internal Audits</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Are the audits of the Radiation Protection Program every 36 months? (835.102)	
<b>Radiation Protection Program Management Qualifications</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Do the individuals responsible for developing, implementing, and compliance with the requirements have the appropriate education, training, and skills? (835.103)	
<b>Procedures</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Are there written procedures developed that are consistent with the ability of the individuals exposed to the hazards? (835.104)	
<b>Occupational Dose Limits</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Are the annual limits to the occupational workers: <ul style="list-style-type: none"> <li>a. 5 rem TEDE/yr (835.201(a)(1))</li> <li>b. 50 rem/yr to internal organs except the eye (835.201(a)(2))</li> <li>c. 15 rem/yr to the eye (835.201(a)(3))</li> <li>d. Shallow dose to the skin of 50 rem/yr? (835.201(a)(4))</li> </ul>	
		2. Is there a means to authorize a Special Planned Exposure? (835.204)	
		3. Is the dose limit to the fetus/embryo 0.1 rem/9 months? (835.206)	
		4. Is the dose limit to minors 0.1 rem/yr? (835.207)	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR DEPARTMENT OF ENERGY PROJECTS**

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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		5. Is the DAC used to calculate internal dose from the inhalation of radioactive material but is this the primary means of determining dose? (835.209)	
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**Surveys and Monitoring** (*Applies if a radioactive material license exists.*)

		1. Is monitoring performed to demonstrate: <ul style="list-style-type: none"> <li>a. Detection of buildup of radioactive material (835.401(a)(4))</li> <li>b. Verify effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure (835.401(a)(5))</li> <li>c. Identify and control potential sources of individual exposure to radiation and/or radioactive material? (835.401(a)(6))</li> </ul>	
		2. Are the instruments and equipment used for monitoring: <ul style="list-style-type: none"> <li>a. Periodically maintained and calibrated on an established frequency (835.401(b)(1))</li> <li>b. Appropriate for the types(s), levels, and energies of the radiation(s) encountered (835.401(b)(2))</li> <li>c. Appropriate for existing environmental conditions (835.401(b)(3))</li> <li>d. Routinely tested for operability? (835.401(b)(4))</li> </ul>	
		3. Is monitoring of individual exposures to external radiation when radiological workers who, under typical conditions, are likely to receive: <ul style="list-style-type: none"> <li>a. An effective dose equivalent to the whole body of 0.1 rem or more in a year, or (835.402(a)(1)(i))</li> <li>b. A shallow dose equivalent to the skin or to any extremity of 5 rem or more in a year, or (835.402(a)(1)(ii))</li> <li>c. A lens of the eye dose equivalent of 1.5 rem or more in a year? (835.402(a)(1)(iii))</li> </ul>	
		4. Are there declared pregnant workers who are likely to receive from external sources a dose equivalent to the embryo/fetus in excess of 10 percent of the limit of 0.5 rem? (835.402(a)(2))	
		5. Are there occupationally exposed minors likely to receive a dose in excess of 50 percent of the limit of 0.1 rem in a year? (835.402(a)(3))	
		6. Are there individuals entering a high or very high radiation area? (835.402(1)(5))	
		7. Is monitoring of airborne radioactivity performed when: <ul style="list-style-type: none"> <li>a. An individual is likely to receive an exposure of 10 or DAC-hrs in a year (835.403(a)(1))</li> <li>b. As necessary to characterize the airborne radioactivity hazard where respiratory protective devices have been prescribed? (835.403(a)(2))</li> </ul>	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		8. Is real-time air monitoring is performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of the insult? (835.403(b))	
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**Access Control to Radiological Areas** (*Applies if a radioactive material license exists.*)

		1. Is there a means for personnel entry control using one or more of the following: a. Signs and barricades (835.501(c)(1)) b. Control devices on entrances (835.501(c)(2)) c. Conspicuous visual and/or audible alarms (835.501(c)(3)) d. Locked entrance ways; or (835.501(c)(4)) e. Administrative controls (835.501(c)(5)) f. No control(s) shall be installed at any radiological area exit that would prevent rapid evacuation of personnel under emergency conditions? (835.501(e))	
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		2. Are the following measures implemented for each entry in to a high or very high radiation area? a. The area is monitored as necessary during access to determine the exposure rates to which the individuals are exposed (835.502(a)(1)) b. Each individual is monitored by a supplemental dosimetry device or other means capable of providing an immediate estimate of the individual's integrated deep dose? (835.502(a)(2))	
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		3. Are one or more of the following features used for each entrance or access point to a high radiation area: a. A control device that prevents entry to the area when high radiation levels exist or upon entry causes the radiation level to be reduced below that level defining a HRA (835.502(b)(1)) b. A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area (835.502(b)(2)) c. A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry (835.502(b)(3)) d. Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained (835.502(b)(4)) e. Continuous direct or electronic surveillance that is capable of preventing unauthorized entry (835.502(b)(5)) f. A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source? (835.502(b)(6))	
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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		4. In addition to the above requirements, are additional measures implemented to ensure individuals are not able to gain unauthorized or inadvertent access to very high radiation areas? (835.502(c))	
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**Posting and Labeling** (*Applies if a radioactive material license exists.*)

		1. Are the postings and labels include the standard radiation warning trefoil in black or magenta imposed upon a yellow background? (835.601(a))	
		2. Are the access points to a controlled area posed whenever radiological areas or radioactive material areas exist where the total effective dose equivalent is not more than 0.1 rem in a year? (835.602(a))	
		3. Is each access point to radiological areas and radioactive material areas posted with signs bearing the following wording: a. Radiation area (835.603(a)) b. High radiation area (835.603(b)) c. Very high radiation area (835.603(c)) d. Airborne radioactivity area (835.603(d)) e. Contamination area (835.603(e)) f. High contamination area (835.603(f)) g. Radioactive material area? (835.603(g))	
		4. Are areas excepted from the posting requirements for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures? (835.604(a))	

**Respiratory Protection and Controls to Restrict Internal Exposures** (*Applies if a radioactive material license exists.*)

		1. Is there air monitoring as necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides have been prescribed? (835.403(a)(2))	
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**Radiological Records** (*Applies if a radioactive material license exists.*)

		1. Are there records documenting doses received by all individuals for whom monitoring was required? (835.702(a))	
		2. Are the results of individual external and internal dose monitoring that is performed, but not required, recorded? (835.702(b))	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR DEPARTMENT OF ENERGY PROJECTS**

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p>3. Are the following results of monitoring for radiation and radioactive material documented:</p> <ul style="list-style-type: none"> <li>a. Results from monitoring entries into high and very high radiation areas and contamination and high contamination areas; (835.703(a))</li> <li>b. Results of monitoring used to determine individual occupational dose from external and internal sources; (835.703(b))</li> <li>c. Results of monitoring for the release and control of material and equipment; and (835.703(c))</li> <li>d. Results of maintenance and calibration performed on survey and monitoring instruments and equipment? (835.703(d))</li> </ul>	
	<p>4. Are training records maintained to show:</p> <ul style="list-style-type: none"> <li>a. Radiation safety training (835.704(a))</li> <li>b. Actions taken to maintain occupational exposure ALARA (835.704(b))</li> <li>c. Documentation of the results of internal audits and other reviews of program content and implementation (835.704(c))</li> <li>d. Written declarations of pregnancy (835.704(d))</li> <li>e. Changes in equipment, techniques, and procedure used for monitoring (835.704(e))</li> <li>f. As necessary to demonstrate compliance with the requirements for sealed radioactive source control, inventory, and source leak tests? (835.704(f))</li> </ul>	

**Reports to Individuals and Licensor** (*Applies if a radioactive material license exists.*)

	<p>1. Is a report to individuals concerning their radiation exposure being reported when:</p> <ul style="list-style-type: none"> <li>a. Is reported in writing and includes the DOE site or facility name, the individuals name, SS number, employee number, or other unique identification number (835.801(a))</li> <li>b. Upon request of the individual terminating employment (835.801(b))</li> <li>c. Annually (835.801(c))</li> <li>d. Upon request (835.801(d))</li> <li>e. When a DOE contractor is required to report to the DOE for occurrence reporting and processing? (835.801(e))</li> </ul>	
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**Sealed Radioactive Source Control** (*Applies if a radioactive material license exists.*)

	<p>1. Is there a program for control of sealed radioactive sources that are used, handled, and stored? (835.1201)</p>	
	<p>2. Is each accountable sealed source inventoried at intervals not to exceed six months and the inventory contains:</p> <ul style="list-style-type: none"> <li>a. Physical location of each accountable sealed radioactive source (835.1302(a)(1))</li> <li>b. Verify the presence and adequacy of associated postings and labels(835.1302(a)(2))</li> <li>c. Establish the adequacy of storage locations, containers, and devices? (835.1302(a)(3))</li> </ul>	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR DEPARTMENT OF ENERGY PROJECTS**

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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

**Radiological Criteria for License Termination** *(Applies if a radioactive material license exists.)*

**Radiation Safety Training or Instruction to Workers** *(Applies if a radioactive material license exists.)*

		1. Does each individual complete radiation safety training on the topics in 835.901(c) commensurate with the hazards in the areas and the required controls? (835.901(a))	
		2. Is this training completed before being permitted unescorted access and before receiving occupational dose? (835.901(b)(1-2))	
		3. Does each individual demonstrate knowledge of the radiation safety training topics in 835.901(c) commensurate with the hazards in the area and required controls, by successful completion of an examination and performance demonstration? (835.901(b))	
		4. Does the Radiation safety training include the following topics, to the extent appropriate to each individual's prior training, work assignments, and degree of exposure to potential radiological hazards: <ul style="list-style-type: none"> <li>a. Risks of exposure to radiation and radioactive materials, including prenatal radiation exposure; (835.901(c)(1))</li> <li>b. Basic radiological fundamentals and radiation protection concepts; (835.901(c)(2))</li> <li>c. Physical design features, administrative controls, limits, policies, procedures, alarms, and other measures implemented at the facility to manage doses and maintain doses ALARA, including both routine and emergency actions; (835.901(c)(3))</li> <li>d. Individual rights and responsibilities as related to implementation of the facility radiation protection program; (835.901(c)(4))</li> <li>e. Individual responsibilities for implementing ALARA measures required by 835.101, and; (835.901(c)(5))</li> <li>f. Individual exposure reports that may be requested? (835.901(c)(6))</li> </ul>	

**Design and Control** *(Applies if a radioactive material license exists.)*

		1. Are measures taken to maintain radiation exposure in controlled areas ALARA through physical design features and administrative control as as supplementary method? (835.1001(a))	
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**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR DEPARTMENT OF ENERGY PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p>2. During the design of new facilities or modification of existing facilities, are the following objectives adopted:</p> <ul style="list-style-type: none"> <li>a. Optimization methods are used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls (835.1002(a))</li> <li>b. The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy are maintained at exposure levels below an average of 0.5 mrem per hour and far below this average as possible (835.1002(b))</li> <li>c. The design objective for the control of airborne radioactive material is under normal conditions, to avoid releases to the workplace atmosphere and in any situation to ALARA levels; confinement and ventilation is normally used; (835.1002(c))</li> <li>d. The design or modification and the selection of materials includes features that facilitate operations, maintenance, decontamination, and decommissioning? (835.1002(d))</li> </ul>	
		<p>3. Does the licensee, during routine operations, use the combination of physical design features and administrative control provided that:</p> <ul style="list-style-type: none"> <li>a. The anticipated occupational dose to general employees does not exceed 835.202 limits, and (835.1003(a))</li> <li>b. The ALARA process is utilized for personnel exposure to ionizing radiation? (835.1003(b))</li> </ul>	

**Radioactive Contamination Control** (*Applies if a radioactive material license exists.*)

		<p>1. Are there means to release material and equipment in contamination areas, high contamination areas, and airborne radioactivity areas to a controlled area, if:</p> <ul style="list-style-type: none"> <li>a. Removable surface contamination levels on accessible surfaces exceed the removable surface contamination levels specified; (835.1101(a)(1))</li> <li>b. Prior use suggests that the removable surface contamination levels on inaccessible surfaces are likely to exceed the removable contamination levels specified? (835.1101(a)(2))</li> </ul>	
		<p>2. Is there a means for material and equipment exceeding the removable surface contamination values specified, to be conditionally release for movement on-site from one radiological area for immediate placement in another radiological area only if appropriate monitoring is performed and appropriate controls for the movement are established and exercised? (835.1101(b))</p>	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
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*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		3. Is there a means for material and equipment with fixed contamination levels that exceed the total contamination values specified, to be released for use in controlled areas outside of radiological areas only under the following conditions: a. Removable surface contamination levels are below the removable surface contamination values specified; and (835.11019(c)(1)) b. The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contamination status? (835.1101(c)(2))	
		4. Does the licensee maintain and verify appropriate controls which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions? (835.1102(a))	
		5. Are areas accessible to individuals where the measured total surface contamination levels are less than, corresponding surface contamination values specified, controlled as follows when located outside of radiological areas: a. The area is routinely monitored; (835.1102(c)(1)) b. The area is conspicuously marked to warn individuals of the contaminated status? (835.1102(c)(2))	
		6. Are individuals exiting contamination, high contamination, or airborne radioactivity areas be monitored, as appropriate, for surface contamination? (835.1102(d))	
		7. Do individuals entering areas in which removable contamination exists at levels exceeding the removable surface contamination values specified, wear protective clothing? (835.1102(e))	

**-- End of Checklist --**

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR NRC/AGREEMENT STATE PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

*This checklist applies to projects where radioactive material and/or types of radiation are present.*

<b>Determination of License Type</b>			
		1. NRC/Agreement State requires that persons/company conducting work with radioactive material be licensed for specific amounts and types of radioactive material. Is there a license? (NRC/Agreement State)	
		2. Is there a documented Radiation Protection Program? (10 CFR 20.1101(a))	
		3. Does the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA? (20.1101(b))	
<b>Internal Audits</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Is an audit of the radiation protection program occurring at least annually and reviewing the content and implementation? (20.101(c))	
<b>Procedures</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Does the licensee use, to the extent practical, procedures based upon sound radiation protection principles to minimize exposure to radiation and radioactive material? (19.12(a)(3))	
<b>Occupational Dose Limits</b> ( <i>Applies if a radioactive material license exists.</i> )			
		1. Are the annual limits to the occupational workers: <ul style="list-style-type: none"> <li>a. 5 rem TEDE/yr (20.1201(a)(1)(i))</li> <li>b. 50 rem/yr to internal organs except the eye (20.1201(a)(1)(ii))</li> <li>c. 15 rem/yr to the eye (20.1201(a)(2)(i))</li> <li>d. Shallow dose to the skin of 50 rem/yr? (20.1201(a)(2)(ii))</li> </ul>	
		2. Is there a means to authorize a Special Planned Exposure? (20.1206)	
		3. Is the dose limit to the fetus/embryo 0.1 rem/9 months? (20.1208)	
		4. Is the dose limit to minors 0.5 rem/yr? (20.1207)	
		5. Is the ALI used to calculate internal dose from the inhalation of radioactive material and is this the primary means of determining dose? (20.1203, 1204)	
<b>Surveys and Monitoring</b> ( <i>Applies if a radioactive material license exists.</i> )			

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR NRC/AGREEMENT STATE PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p>1. Is monitoring performed to demonstrate:</p> <ul style="list-style-type: none"> <li>a. Compliance with the regulations of the part (20.1501(a)(1))</li> <li>b. Evaluate the magnitude and extent of radiation levels (20.1501(a)(2)(i))</li> <li>c. Concentrations or quantities of radioactive material (20.1501(a)(2)(ii))</li> <li>d. The potential radiological hazards? (20.1501(a)(2)(iii))</li> </ul>	
	<p>2. Does the licensee ensure that the instruments and equipment used for quantitative radiation measurements are calibrated periodically for the radiation measured? (20.1501(b))</p>	
	<p>3. Does the licensee ensure that all personnel dosimeters that require processing to determine the radiation dose must be processed and evaluated by a dosimetry processor that:</p> <ul style="list-style-type: none"> <li>a. Holds a current personnel dosimetry accreditation from the National voluntary Laboratory Accreditation Program (20.1501(c)(1))</li> <li>b. Is approved in the accreditation process for the type of radiations included in the NVLAP program and closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored? (20.1501(c)(2))</li> </ul>	
	<p>4. Is monitoring of individual exposures to external radiation when radiological workers who, under typical conditions, are likely to receive:</p> <ul style="list-style-type: none"> <li>a. In 1 year, in excess of 10% of the annual limit of 5 rem (20.1502(a)(1))</li> <li>b. Minors in 1 year, in excess of 0.1 rem, 0.15 rem to the lens of the eye, or a shallow dose to the skin in excess of 0.5 rem (20.1502(a)(2))</li> <li>c. Declared pregnant women during the entire pregnancy in excess of 0.1 rem (20.1502(a)(3))</li> <li>d. Individuals entering a high or very high radiation area? (20.1502(a)(4))</li> </ul>	
	<p>5. Is monitoring the occupational intake of radioactive material occurring by and assess the committed effective dose equivalent to:</p> <ul style="list-style-type: none"> <li>a. Adults likely to receive, in 1 year, a committed effective dose equivalent in excess of 10% of Appendix B (20.1502(b)(1))</li> <li>b. Minors likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.1rem (20.1502(b)(2))</li> <li>c. Declared pregnant women likely to receive, during e entire pregnancy, a committed effective dose equivalent in excess of 0.1 rem? (20.1502(b)(3))</li> </ul>	

**Access Control to Radiological Areas** (*Applies if a radioactive material license exists.*)

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION  
FOR NRC/AGREEMENT STATE PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		1. Is there a means for personnel entry control to a high radiation area using one or more of the following features <ul style="list-style-type: none"> <li>a. A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which and individual might receive a deep-dose equivalent of 0.1 rem in 1 hour at 30 cm. from the radiation source or from any surface that the radiation penetrates (20.1601(a)(1))</li> <li>b. A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry (20.1601(a)(2))</li> <li>c. Entry ways that are locked, except during periods when access to the areas is required, with positive control over each individual entry (20.1601(a)(3))</li> <li>d. In place of the controls required by paragraph (a) of this section for a high radiation area, the licensee may substitute continuous direct electronic surveillance that is capable of preventing unauthorized entry? (20.1601(b))</li> </ul>	
		2. Does the licensee establish controls in a way that do not prevent individuals from leaving a high radiation area? (20.1601(d))	
		3. In addition to the above requirements, is the licensee instituting additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates? (20.1602)	

**Posting and Labeling** (*Applies if a radioactive material license exists.*)

		a. Is there the standard radiation symbol (trefoil) with the colors magenta, purple, or black on yellow background? (20.1902(a)(1-2))	
		b. Is each of the following areas posted with signs bearing the following wording: <ul style="list-style-type: none"> <li>a. Caution, Radiation area (20.1902(a))</li> <li>b. Caution, High radiation area (20.1902(b))</li> <li>c. Grave Danger, Very high radiation area (20.1902(c))</li> <li>d. Caution, Airborne radioactivity area (20.1902(d))</li> <li>e. Caution, Radioactive material(s)? (20.1902(e))</li> </ul>	

**Respiratory Protection and Controls to Restrict Internal Exposures** (*Applies if a radioactive material license exists.*)

		1. Has the licensee used to the extent practical process or other engineering controls to control the concentration of radioactive material in air? (20.1701)	
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			<p>2. Does the licensee increase monitoring and limit intakes by one or more of the following means if engineering and process controls are not practical to control the concentrations of radioactive material in the air to values below those that define an airborne radioactivity area:</p> <ul style="list-style-type: none"> <li>a. Control of access; (20.1702(a)(1))</li> <li>b. Limitation of exposure times; (20.1702(a)(2))</li> <li>c. Use of respiratory protection equipment; or (20.1702(a)(3))</li> <li>d. Other controls? (20.1702(a)(4))</li> </ul>	
			<p>3. If the licensee performs an ALARA analysis to determine whether or not respirators should be used, does the licensee consider safety factors other than radiological factors? Does the licensee also consider the impact of respirator use on workers' industrial health and safety? (20.1702(b))</p>	
			<p>4. If the licensee assigns or permits the use of respiratory protection equipment to limit the intake of radioactive materials, does the licensee use only respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health (NIOSH) or has the licensee submitted an application to the NRC for authorized use of this equipment except as provided in this part? (20.1703(a-b))</p>	



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		<p>8. Does the licensee implement and maintain a respiratory protection program that includes:</p> <ul style="list-style-type: none"> <li>a. The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other conditions that might require such relief. (20.1703(d))</li> <li>b. The licensee shall also consider limitations appropriate to the type and mode of use. (20.1703(e))</li> <li>c. Standby rescue persons are required under prescribed situations. (20.1703(f))</li> <li>d. Atmosphere-supplying respirators must be supplied with respirable air of grade D quality or better air. (20.1703(g))</li> <li>e. The licensee shall ensure that no objects, materials or substances, such as facial hair, or any conditions that interfere with the face-facepiece seal or valve function, and that are under the control of the respirator wearer, are present between the skin of the wearer's face and the sealing surface of a tight-fitting respirator facepiece. (20.1703(h))</li> <li>f. In estimating the dose to individuals from intake of airborne radioactive materials, the concentration of radioactive material in the air that is inhaled when respirators are worn is initially assumed to be the ambient concentration in air without respiratory protection, divided by the assigned protection factor? (20.1703(i))</li> </ul>	
		<p>9. Does the licensee have additional restrictions such as:</p> <ul style="list-style-type: none"> <li>a. Ensuring that the respiratory protection program is adequate to limit doses to individuals from airborne radioactive materials consistent with ALARA, (20.1704(a))</li> <li>b. Limiting the extent to which the use of respiratory protection equipment instead of process or other engineering controls? (20.1704(a))</li> </ul>	

**Radiological Records** (*Applies if a radioactive material license exists.*)

		<p>1. Has the licensee maintained records of the radiation protection program including;</p> <ul style="list-style-type: none"> <li>a. Provisions of the program (20.2102(a)(1))</li> <li>b. Audits and other reviews of program content and implementation? (20.2102(a)(2))</li> </ul>	
		<p>2. Is the licensee maintaining records showing the results of surveys and calibrations? (20.2103(a))</p>	

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	<p>3. Is the licensee retaining the following records until the Commission terminates the license:</p> <ul style="list-style-type: none"> <li>a. Results of surveys to determine the dose from external sources and used, in the absence of combination with individual monitoring data, in the assessment of individual dose equivalents. (20.2103(b)(1))</li> <li>b. Results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose. (20.2103(b)(2))</li> <li>c. Results of air sampling, surveys, and bioassays. This includes those records showing the results of air sampling, surveys, and bioassays; and (20.2103(b)(3))</li> <li>d. The results of measurements and calculations used to evaluate the release of radioactive effluents to the environment? (20.2103(b)(4))</li> </ul>	
	<p>4. Is the licensee for each individual who is likely to receive in a year, an occupational dose requiring monitoring:</p> <ul style="list-style-type: none"> <li>a. Determining the occupational radiation dose received during the current year, (20.2104(a)(1))</li> <li>b. Attempting to obtain the records of cumulative occupational radiation dose? (20.2104(a)(2))</li> </ul>	
	<p>5. Does the licensee maintain records that describe special planned exposure use;</p> <ul style="list-style-type: none"> <li>a. The exceptional circumstances requiring the use of a planned special exposure, (20.2105(a)(1))</li> <li>b. The name of the management official who authorized the planned special exposure and a copy of the signed authorization, and when necessary (20.2105(a)(2))</li> <li>c. What action were necessary (20.2105(a)(3))</li> <li>d. Why the actions were necessary (20.2105(a)(4))</li> <li>e. How doses were maintained ALARA, and (20.2105(a)(5))</li> <li>f. What individual and collective doses were expected to result and actual doses received? (20.2105(a)(6))</li> </ul>	
	<p>6. Does the licensee maintain records of individual monitoring results? (20.2106(a))</p>	
	<p>7. Does the licensee maintain records of dose to individual members of the public? (20.2107)</p>	
	<p>8. Does the licensee maintain records of disposal of licensed materials? (20.2108)</p>	

**Reports to Individuals and Licensor** (*Applies if a radioactive material license exists.*)

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		9. Does the licensee report the following to the licensor: a. Reports of theft or loss of licensed material (20.2201) b. Notification of incidents (20.2202) c. Reports of exposure, radiation levels, and concentrations of radioactive material exceeding the limits (20.2203) d. Reports of special planned exposures (20.2204) e. Reports to individuals of exceeding dose limits, and (20.2205) f. An annual report of the individual monitoring results? (20.2206)	
		10. Is a written report, include appropriate identifying data, name of the individual, the individual's SS number, the exposure information, and a statement to individuals concerning their radiation exposure being reported when: a. Annually (19.13(b)) b. Upon request of a worker formally employed (19.13(c)) c. Upon request of the individual terminating employment? (19.13(e))	

**Sealed Radioactive Source Control** (*Applies if a radioactive material license exists.*)

		1. Does the licensee label and post the licensed material and the rooms that the material is used or stored? (20.1902, Appendix C)	
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**Radiological Criteria for License Termination** (*Applies if a radioactive material license exists.*)

		1. If the licensee wants to terminate the license, has the licensee decontaminated the site, calculated the peak annual TEDE to an average member of the critical group by using 1000 years after decontamination? (20.1401(d))	
		2. In order to allow unrestricted use, has the licensee calculated that the highest annual TEDE is 25 mrem per year or less to the average member of the critical group? (20.1402)	



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	<p>1. Are all individuals who in the course of employment that are likely to receive in a year an occupational dose in excess of 100 mrem the following information:</p> <ul style="list-style-type: none"> <li>a. Kept informed of the storage, transfer, or use of radiation and/or radioactive material; (19.12(a)(1))</li> <li>b. Instructed in the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed; (19.12(a)(2))</li> <li>c. Instructed in, and required to observe, to the extent within the workers control, the applicable provisions of Commission regulations and licenses for the protection of personnel from exposure to radiation and/or radioactive material; (19.12(a)(3))</li> <li>d. Instructed of their responsibility to report promptly to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation and/or radioactive material; (19.12(a)(4))</li> <li>e. Instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation and/or radioactive material; and (19.12(a)(5))</li> <li>f. Advised as to the radiation exposure reports which workers may request pursuant to § 19.13. (19.12(a)(6))</li> </ul>	
	<p>2. Does the licensee, in determining those individuals subject to the requirements of paragraph (a) of this section take into consideration assigned activities during normal and abnormal situations involving exposure to radiation and/or radioactive material which can reasonably be expected to occur during the life of a licensed facility? Is the extent of these instructions must be commensurate with potential radiological health protection problems present in the work place? (19.12(b))</p>	

**Design and Control** (*Applies if a radioactive material license exists.*)

	<p>1. Does the licensee describe in the application (or radiation protection program) how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste? (20.1406)</p>	
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**-- End of Checklist --**

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*This checklist applies to projects where radioactive material and/or types of radiation are present.*

<b>Determination of License Type</b>			
		1. <b>License.</b> DOE/NRC/Agreement State requires that persons/company conducting work with radioactive material be licensed for specific amounts and types of radioactive material. Is there a license? (DOE/NRC/Agreement State regulations)	
		2. Is there a documented Radiation Protection Program (RPP)? (10 CFR 835.101(a))	
		3. Is there a documented Radiation Protection Program? (10 CFR 20.1101(a))	
		4. Is the RPP content commensurate with the nature of the activities performed and shall include formal plans and measures for applying the ALARA process to occupational exposures? (835.101(c))	
		5. Does the NRC/Agreement State licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA? (20.1101(b))	
		6. Does the RPP specify the existing and/or anticipated operational tasks that are intended to be within the scope of the RPP? (835.101(d))	
		7. If the RPP was updated, was a revision submitted to DOE? (835.101(g))	
<b>Internal Audits (Applies if a radioactive material license exists.)</b>			
		8. <b>1.</b> If a DOE licensee, are the audits of the Radiation Protection Program every 36 months? (835.102)	
		9. <b>2.</b> If a NRC/Agreement State licensee, is an audit of the radiation protection program occurring at least annually and reviewing the content and implementation? (20.101(c))	
<b>Radiation Protection Program Management Qualifications (Applies if a radioactive material license exists.)</b>			
		10. If a DOE licensee, do the individuals responsible for developing, implementing, and compliance with the requirements have the appropriate education, training, and skills? (835.103)	
<b>Procedures (Applies if a radioactive material license exists.)</b>			
		1. If a DOE licensee, are there written procedures developed that are consistent with the ability of the individuals exposed to the hazards? (835.104)	

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		2. Does the NRC/Agreement State licensee use, to the extent practical, procedures based upon sound radiation protection principles to minimize exposure to radiation and radioactive material? (19.12(a)(3))	
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**Occupational Dose Limits** (*Applies if a radioactive material license exists.*)

		11. If a DOE licensee, are the annual limits to the occupational workers: a. 5 rem TEDE/yr (835.201(a)(1)) b. 50 rem/yr to internal organs except the eye (835.201(a)(2)) c. 15 rem/yr to the eye (835.201(a)(3)) d. Shallow dose to the skin of 50 rem/yr? (835.201(a)(4))	
		12. If a NRC/Agreement State licensee, are the annual limits to the occupational workers: a. 5 rem TEDE/yr (20.1201(a)(1)(i)) b. 50 rem/yr to internal organs except the eye (20.1201(a)(1)(ii)) c. 15 rem/yr to the eye (20.1201(a)(2)(i)) d. Shallow dose to the skin of 50 rem/yr? (20.1201(a)(2)(ii))	
		13. Is there a means to authorize a Special Planned Exposure? (835.204) or (20.1206)	
		14. Is the dose limit to the fetus/embryo 0.1 rem/9 months? (835.206) or (20.1208)	
		15. If a DOE licensee, is the dose limit to minors 0.1 rem/yr? (835.207)	
		16. If a NRC/Agreement State licensee, is the dose limit to minors 0.5 rem/yr? (20.1207)	
		17. If a DOE licensee, is the DAC used to calculate internal dose from the inhalation of radioactive material but is this the primary means of determining dose? (835.209)	
		18. If a NRC/Agreement State licensee, is the ALI used to calculate internal dose from the inhalation of radioactive material and is this the primary means of determining dose? (20.1203, 1204)	

**Surveys and Monitoring** (*Applies if a radioactive material license exists.*)

		19. If a DOE licensee, is monitoring performed to demonstrate: a. Detection of buildup of radioactive material (835.401(a)(4)) b. Verify effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure (835.401(a)(5)) c. Identify and control potential sources of individual exposure to radiation and/or radioactive material? (835.401(a)(6))	
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	<p>20. Are the instruments and equipment used for monitoring:</p> <ul style="list-style-type: none"> <li>a. Periodically maintained and calibrated on an established frequency (835.401(b)(1))</li> <li>b. Appropriate for the types(s), levels, and energies of the radiation(s) encountered (835.401(b)(2))</li> <li>c. Appropriate for existing environmental conditions (835.401(b)(3))</li> <li>d. Routinely tested for operability? (835.401(b)(4))</li> </ul>	
	<p>21. If a NRC/Agreement State licensee, is monitoring performed to demonstrate:</p> <ul style="list-style-type: none"> <li>a. Compliance with the regulations of the part (20.1501(a)(1))</li> <li>b. Evaluate the magnitude and extent of radiation levels (20.1501(a)(2)(i))</li> <li>c. Concentrations or quantities of radioactive material (20.1501(a)(2)(ii))</li> <li>d. The potential radiological hazards? (20.1501(a)(2)(iii))</li> </ul>	
	<p>22. Does the licensee ensure that the instruments and equipment used for quantitative radiation measurements are calibrated periodically for the radiation measured? (20.1501(b))</p>	
	<p>23. Does the licensee ensure that all personnel dosimeters that require processing to determine the radiation dose must be processed and evaluated by a dosimetry processor that:</p> <ul style="list-style-type: none"> <li>a. Holds a current personnel dosimetry accreditation from the National voluntary Laboratory Accreditation Program (20.1501(c)(1))</li> <li>b. Is approved in the accreditation process for the type of radiations included in the NVLAP program and closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored? (20.1501(c)(2))</li> </ul>	
	<p>24. If a DOE licensee, is monitoring of individual exposures to external radiation when radiological workers who, under typical conditions, are likely to receive:</p> <ul style="list-style-type: none"> <li>a. An effective dose equivalent to the whole body of 0.1 rem or more in a year, or (835.402(a)(1)(i))</li> <li>b. A shallow dose equivalent to the skin or to any extremity of 5 rem or more in a year, or (835.402(a)(1)(ii))</li> <li>c. A lens of the eye dose equivalent of 1.5 rem or more in a year? (835.402(a)(1)(iii))</li> </ul>	
	<p>25. Are there declared pregnant workers who are likely to receive from external sources a dose equivalent to the embryo/fetus in excess of 10 percent of the limit of 0.5 rem? (835.402(a)(2))</p>	
	<p>26. Are there occupationally exposed minors likely to receive a dose in excess of 50 percent of the limit of 0.1 rem in a year? (835.402(a)(3))</p>	

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		27. Are there individuals entering a high or very high radiation area? (835.402(1)(5))	
		28. Is monitoring of airborne radioactivity performed when: <ul style="list-style-type: none"> <li>a. An individual is likely to receive an exposure of 10 or DAC-hrs in a year (835.403(a)(1))</li> <li>b. As necessary to characterize the airborne radioactivity hazard where respiratory protective devices have been prescribed? (835.403(a)(2))</li> </ul>	
		29. Is real-time air monitoring is performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of the insult? (835.403(b))	
		30. If a NRC/Agreement State licensee, is monitoring of individual exposures to external radiation when radiological workers who, under typical conditions, are likely to receive: <ul style="list-style-type: none"> <li>a. In 1 year, in excess of 10% of the annual limit of 5 rem (20.1502(a)(1))</li> <li>b. Minors in 1 year, in excess of 0.1 rem, 0.15 rem to the lens of the eye, or a shallow dose to the skin in excess of 0.5 rem (20.1502(a)(2))</li> <li>c. Declared pregnant women during the entire pregnancy in excess of 0.1 rem (20.1502(a)(3))</li> <li>d. Individuals entering a high or very high radiation area? (20.1502(a)(4))</li> </ul>	
		31. Is monitoring the occupational intake of radioactive material occurring by and assess the committed effective dose equivalent to: <ul style="list-style-type: none"> <li>a. Adults likely to receive, in 1 year, a committed effective dose equivalent in excess of 10% of Appendix B (20.1502(b)(1))</li> <li>b. Minors likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.1rem (20.1502(b)(2))</li> <li>c. Declared pregnant women likely to receive, during e entire pregnancy, a committed effective dose equivalent in excess of 0.1 rem? (20.1502(b)(3))</li> </ul>	

**Access Control to Radiological Areas** (*Applies if a radioactive material license exists.*)

		32. If a DOE licensee, is there a means for personnel entry control using one or more of the following: <ul style="list-style-type: none"> <li>a. Signs and barricades (835.501(c)(1))</li> <li>b. Control devices on entrances (835.501(c)(2))</li> <li>c. Conspicuous visual and/or audible alarms (835.501(c)(3))</li> <li>d. Locked entrance ways; or (835.501(c)(4))</li> <li>e. Administrative controls (835.501(c)(5))</li> <li>f. No control(s) shall be installed at any radiological area exit that would prevent rapid evacuation of personnel under emergency conditions? (835.501(e))</li> </ul>	
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	<p>33. If a DOE licensee, are the following measures implemented for each entry in to a high or very high radiation area?</p> <ul style="list-style-type: none"> <li>a. The area is monitored as necessary during access to determine the exposure rates to which the individuals are exposed (835.502(a)(1))</li> <li>b. Each individual is monitored by a supplemental dosimetry device or other means capable of providing an immediate estimate of the individual's integrated deep dose? (835.502(a)(2))</li> </ul>	
	<p>34. Are one or more of the following features used for each entrance or access point to a high radiation area:</p> <ul style="list-style-type: none"> <li>a. A control device that prevents entry to the area when high radiation levels exist or upon entry causes the radiation level to be reduced below that level defining a HRA (835.502(b)(1))</li> <li>b. A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area (835.502(b)(2))</li> <li>c. A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry (835.502(b)(3))</li> <li>d. Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained (835.502(b)(4))</li> <li>e. Continuous direct or electronic surveillance that is capable of preventing unauthorized entry (835.502(b)(5))</li> <li>f. A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source? (835.502(b)(6))</li> </ul>	
	<p>35. In addition to the above requirements, are additional measures implemented to ensure individuals are not able to gain unauthorized or inadvertent access to very high radiation areas? (835.502(c))</p>	

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		36. If a NRC/Agreement State licensee, is there a means for personnel entry control to a high radiation area using one or more of the following features a. A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which and individual might receive a deep-dose equivalent of 0.1 rem in 1 hour at 30 cm. from the radiation source or from any surface that the radiation penetrates (20.1601(a)(1)) b. A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry (20.1601(a)(2)) c. Entry ways that are locked, except during periods when access to the areas is required, with positive control over each individual entry (20.1601(a)(3)) d. In place of the controls required my paragraph (a) of this section for a high radiation area, the licensee may substitute continuous director electronic surveillance that is capable of preventing unauthorized entry? (20.1601(b))	
		37. Does the licensee establish controls in a way that do not prevent individuals from leaving a high radiation area? (20.1601(d))	
		38. In addition to the above requirements, is the licensee instituting additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates? (20.1602)	

**Posting and Labeling** (*Applies if a radioactive material license exists.*)

		39. If a DOE licensee, are the postings and labels include the standard radiation warning trefoil in black or magenta imposed upon a yellow background? (835.601(a))	
		40. Are the access points to a controlled area posed whenever radiological areas or radioactive material areas exist where the total effective dose equivalent is not more than 0.1 rem in a year? (835.602(a))	
		41. Is each access point to radiological areas and radioactive material areas posted with signs bearing the following wording: a. Radiation area (835.603(a)) b. High radiation area (835.603(b)) c. Very high radiation area (835.603(c)) d. Airborne radioactivity area (835.603(d)) e. Contamination area (835.603(e)) f. High contamination area (835.603(f)) g. Radioactive material area? (835.603(g))	
		42. Are areas excepted from the posting requirements for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures? (835.604(a))	

PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		43. If a NRC/Agreement State licensee, is there the standard radiation symbol (trefoil) with the colors magenta, purple, or black on yellow background? (20.1902(a)(1-2))	
		44. Is each of the following areas posted with signs bearing the following wording: a. Caution, Radiation area (20.1902(a)) b. Caution, High radiation area (20.1902(b)) c. Grave Danger, Very high radiation area (20.1902(c)) d. Caution, Airborne radioactivity area (20.1902(d)) e. Caution, Radioactive material(s)? (20.1902(e))	

**Respiratory Protection and Controls to Restrict Internal Exposures** (*Applies if a radioactive material license exists.*)

		45. If a DOE licensee, is there air monitoring as necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides have been prescribed? (835.403(a)(2))	
		46. If a NRC/Agreement State licensee, has the licensee used to the extent practical process or other engineering controls to control the concentration of radioactive material in air? (20.1701)	
		47. Does the NRC/Agreement State licensee if engineering and process controls are not practical to control the concentrations of radioactive material in the air to values below those that define an airborne radioactivity area, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by one or more of the following means; a. Control of access; (20.1702(a)(1)) b. Limitation of exposure times; (20.1702(a)(2)) c. Use of respiratory protection equipment; or (20.1702(a)(3)) d. Other controls? (20.1702(a)(4))	
		48. If the licensee performs an ALARA analysis to determine whether or not respirators should be used, does the licensee consider safety factors other than radiological factors? Does the licensee also consider the impact of respirator use on workers' industrial health and safety? (20.1702(b))	
		49. If the licensee assigns or permits the use of respiratory protection equipment to limit the intake of radioactive materials, does the licensee use only respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health (NIOSH) or has the licensee submitted an application to the NRC for authorized use of this equipment except as provided in this part? (20.1703(a-b))	

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p>50. Does the licensee implement and maintain a respiratory protection program that includes:</p> <ul style="list-style-type: none"> <li>a. Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate doses; (20.1703(c)(1))</li> <li>b. Surveys and bioassays, as necessary, to evaluate actual intakes; (20.1703(c)(2))</li> <li>c. Testing of respirators for operability (user seal check for face sealing devices and functional check for others) immediately prior to each use; (20.1703(c)(3))</li> <li>d. Testing of respirators for operability (user seal check for face sealing devices and functional check for others) immediately prior to each use; (20.1703(c)(3))</li> <li>e. Written procedures regarding:             <ul style="list-style-type: none"> <li>(i) Monitoring, including air sampling and bioassays;</li> <li>(ii) Supervision and training of respirator users;</li> <li>(iii) Fit testing;</li> <li>(iv) Respirator selection;</li> <li>(v) Breathing air quality;</li> <li>(vi) Inventory and control;</li> <li>(vii) Storage, issuance, maintenance, repair, testing, and quality assurance of respiratory protection equipment;</li> <li>(viii) Recordkeeping; and</li> <li>(ix) Limitations on periods of respirator use and relief from respirator use; (20.1703(c)(4))</li> </ul> </li> <li>f. Determination by a physician that the individual user is medically fit to use respiratory protection equipment:             <ul style="list-style-type: none"> <li>(i) Before the initial fitting of a face sealing respirator;</li> <li>(ii) Before the first field use of non-face sealing respirators, and</li> <li>(iii) Either every 12 months thereafter, or periodically at a frequency determined by a physician. (20.1703(c)(5))</li> </ul> </li> <li>g. Fit testing, with fit factor <math>\geq 10</math> times the APF for negative pressure devices, and a fit factor <math>\geq 500</math> for any positive pressure, continuous flow, and pressure-demand devices, before the first field use of tight fitting, face-sealing respirators and periodically thereafter at a frequency not to exceed 1 year. (20.1703(c)(6))</li> </ul>	
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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p>51. Does the licensee implement and maintain a respiratory protection program that includes:</p> <ul style="list-style-type: none"> <li>a. The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other conditions that might require such relief. (20.1703(d))</li> <li>b. The licensee shall also consider limitations appropriate to the type and mode of use. (20.1703(e))</li> <li>c. Standby rescue persons are required under prescribed situations. (20.1703(f))</li> <li>d. Atmosphere-supplying respirators must be supplied with respirable air of grade D quality or better air. (20.1703(g))</li> <li>e. The licensee shall ensure that no objects, materials or substances, such as facial hair, or any conditions that interfere with the face-facepiece seal or valve function, and that are under the control of the respirator wearer, are present between the skin of the wearer's face and the sealing surface of a tight-fitting respirator facepiece. (20.1703(h))</li> <li>f. In estimating the dose to individuals from intake of airborne radioactive materials, the concentration of radioactive material in the air that is inhaled when respirators are worn is initially assumed to be the ambient concentration in air without respiratory protection, divided by the assigned protection factor? (20.1703(i))</li> </ul>	
		<p>52. Does the licensee have additional restrictions such as:</p> <ul style="list-style-type: none"> <li>a. Ensuring that the respiratory protection program is adequate to limit doses to individuals from airborne radioactive materials consistent with ALARA, (20.1704(a))</li> <li>b. Limiting the extent to which the use of respiratory protection equipment instead of process or other engineering controls? (20.1704(a))</li> </ul>	
<b>Radiological Records</b> ( <i>Applies if a radioactive material license exists.</i> )			
		53. If a DOE licensee, are there records documenting doses received by all individuals for whom monitoring was required? (835.702(a))	
		54. Are the results of individual external and internal dose monitoring that is performed, but not required, recorded? (835.702(b))	

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION**

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	<p>55. Are the following results of monitoring for radiation and radioactive material documented:</p> <ul style="list-style-type: none"> <li>a. Results from monitoring entries into high and very high radiation areas and contamination and high contamination areas; (835.703(a))</li> <li>b. Results of monitoring used to determine individual occupational dose from external and internal sources; (835.703(b))</li> <li>c. Results of monitoring for the release and control of material and equipment; and (835.703(c))</li> <li>d. Results of maintenance and calibration performed on survey and monitoring instruments and equipment? (835.703(d))</li> </ul>	
	<p>56. Are training records maintained to show:</p> <ul style="list-style-type: none"> <li>a. Radiation safety training (835.704(a))</li> <li>b. Actions taken to maintain occupational exposure ALARA (835.704(b))</li> <li>c. Documentation of the results of internal audits and other reviews of program content and implementation (835.704(c))</li> <li>d. Written declarations of pregnancy (835.704(d))</li> <li>e. Changes in equipment, techniques, and procedure used for monitoring (835.704(e))</li> <li>f. As necessary to demonstrate compliance with the requirements for sealed radioactive source control, inventory, and source leak tests? (835.704(f))</li> </ul>	
	<p>57. If a NRC/Agreement State licensee, has the licensee maintained records of the radiation protection program including:</p> <ul style="list-style-type: none"> <li>a. Provisions of the program (20.2102(a)(1))</li> <li>b. Audits and other reviews of program content and implementation? (20.2102(a)(2))</li> </ul>	
	<p>58. Is the licensee maintaining records showing the results of surveys and calibrations? (20.2103(a))</p>	
	<p>59. Is the licensee retaining the following records until the Commission terminates the license:</p> <ul style="list-style-type: none"> <li>a. Results of surveys to determine the dose from external sources and used, in the absence of combination with individual monitoring data, in the assessment of individual dose equivalents. (20.2103(b)(1))</li> <li>b. Results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose. (20.2103(b)(2))</li> <li>c. Results of air sampling, surveys, and bioassays. This includes those records showing the results of air sampling, surveys, and bioassays; and (20.2103(b)(3))</li> <li>d. The results of measurements and calculations used to evaluate the release of radioactive effluents to the environment? (20.2103(b)(4))</li> </ul>	

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	60. Is the licensee for each individual who is likely to receive in a year, an occupational dose requiring monitoring: <ul style="list-style-type: none"> <li>a. Determining the occupational radiation dose received during the current year, (20.2104(a)(1))</li> <li>b. Attempting to obtain the records of cumulative occupational radiation dose? (20.2104(a)(2))</li> </ul>	
	61. Does the licensee maintain records that describe special planned exposure use; <ul style="list-style-type: none"> <li>a. The exceptional circumstances requiring the use of a planned special exposure, (20.2105(a)(1))</li> <li>b. The name of the management official who authorized the planned special exposure and a copy of the signed authorization, and when necessary (20.2105(a)(2))</li> <li>c. What action were necessary (20.2105(a)(3))</li> <li>d. Why the actions were necessary (20.2105(a)(4))</li> <li>e. How doses were maintained ALARA, and (20.2105(a)(5))</li> <li>f. What individual and collective doses were expected to result and actual doses received? (20.2105(a)(6))</li> <li>g.</li> </ul>	
	62. Does the licensee maintain records of individual monitoring results? (20.2106(a))	
	63. Does the licensee maintain records of dose to individual members of the public? (20.2107)	
	64. Does the licensee maintain records of disposal of licensed materials? (20.2108)	

**Reports to Individuals and Licensor** (*Applies if a radioactive material license exists.*)

	65. If a DOE licensee, is a report to individuals concerning their radiation exposure being reported when: <ul style="list-style-type: none"> <li>a. Is reported in writing and includes the DOE site or facility name, the individuals name, SS number, employee number, or other unique identification number (835.801(a))</li> <li>b. Upon request of the individual terminating employment (835.801(b))</li> <li>c. Annually (835.801(c))</li> <li>d. Upon request (835.801(d))</li> <li>e. When a DOE contractor is required to report to the DOE for occurrence reporting and processing? (835.801(e))</li> </ul>	
	66. If a NRC/Agreement State licensee, does the licensee report the following to the licensor: <ul style="list-style-type: none"> <li>a. Reports of theft or loss of licensed material (20.2201)</li> <li>b. Notification of incidents (20.2202)</li> <li>c. Reports of exposure, radiation levels, and concentrations of radioactive material exceeding the limits (20.2203)</li> <li>d. Reports of special planned exposures (20.2204)</li> <li>e. Reports to individuals of exceeding dose limits, and (20.2205)</li> <li>f. An annual report of the individual monitoring results? (20.2206)</li> </ul>	

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Yes	No	N/A	<b>REQUIREMENTS</b>
			<b>COMMENTS/NOTES</b>

		67. If a NRC/Agreement State licensee, is a written report, include appropriate identifying data, name of the individual, the individual's SS number, the exposure information, and a statement to individuals concerning their radiation exposure being reported when: <ul style="list-style-type: none"> <li>a. Annually (19.13(b))</li> <li>b. Upon request of a worker formally employed (19.13(c))</li> <li>c. Upon request of the individual terminating employment? (19.13(e))</li> <li>d.</li> </ul>	
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**Sealed Radioactive Source Control** (*Applies if a radioactive material license exists.*)

		68. If a DOE licensee, is there a program for control of sealed radioactive sources that are used, handled, and stored? (835.1201)	
		69. Is each accountable sealed source inventoried at intervals not to exceed six months and the inventory contains: <ul style="list-style-type: none"> <li>a. Physical location of each accountable sealed radioactive source (835.1302(a)(1))</li> <li>b. Verify the presence and adequacy of associated postings and labels(835.1302(a)(2))</li> <li>c. Establish the adequacy of storage locations, containers, and devices? (835.1302(a)(3))</li> </ul>	
		70. If a NRC/Agreement State licensee, does the licensee label and post the licensed material and the rooms that the material is used or stored? (20.1902, Appendix C)	

**Radiological Criteria for License Termination** (*Applies if a radioactive material license exists.*)

		71. If a NRC/Agreement State licensee and the licensee wants to terminate the license, has the licensee decontaminated the site, calculated the peak annual TEDE to an average member of the critical group by using 1000 years after decontamination? (20.1401(d))	
		72. In order to allow unrestricted use, has the licensee calculated that the highest annual TEDE is 25 mrem per year or less to the average member of the critical group? (20.1402)	

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p>73. In order to allow restricted use, has the licensee:</p> <ul style="list-style-type: none"> <li>a. Demonstrated that further reduction s in residual radioactivity necessary to meet the &lt;25 mrem/yr would result in net public or environmental harm and the residual levels with restricted conditions are ALARA; (20.1403(a))</li> <li>b. The licensee has made provisions for legally enforceable institutional controls that provide reasonable assurance that the radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem per year; (20.1403(b))</li> <li>c. The licensee has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site; (20.1403(c))</li> <li>d. The licensee has submitted a decommissioning plan or License Termination Plan (LTP) to the Commission indicating the licensee's intent to decommission and specifying that the licensee intends to decommission by restricting use of the site; (20.1403(d))</li> <li>e. Residual radioactivity at the site has been reduced so that if the institutional controls were no longer in effect, there is reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group is as low as reasonably achievable and would not exceed either— <ul style="list-style-type: none"> <li>(1) 100 mrem per year; or</li> <li>(2) 500 mrem per year (20.1403(e))</li> </ul> </li> </ul>	
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**Radiation Safety Training or Instruction to Workers** (*Applies if a radioactive material license exists.*)

	74. If a DOE licensee, does each individual complete radiation safety training on the topics in 835.901(c) commensurate with the hazards in the areas and the required controls? (835.901(a))	
	75. Is this training completed before being permitted unescorted access and before receiving occupational dose? (835.901(b)(1-2))	
	76. Does each individual demonstrate knowledge of the radiation safety training topics in 835.901(c) commensurate with the hazards in the area and required controls, by successful completion of an examination and performance demonstration? (835.901(b))	

PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

	<p>77. Does the Radiation safety training include the following topics, to the extent appropriate to each individual's prior training, work assignments, and degree of exposure to potential radiological hazards:</p> <ul style="list-style-type: none"> <li>a. Risks of exposure to radiation and radioactive materials, including prenatal radiation exposure; (835.901(c)(1))</li> <li>b. Basic radiological fundamentals and radiation protection concepts; (835.901(c)(2))</li> <li>c. Physical design features, administrative controls, limits, policies, procedures, alarms, and other measures implemented at the facility to manage doses and maintain doses ALARA, including both routine and emergency actions; (835.901(c)(3))</li> <li>d. Individual rights and responsibilities as related to implementation of the facility radiation protection program; (835.901(c)(4))</li> <li>e. Individual responsibilities for implementing ALARA measures required by 835.101, and; (835.901(c)(5))</li> <li>f. Individual exposure reports that may be requested? (835.901(c)(6))</li> </ul>	
	<p>78. If a NRC/Agreement State licensee, are all individuals who in the course of employment that are likely to receive in a year an occupational dose in excess of 100 mrem the following information:</p> <ul style="list-style-type: none"> <li>a. Kept informed of the storage, transfer, or use of radiation and/or radioactive material; (19.12(a)(1))</li> <li>b. Instructed in the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed; (19.12(a)(2))</li> <li>c. Instructed in, and required to observe, to the extent within the workers control, the applicable provisions of Commission regulations and licenses for the protection of personnel from exposure to radiation and/or radioactive material; (19.12(a)(3))</li> <li>d. Instructed of their responsibility to report promptly to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation and/or radioactive material; (19.12(a)(4))</li> <li>e. Instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation and/or radioactive material; and (19.12(a)(5))</li> <li>f. Advised as to the radiation exposure reports which workers may request pursuant to § 19.13. (19.12(a)(6))</li> </ul>	

PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION

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<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		79. Does the licensee, in determining those individuals subject to the requirements of paragraph (a) of this section take into consideration assigned activities during normal and abnormal situations involving exposure to radiation and/or radioactive material which can reasonably be expected to occur during the life of a licensed facility? Is the extent of these instructions must be commensurate with potential radiological health protection problems present in the work place? (19.12(b))	
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**Design and Control** (*Applies if a radioactive material license exists.*)

		80. If a DOE licensee, are measures taken to maintain radiation exposure in controlled areas ALARA through physical design features and administrative control as as supplementary method? (835.1001(a))	
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		81. During the design of new facilities or modification of existing facilities, are the following objectives adopted: <ul style="list-style-type: none"> <li>a. Optimization methods are used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls (835.1002(a))</li> <li>b. The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy are maintained at exposure levels below an average of 0.5 mrem per hour and far below this average as possible (835.1002(b))</li> <li>c. The design objective for the control of airborne radioactive material is under normal conditions, to avoid releases to the workplace atmosphere and in any situation to ALARA levels; confinement and ventilation is normally used; (835.1002(c))</li> <li>d. The design or modification and the selection of materials includes features that facilitate operations, maintenance, decontamination, and decommissioning? (835.1002(d))</li> </ul>	
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		82. Does the licensee, during routine operations, use the combination of physical design features and administrative control provided that: <ul style="list-style-type: none"> <li>a. The anticipated occupational dose to general employees does not exceed 835.202 limits, and (835.1003(a))</li> <li>b. The ALARA process is utilized for personnel exposure to ionizing radiation? (835.1003(b))</li> </ul>	
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		83. If a NRC/Agreement licensee, does the licensee describe in the application (or radiation protection program) how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste? (20.1406)	
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**Radioactive Contamination Control** (*Applies if a radioactive material license exists.*)

**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION**

*CONFIDENTIAL*

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		84. If a DOE licensee, are there means to release material and equipment in contamination areas, high contamination areas, and airborne radioactivity areas to a controlled area, if: <ul style="list-style-type: none"> <li>a. Removable surface contamination levels on accessible surfaces exceed the removable surface contamination levels specified; (835.1101(a)(1))</li> <li>b. Prior use suggests that the removable surface contamination levels on inaccessible surfaces are likely to exceed the removable contamination levels specified? (835.1101(a)(2))</li> </ul>	
		85. Is there a means for material and equipment exceeding the removable surface contamination values specified, to be conditionally release for movement on-site from one radiological area for immediate placement in another radiological area only if appropriate monitoring is performed and appropriate controls for the movement are established and exercised? (835.1101(b))	
		86. Is there a means for material and equipment with fixed contamination levels that exceed the total contamination values specified, to be released for use in controlled areas outside of radiological areas only under the following conditions: <ul style="list-style-type: none"> <li>a. Removable surface contamination levels are below the removable surface contamination values specified; and (835.11019(c)(1))</li> <li>b. The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contamination status? (835.1101(c)(2))</li> </ul>	
		87. Does the licensee maintain and verify appropriate controls which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions? (835.1102(a))	
		88. If the licensee has areas accessible to individuals where the measured total surface contamination levels are less than, corresponding surface contamination values specified, controlled as follows when located outside of radiological areas: <ul style="list-style-type: none"> <li>a. The area is routinely monitored; (835.1102(c)(1))</li> <li>b. The area is conspicuously marked to warn individuals of the contaminated status? (835.1102(c)(2))</li> </ul>	
		89. Does the licensee require individuals exiting contamination, high contamination, or airborne radioactivity areas be monitored, as appropriate, for surface contamination? (835.1102(d))	
		90. Does the licensee require individuals entering areas in which removable contamination exists at levels exceeding the removable surface contamination values specified, wear protective clothing? (835.1102(e))	
<b>-- End of Checklist --</b>			

**EHS 3-3 ATTACHMENT E**



**TETRA TECH EC, INC.**

**ACTION ITEM REPORT**

**CONFIDENTIAL**

**Project Name:**

**Location:**

**Delivery Order No.:**

**Date of Inspection:**

<b>ACTION ITEM</b>	<b>CLASS* MA/MI/R<sup>1</sup></b>	<b>RESPONSIBLE PARTY</b>	<b>SCHEDULE</b>	<b>DATE COMPLETED</b>
1.				
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Reviewed by: \_\_\_\_\_  
Project Manager/ Operations Manager

\_\_\_\_\_ Date

**PESM Inspections:**

***Return original, completed Action Item Report to PESM within 60 days of Inspection date. PESM to forward original to Director, Quality Programs and copy to Regional ESQ Manager.***

**Office/Warehouse Inspections:**

***Send copies of completed Action Item Report to ESC and Regional ESQ Manager.***

\* Recommendations shall be entered as observations in the EtQ Solutions database

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<sup>1</sup> Ma – Major, Mi - Minor, R - Recommendation  
Revision Date 04/03/03



EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

CONFIDENTIAL

Office/Warehouse:	Inspector:	Date:
REQUIREMENTS	COMMENTS/NOTES	

Walking Surfaces, Housekeeping		
1. Aisles are proper width and are clear of storage.		
2. No tripping hazards are evident.		
3. Floors are even (no holes or cracks).		
4. Wires not stretched across aisles. Extension cords are covered to reduce trip hazard		
5. Floors dry - not slippery.		
6. Carpets and rugs secure.		
7. No samples or hazardous materials present in offices or office storage areas.		
8. Storage areas kept free of tripping and fire hazards.		
9. Outside walkways and parking areas are in good repair.		
Stairways, Halls, Ramps		
1. Adequate lighting.		
2. Ramps have non-slip surface.		
3. Stairways clear - not cluttered.		
4. Stair treads in good condition.		
5. Handrails installed and in good condition.		
6. Guardrails installed and in good condition.		
7. Halls kept clear of equipment and supplies.		
8. Shelves not overloaded.		
9. Storage shelf files and bookcases secured to wall when necessary.		



## EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

**CONFIDENTIAL**

Office/Warehouse:	Inspector:	Date:
REQUIREMENTS	COMMENTS/NOTES	

**Office Equipment, Duplicating Machines, Tools**

1. File drawers closed when not in use.		
2. Chairs (springs, casters) in good mechanical condition, free of splinters and rough edges.		
3. Fans guarded and secure from falling or tipping.		
4. Paper cutter is equipped with guard and blade spring on guard functions.		
5. Paper shredder guarded and functions.		
6. Safe (non-rolling type) step stools used when needed.		
7. No complaints of ventilation problems.		
8. Ozone filters are replaced as required on laser printers and other office equipment.		
9. Duplicating chemicals properly stored.		
10. Paper, supplies, and material safely stacked.		
11. Knives, scissors, and other sharp tools used/ stored correctly.		
12. Emptied containers of duplicating chemicals properly disposed. MSDS obtained for duplicating chemicals		
13. Tops of file cabinets clean of excess boxes, papers, binders, etc.		

**Ergonomics (EHS 3-1)**

1. New Employees received training.		
2. Workstation evaluations completed as scheduled and action items are closed out.		
3. Workstations meet corporate standards per ehs 3-1.		

**Electric Hazards**

1. Machines and equipment appropriately grounded.		
2. Electrical outlets not overloaded.		
3. Extension cords are UL approved or 3 wire type.		
4. Condition of power cords (not patched or spliced).		



EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

CONFIDENTIAL

Office/Warehouse:	Inspector:	Date:
REQUIREMENTS	COMMENTS/NOTES	

5. Floor electrical outlets are protected with cover plates.		
6. Safe condition of plugs and wall outlets maintained.		
7. Electric switch panels clear for access (at least 30" side, 3' front).		
8. Combustible materials not stored within 5 ft of switch panels.		
9. No wires under carpets.		
10. Electric heaters safety are UL rated/approved and use is allowed by landlord.		
<b>Emergency Preparedness/ Fire Protection</b>		
1. Emergency exit routes prominently posted, fire exits marked, and access not blocked or obstructed.		
2. Aisles used as primary emergency exits have minimum clearance of 36".		
3. Fire extinguishers accessible, not blocked, or obstructed, and monthly inspections conducted.		
4. Fire doors not locked, closed, or blocked open.		
5. Sprinkler heads not blocked.		
6. Excess paper trash removed.		
7. Emergency lights are available.		
8. Emergency phone numbers posted.		
9. First aid kits fully stocked.		
10. Field/ Vehicles first aid kits fully stocked.		
11. Bloodborne pathogen kits available, and fully stocked and readily accessible.		
12. List of first aid trained persons posted.		
13. Maps to medical facility available.		
14. Required notices: OSHA or State OSHA, State Right-to-Know, Workers' Compensation posted.		
15. Office Evacuation Plan is up-to-date and current version is located on Lotus Notes.		



EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

**CONFIDENTIAL**

Office/Warehouse:	Inspector:	Date:		
REQUIREMENTS	COMMENTS/NOTES			

16. Is automatic external defibrillator (AED) presently installed in a permanent location and clearly labeled? Is the maintenance current on the AED?			
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EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

**CONFIDENTIAL**

Office/Warehouse:	Inspector:	Date:
REQUIREMENTS	COMMENTS/NOTES	

<b>Materials and Waste Storage and Disposal</b>		
1. Expiration date of chemicals/ hazardous materials have been checked.		
2. Expired chemicals are in the process of being properly disposed. ESQ personnel are involved in waste characterization, management and disposal.		
3. If hazardous wastes (e.g., samples or excess chemicals brought back to office/warehouse) are generated and disposed manifests must be properly maintained and tracked.		
<b>Warehouse Storage</b>		
1. If vehicles or equipment are stored in warehouse, is there an emergency spill kit available in the event that fuel, oil, or other fluids are released?		
<b>Environmental Management System</b>		
1. ESQ Policy Posting. Current Environmental policy is posted at appropriate locations throughout the office.		
2. Awareness. TtEC employees are aware of the ESQ policy and commitments it contains. Have new employees received EMS awareness training?		
3. <b>Company-wide Significant Environmental Risks (Aspects), Objectives and Targets.</b> The company-wide significant risks (aspects), objectives and targets are being incorporated into the office activities. Where appropriate, ensure proper documentation exists to demonstrate conformance.		
4. <b>Waste Management</b> See Materials and Waste Storage and Disposal above		
a. <b>Worker Health &amp; Safety</b> Have ergonomic surveys been completed per EHS 3-1, Ergonomics?		



EHS OFFICE/WAREHOUSE INSPECTION CHECKLIST

**CONFIDENTIAL**

Office/Warehouse:	Inspector:	Date:
REQUIREMENTS	COMMENTS/NOTES	

<p><b>b. Pollution Prevention Practices.</b></p> <p><b>1) Paper.</b> What percentage of recycled content paper is being used?</p>		
<p><b>2) Employee Participation.</b> How many employees surveyed/observed are using double-sided copying, double-sided printing and/or implementing other pollution prevention practices (electronic editing, minimal printing, etc.)?</p>		
<p><b>3) Posters.</b> Are double-sided copying posters posted?</p>		
<p><b>5. Recycling.</b></p> <p><b>a. Justification.</b> Is recycling program commensurate with waste generated and cost?</p>		
<p><b>b. Employee Participation.</b> Are employees recycling these materials? Check employee waste baskets and recycling bins.</p>		
<p><b>6. Monitoring and Measuring and Corrective Measures</b></p>		
<p><b>a. Monitoring and Measuring.</b> When was the last EHS Office/Warehouse inspection conducted and documented?</p>		
<p><b>b. Corrective Action.</b> Are corrective action to address any deficiencies implemented and closure is documented in the office files.</p>		
<p><b>-End of Checklist-</b></p>		

cc: ESC  
 Manager, EHS Services



**ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

*This checklist applies to all projects*

<b>Program Administration and Documentation</b>		
		<b>1. EHS Procedures.</b> Site has access to current, relevant EHS Program requirements through CRL or other communication source.
		<b>2. Awareness Recognition Programs (EHS 1-2).</b> EHS awareness being implemented (e.g., postings, posters, etc.). EHS recognition program instituted.
		<b>3. Employee Participation Program (EHS 1-3).</b> "Major Projects" have EHS Committee, meetings held, and files contain required documentation. The EPP has been implemented and documented (EHS 1-3, Section 3.3).
		<b>4. Subcontractors (EHS 1-4).</b>
		<b>a) HIPO Field Contractors</b> have been approved and proper documentation is maintained.
		<b>b) Waste Management Subs</b> have been approved (including lower tier subcontractors) and proper documentation is maintained.
		<b>5. Visitor Safety (EHS 1-5).</b> Visitors entering site have complied with procedural requirements.
		<b>6. EHS Meetings (EHS 1-3)</b>
		<b>a)</b> EHS Daily Briefings conducted – contents properly documented, EMS issues discussed (ESQ Policy, worker impacts to environment, pollution prevention).
		<b>b)</b> "Major Projects" conduct weekly meetings. Documentation is maintained.
		<b>7. Incident/Regulatory Reporting (EHS 1-7)</b>
		<b>a)</b> Incident reports submitted for all incidents in a timely fashion.
		<b>b)</b> Investigation report submitted for all incidents in a timely fashion.
		<b>c)</b> Corrective actions identified in the investigation report have been completed and closure has been documented.
		<b>d)</b> Employer's first report of injury prepared and submitted on time.
		<b>e)</b> Permit exceedences/spills/releases have been reported to regulatory agencies as required by law or regulation.
		<b>8. Manifests/TtEC Permits (EHS 1-8).</b>
		<b>a)</b> Manifests are not signed by TtEC personnel except as allowed by EHS 1-8.
		<b>b)</b> No environmental permits in TtEC's name or TtEC as operator except as allowed by EHS 1-8.



PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS

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Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p><b>9. Recordkeeping (EHS 1-9).</b> All EHS records maintained per procedure          Personnel medical clearance          EHS Correspondence          H&amp;S Logbooks          Weekly Reports          Air/noise monitoring records are complete including calibration, monitoring records, chain of custody, laboratory results, and employee notifications as necessary.          EHS Compliance Documents          EHS Program Documentation (e.g., work permit, fit-test results, etc.)</p>	
		<p><b>10. External Regulatory Inspections/Notices (EHS 1-10).</b>          Have any inspections been conducted by external EHS regulatory agency? If so, when? External EHS Inspection checklist completed, maintained in files, and notifications were made per procedure. Are corrective actions completed?</p>	
		<p><b>11. EHS/EMS Training (EHS 1-11).</b></p>	
		<p>a) All staff (including subcontractors) have required EHS and TtEC training. Documentation is maintained on-site as required by EHS 1-11.</p>	
		<p>b) Training on EHS, WM, and DOT Plans have occurred and is documented (EHS 3-2).</p>	
		<p>c) Are personnel trained in the environmental aspects of their activities?</p>	
		<p><b>12. Ergonomics (EHS 3-1).</b> Field and Office Ergonomic evaluations have been conducted as suggested in EHS 3-1</p>	
		<p><b>13. EHS Plans (EHS 3-2).</b></p>	
		<p>a) Meets requirements of EHS 3-2, including requirements under 29 CFR 1910.120 and any other safety or environmental statute or regulation.</p>	
		<p>b) Are TIP/RMP risks incorporated into EHS plan?</p>	
		<p>c) Completed, approved, and signed copy is on-site.</p>	
		<p>d) Has been modified to reflect changing site condition/activities.</p>	
		<p>e) Is being implemented as written.</p>	
		<p>f) Identifies activity hazard analyses, which adequately address site hazards (EHS 3-5).</p>	
		<p>g) Identifies PPE, which is appropriate for site contaminants, actual, and potential exposure levels, and site activities.</p>	
		<p>h) Identifies Air/Noise monitoring strategy (s), which is appropriate for contaminants and activities.</p>	
		<p>i) Lists action levels which are appropriate and action levels are being implemented.</p>	
		<p>j) Identifies exclusion, CRZ, and support zones, site is clearly demarcating these zones per EHS plan (EHS 3-4).</p>	



**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

	<b>k)</b> Discusses appropriate personnel and equipment decontamination procedures. Procedures are being implemented (EHS 5-1).	
	<b>l)</b> Includes Emergency Response Plan, which addresses potential site emergencies (EHS 2-1).	
	<b>m)</b> Addresses Bloodborne Pathogens (EHS 4-1), Hazard Communications (EHS 4-2), Radioactive/Mixed Waste (EHS 4-3), Hearing Conservation (EHS 4-4), and Temperature Extreme (EHS 4-6) requirements as applicable. Requirements are appropriate and properly implemented.	
	<b>n)</b> Addresses respiratory protection program (EHS 5-2) requirements. Program being implemented.	
	<b>o)</b> Addresses environmental conditions and regulatory requirements.	
	<b>p)</b> Identifies all waste streams, management requirements (including client requirements), and transport/disposal plans. These requirements are being implemented.	
	<b>q)</b> Identifies all required environmental permits – permits are current and all applicable conditions are implemented. <i>(Refer to specific checklists if necessary).</i>	
	<b>14. Inspections (EHS 3-3).</b>	
	<b>a)</b> Weekly/monthly inspections conducted. Closure of action items are documented.	
	<b>b)</b> Closures of previous PESM inspection action items are documented. <i>(Those action items not closed must be forwarded to action item matrix for this inspection).</i>	

**Postings/ Signs/ Labeling/ Markings**

	<b>15.</b> OSHA Job Safety & Health Poster.	
	<b>16.</b> OSHA 300 Log (February) posted.	
	<b>17.</b> OSHA Noise Regulation posted.	
	<b>18.</b> Department of Labor Postings.	
	<b>19.</b> Emergency phone numbers posted.	
	<b>20.</b> Other suggested postings: <b>a)</b> Evacuation routes posted. <b>b)</b> All hazard warning signs. <b>c)</b> Noise hazard warning signs. <b>d)</b> Control zones clearly identified. <b>e)</b> Site perimeter posted and controlled. <b>f)</b> Emergency exits clearly marked. <b>g)</b> Fire extinguishers clearly marked. <b>h)</b> Safety showers/ eyewashes clearly marked. <b>i)</b> Circuit breakers labeled. <b>j)</b> Low overhead hazards clearly marked.	
	<b>21.</b> Copy of TtEC Work Rules Posted (EHS 3-6).	



PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS

CONFIDENTIAL

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		22. ESQ Policy posted.	
		23. TtEC Hotline Poster.	
		24. ZIP/EMS Bulletins are posted, as appropriate.	

**Work Practices and EHS Knowledge**

		25. Identify at least 1 Safety Observation performed	
		<ul style="list-style-type: none"> <li>a) Do Site Personnel: <ul style="list-style-type: none"> <li>Where appropriate PPE</li> <li>Understand risks</li> <li>Implement appropriate controls</li> <li>Implement permit systems</li> <li>Comply with EHS Plan requirements</li> </ul> </li> <li>b) Do Supervisors: <ul style="list-style-type: none"> <li>Provide appropriate tasking</li> <li>Identify competent persons as necessary</li> <li>Provide sufficient oversight</li> </ul> </li> </ul>	
		26. EHS personnel have good knowledge regarding use and limitations of the monitoring equipment.	
		27. TtEC (including craft labor) and subcontractor employees are aware of the ESQ policy and commitments it contains.	

**High Loss Potential Activities (Meet TtEC and/or Regulatory Requirements)**

		28. Asbestos operations (EHS 8-1).	
		29. Hazardous Materials Management (EHS 3-7).	
		30. Confined space entries (EHS 6-1).	
		31. Drill rigs (EHS 6-2).	
		32. Excavations (EHS 6-3).	
		33. Lockout/ tagout (EHS 6-4).	
		34. Hotwork (EHS 6-5).	
		35. Boating (EHS 6-6).	
		36. Drum Handling (EHS 6-7).	
		37. Adequate fall protection (EHS 3-8).	
		38. Hydroblasting.	
		39. Demolition (EHS 6-8).	
		40. Crane operations.	
		41. UXO Operations.	

**Emergency Preparedness**

		42. SCBAs for emergency use inspected each month and documented.	
		43. Sufficient dedicated ER equipment available.	



**ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

		<b>44.</b> Sufficient trained CPR/ first aid personnel available. (See EHS 1-11 for TtEC requirements).	
		<b>45.</b> Site personnel trained to perform ER tasks per EHS Plan.	
		<b>46.</b> ER drills conducted per EHS Plan.	
		<b>47.</b> Emergency response phone numbers verified.	
		<b>48.</b> Local fire department, hazardous materials group, hospital, etc. aware of TtEC expectations for emergency situations	

**Environmental Management System**

		<b>49. Project-Specific Significant Environmental Risks (Aspects).</b> Project-specific significant environmental risks (aspects) have been identified in TIP.	
		<b>50. Significant EHS Risks</b> The Project/Site Manager should be able to describe project environmental and H&S risks and their mitigations.	
		<b>a) Pollution Prevention.</b> Does project have a recycling program for paper, bottle, cans, construction debris, trees/shrubs, other: _____ (specify). (Please circle all that apply). <i>If not, why not?</i>	
		<b>51. Document Control.</b> No obsolete company guidance documents are maintained on-site. See PO-8 for requirements. Project Staff utilize current company procedures/ have access to CRL.	
		<b>52. Operational Controls.</b> The operations/activities associated with project-specific significant environmental risks (aspects) are carried out in accordance with specifications included in the project work plan, other project plans, and/or applicable procedures. <i>Operational controls are described as mitigation measures in TIP.</i>	
		<b>53. Monitoring and Measuring and Corrective Measures.</b> Significant environmental risks (aspects) are being monitored and measured. Corrective action to address deficiencies is implemented and closure is documented in project files.	

-- End of Checklist--


**EHS 3-3 ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

<b>Permitting Applicability/Exemption</b> <i>(Please complete each line in this section)</i>		
		<p><b>1. State/Local Pre-Construction Permit.</b> The project modified a point or nonpoint air emissions source for which a permit modification must be obtained from the state/local regulatory agency. (State/regional/local air regulations) <i>Note: regulated sources may include passive emission sources such as landfills, bioremediation piles, etc.</i></p>
		<p><b>2. PSD Permit.</b> Project modified a major source which has the potential to emit 250 tpy (or 100 tpy if source is one of 28 listed sources) of any regulated air pollutant. Project has potential to emit in "significant amounts" criteria pollutants for which the area is in attainment (NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>10</sub>, VOC, CO, lead). Project meets PSD permit conditions (40 CFR 52.21, State/local air regulations)</p>
		<p><b>3. Non-attainment Area.</b> Project involves the modification of a "major source" which emits a "significant" amount of criteria pollutants for which the area is designated non-attainment. The project obtained permit mod &amp; meets conditions in the pre-construction permit (40 CFR 52, State/local regulations) <i>Note: definitions for major source and significant amounts of pollutants will vary depending upon the classification of the nonattainment area.</i></p>
		<p><b>4. NSPS Sources.</b> Project involves modification of a source that is subject to NSPS standards. Project obtained permit mod &amp; meets permit conditions. (40 CFR 60)</p>
		<p><b>5. Hazardous Air Pollutant Sources.</b> Project involves the modification of a source that is listed as a HAP source and has the potential to emit 10 tpy of a single HAP or 25 tpy of a combination of HAPs. Project has obtained proper approval from regulatory agency. (40 CFR 63)</p>
		<p><b>6. Title V Permit.</b> Project involves the operation of a source which has the potential to emit 100 tpy of any regulated air contaminant, or 10 tpy of a single HAP or 25 tpy of combination of HAPs, or source is subject to NSPS, PSD or nonattainment area permitting. Project complies with permit requirements. (40 CFR 70, State/local air regulations)</p>
		<p><b>7. State Toxic Air Pollutants.</b> Project involves the modification of a source of toxic air pollutants that is regulated by state/local agency and proper approval has been obtained. (State/local regulations)</p>


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**TETRA TECH EC, INC.**  
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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

			<p><b>8. Permit Exclusion/Exemption.</b> Project involves modification of a point or nonpoint source that emits regulated air pollutants and the state/local air regulations specifically exempt the project activities from obtaining a permit/approval or an exemption has been obtained. Documentation exists in the project files recording the exemption. (State/local regulations)</p>	
			<p><b>9. Permit Equivalency.</b> Project is being conducted pursuant to CERCLA. “Substantive” requirements of ARARs, permits/approvals have been documented in project plans/correspondence and project is implementing substantive requirements.</p>	

**Equipment/Pollution Control Devices** (*Applies if project has equipment that generates or controls air pollution.*)

			<p><b>10. Equipment, Process, Materials, Process Rates.</b> Permit terms/conditions reflect current equipment, process, materials, and process rates. If not, note differences and determine if permit modification is required.</p>	
			<p><b>11. Pollution Control Devices.</b> Air emissions source includes control technology. Evaluation of the following was conducted and determined to be in compliance:</p> <ul style="list-style-type: none"> <li>a. Verification was made that control technology as specified in permit/regulations is in place and operating properly.</li> <li>b. Inspections of control equipment are being conducted in accordance with permit terms or SOPs. Documentation of inspections is recorded in logbooks/operating record/project files.</li> </ul>	
			<p><b>12. Treatment Residues.</b> Control equipment generates treatment residues which have been properly characterized, managed, and/or disposed of. <i>Complete applicable waste checklists.</i></p>	

**Emissions Monitoring and Testing** (*Applies if project must conduct air emissions monitoring or testing.*)

			<p><b>13. Continuous or Periodic Emissions Measurement.</b> Emissions from project sources are subject to continuous/periodic emissions measurements. Evaluation of the following was conducted and determined to be in compliance:</p> <ul style="list-style-type: none"> <li>a. Verification was made that emissions measurements comply with regulatory requirements.</li> <li>b. Monitoring data was reviewed and meets emissions limits specified in regulations/permit conditions.</li> <li>c. Recordkeeping to regulatory agency, if required, is being conducted. Documentation exists in project files.</li> </ul>	
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**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

		<p><b>14. Stack Testing.</b> Project is required to conduct stack testing in accordance with federal, state, or local regulations and/or permit. (40 CFR 51 and 52, State/local regulations)</p> <ul style="list-style-type: none"> <li>a. Testing was conducted as specified in regulations/permit.</li> <li>b. Notification to regulatory agency, if required, was performed/documented.</li> <li>c. Reporting of testing results was performed, if required.</li> <li>d. Testing verified that source was in compliance with regulatory/permit requirements.</li> </ul>	
		<p><b>15. NSPS Sources.</b> Sources subject to NSPS have specific Continuous Emission Monitoring (CEM) &amp; performance testing requirements. An evaluation of the following was conducted and found to be in compliance:</p> <ul style="list-style-type: none"> <li>a. Source-specific CEM performance testing specified in applicable Subpart.</li> <li>b. Notification prior to startup of CEM/opacity demonstration was provided to agency. (40 CFR 60.7)</li> <li>c. If excess emissions occurred, quarterly reports were submitted to agency. (40 CFR 60.7)</li> <li>d. CEM requirements in 40 CFR 60.13 are being met.</li> <li>e. General performance testing requirements specified in 40 CFR 60.8 has been met.</li> </ul>	
		<p><b>16. HAPs/NESHAP Sources.</b> Sources subject to HAPs/NESHAPs have specific Continuous Monitoring System (CMS) &amp; performance testing requirements. (40 CFR 61 and 63) An evaluation of the following was conducted and found to be in compliance:</p> <ul style="list-style-type: none"> <li>a. Source-specific CEM/performance testing specified in applicable Subpart.</li> <li>b. Notification prior to performance test/startup of CEM was provided to agency. (40 CFR 63.7/63.8)</li> <li>c. CMS requirements in 40 CFR 63.8 are being met, including CMS quality control program.</li> </ul>	
<b>Emissions Limits</b> <i>(Please complete each line in this section)</i>			
		<p><b>17. General Regulatory Emissions Limits.</b> Emissions for project source comply with all applicable federal, state, local emission limits. This includes point source emissions from units, fugitive emissions from unit and material handling equipment, and toxic air pollutants. (Federal/state/local regulations)</p>	
		<p><b>18. Permit-specific Emissions Limits.</b> Emissions from project sources comply with permit-specific emissions limits.</p>	
		<p><b>19. NSPS Source-Specific Emissions Limits.</b> Project is in compliance with NSPS emissions limits. (40 CFR 60, Subparts)</p>	


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

			<b>20. HAPs/NESHAPs Source-Specific Emissions Limits.</b> Project is in compliance with HAPs/NESHAPs emissions limits. (40 CFR 61/63, Subparts)	
<b>Reporting/Recordkeeping</b> <i>(Please complete each line in this section)</i>				
			<b>21. Registration.</b> Emissions source is required to register with state/local agency. Project files document that registration has been performed. (State/local air regulations)	
			<b>22. Emissions Inventory.</b> Emissions inventory must be submitted to state/local agency and project files document that emissions inventory has been submitted. (State/local air regulations)	
			<b>23. Permit Posting.</b> Permit is posted conspicuously, if required. (State/ local air regulations)	
			<b>24. Reporting of Startup/Shutdown/Malfunctions/Emissions Excesses/Other.</b> Project files contain documentation that startup/shutdown/malfunctions/excess emission (as applicable) were reported to State/local/EPA. (40 CFR 60, 61, 63, state/local regulations)	
			<b>25. Recordkeeping.</b> All permit/agency required records are maintained in the project files. This may include data from CEM, monitoring, stack tests, maintenance of equipment/pollution control devices, malfunctions, excess emissions, etc. (State/local regulations)	
			<b>26. NSPS Reporting/Recordkeeping.</b> Project is in compliance with the following requirements: <ul style="list-style-type: none"> <li>a. Documentation exists in project files demonstrating that project has complied with applicable notification requirements. (40 CFR 60.7)</li> <li>b. Records of startup/shutdown, malfunctions of NSPS process, control and monitoring equipment are in project files. (40 CFR 60.7)</li> <li>c. Source-specific recordkeeping requirements have been evaluated and project files contain all proper records. (40 CFR 60 Subparts)</li> <li>d. Reporting to regulatory agencies of source-specific requirements. (40 CFR 60 Subparts)</li> </ul>	


**ATTACHMENT C**  
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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

		<p><b>27. HAPs/NESHAPs Reporting/Recordkeeping.</b> Project is in compliance with the following requirements:</p> <ul style="list-style-type: none"> <li>a. Documentation exists in project files demonstrating that project has complied with applicable notification requirements (e.g., performance tests, visible emissions; startup/shutdown/malfunction reports; CMS performance; excess emissions and CMS performance report; summary report for each HAP) (40 CFR 63.7, .9, .10)</li> <li>b. Records of startup/shutdown, malfunctions, control and monitoring equipment are in project files. (40 CFR 63.6(e))</li> <li>c. Source-specific recordkeeping requirements have been evaluated and project files contain all proper records. (40 CFR 63, Subparts)</li> <li>d. Records of performance tests are maintained for 5 years.</li> <li>e. Startup/shutdown/malfunction plan has been developed &amp; is being properly implemented. Records are kept to demonstrate compliance with plan. If actions are taken that are inconsistent with plan, verbal reporting to agency was performed within 2 days &amp; written report was submitted within 7 days. (40 CFR 63.6(e)(3))</li> <li>f. Records required in 40 CFR 63.10 are being kept for 5 years.</li> </ul>	
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**CFCs** *(This section applies to projects which involve the handling of CFCs.)*

		<p><b>28. Export/Import/Production Destruction/Transformation of Ozone-Depleting Controlled Substances.</b> If project involves any of these activities, 40 CFR 82 must be consulted for specific reporting, recordkeeping, labeling, and training requirements.</p>	
		<p><b>29. Disposal of Appliances/Motor Vehicle Air Conditioners.</b> The disposal of appliances and MVACs are subject to specific disposal prohibitions specified in 40 CFR 82.154. The CFCs from these units must be evacuated by a certified recovery/recycling machine prior to disposal. (40 CFR 82.156) Persons performing testing and equipment used must be certified. (40 CFR 82.158(a) - (d))</p>	
		<p><b>30. Recordkeeping/Reporting.</b> If appliances/MVACs are disposed of, reporting and recordkeeping requirements are being met. (40 CFR 82.166)</p>	

**Miscellaneous** *(Please complete each line in this section)*

		<p><b>31. Fugitive Dust.</b> Project generates fugitive dust and all reasonable measures (or other local standard) are being used to minimize fugitive emissions. At time of inspection fugitive dust was minimal and measures used to minimize dust were observed (e.g., water tank truck). (State/local regulations)</p>	
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**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

		<p><b>32. Odor.</b> Odors from project are minimized. (State/local regulations)</p>	
		<p><b>33. Complaints by Adjacent Landowners.</b> Complaints from adjacent landowners have been filed.</p>	
		<p><b>34. Inspections by Air Quality Regulatory Agencies.</b> Project has been inspected by air quality regulatory agency. <i>Please note the purpose (e.g., permit compliance), and results of the inspection.</i></p>	
		<p><b>35. Accidental Release Emergency Planning.</b> State emergency planning requirements are applicable to this project because toxic substances are stored on site that exceed threshold levels. These requirements may include registration, development of risk management plan (RMP), or incorporation of project-related activities into client's facility RMP. <i>Note: Federal § 112(r) program has not been finalized to date.</i> (State regulations).</p>	
		<p><b>36. Open Burning.</b> Project involves opening burning of construction - related debris/materials. Permit has been obtained from State/local air agency, if applicable. Burn - ban criteria have been evaluated and determined to <u>not</u> be applicable. State/local Fire Marshall has been contacted and approval, if required, has been granted. Project is being performed in compliance with any approvals/permits.</p>	

**--End of Checklist--**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE TANK  
 INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

*This checklist applies when project involves the installation, closure or corrective action of underground or aboveground storage tanks that store hazardous substances/oil. Under federal regulations, regulated USTs include tank systems used to contain hazardous substances/oil the volume of which is 10% beneath the ground. The following are not regulated USTs: heating oil tank used for consumptive use on premises, septic tanks, surface impoundment, pit, stormwater/wastewater collection, flow through process tanks, tanks which contain de minimum amounts of hazardous substances, hazardous waste tanks, wastewater treatment units that are part of a POTW/NPDES permitted facility, equipment/machinery that contains hazardous substances for operational purposes, emergency spill/overflow tanks that are emptied immediately, and tanks which are less than 110 gallons.*

*PESM should reference 40 CFR Part 282, especially Appendix A to Part 282 which details various State requirements incorporated by reference for states that have State administered UST programs to ensure State requirements are being met.*

<b>General Information</b>			
			<p><b>1. Activity.</b> Project involves the following activity at an UST/AST:            (Please circle applicable activity):</p> <ul style="list-style-type: none"> <li>a. Installation</li> <li>b. Upgrading</li> <li>c. Closure: Demolition/In-place</li> <li>d. Investigation</li> <li>e. Corrective Action</li> <li>f. Other: _____</li> </ul>
			<p><b>2. Type of Substance.</b> For each UST/AST which is part of the project activities, identify the hazardous substance/oil it stores or historically has stored and its quantity in the adjacent column. Attach a table/list, if necessary.</p>
<p><b>USTs Installed AFTER December 22, 1988</b> (Applies if project involves installation /repairs of a new tank or upgrading to "new" tank requirements of a tank installed before December 22, 1988.) Note for item 4.) Not every state has the 1991 overfill prevention alternatives for overfill prevention in their state specific rules. NFPA does not have 1991 alternatives, but actually requires both 90% alert and the 95% shut off.</p>			
			<p><b>3. Corrosion Protection.</b> USTs meet one of following standards:</p> <ul style="list-style-type: none"> <li>a. Constructed of fiberglass-reinforced plastic (FRP);</li> <li>b. Constructed of steel and cathodically protected with dielectric material coating; field-installed cathodic protection system designed by corrosion expert; impress-current cathodic protection system and inspected every 60 days;</li> <li>c. Constructed of steel/FRP composite;</li> <li>d. Constructed of steel with no corrosion protection if site determined by corrosion expert to not be corrosive enough to cause release; or</li> <li>e. Alternative design approved by regulatory agency. (40 CFR 280.20(a) and (b))</li> </ul>



**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p><b>4. Spill and Overfill Prevention.</b> If tank system is filled by transfer of more than 25 gallons, it has spill/overfill protection which include:</p> <ul style="list-style-type: none"> <li>a. Equipment that will prevent release of product when transfer hose is detached from fill pipe (e.g., catchment basin);</li> <li>b. Overfill equipment that: when tank is no more than 95% full shuts off automatically; when tanks is no more than 90% full, it has a high-level alarm; and for tanks with &gt; 4,000 gal capacity, flow is restricted 30 minutes prior to overfilling with high-level alarm 1 minute before overfilling; tank has automatic shut-off flow; or</li> <li>c. Alternative equipment approved by regulatory agency. (40 CFR 280.20(c))</li> </ul>	
	<p><b>5. Proper Installation/Certified Installer.</b> Regulatory agency was notified of installation by ONE of the following certifications:</p> <ul style="list-style-type: none"> <li>a. Checklist showing that all work in manufacturer’s checklist is completed;</li> <li>b. Installer is certified by tank/piping manufacturers or regulatory agency;</li> <li>c. Installation has been inspected and certified by registered PE with experience in UST installation;</li> <li>d. Installation has been approved by regulatory agency; or</li> <li>e. Another method approved by regulatory agency. (40 CFR 280.20(d) and (e))</li> </ul> <p><i>Note: State regulations may specifically require one type of certification. Check state regulations.</i></p>	
	<p><b>6. Release Detection.</b> ONE of the following release detections is being used:</p> <ul style="list-style-type: none"> <li>a. Every 30 days monitoring for release is conducted through automatic tank gauging/inventory control; vapor monitoring; groundwater monitoring; interstitial monitoring; or alternative method approved by regulatory agency;</li> <li>b. Inventory control is conducted on a monthly basis to detect any release of at least 1% of flow-through plus 130 gallons AND tightness testing every 5 years until tank is 10 years old, then tank is monitored every 30 days for releases; OR</li> <li>c. Weekly manual tank gauging is conducted if tank is 550 gallons or less. (40 CFR 280.41(a))</li> </ul> <p>Records are kept documenting compliance with inspection/monitoring/ testing requirements.</p>	



PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

	<p><b>7. Petroleum UST Release Detection for Piping.</b> If project involves installation of an UST which stores petroleum, the UST has release detection in piping which consists of:</p> <ul style="list-style-type: none"> <li>a. Pressurized piping which is equipped with automatic line leak detector and EITHER tested annually for line tightness OR monitored monthly for releases by vapor/groundwater/interstitial/agency-approved alternative monitoring; or</li> <li>b. Suction piping requirements: below grade piping operates at less than atmospheric pressure and is sloped so that contents of pipe will drain back into tank if suction is released; only 1 check valve is included in each suction line and it is located directly below and as close as practicable to suction pump; and method is provided to check suction requirements.</li> <li>c. No release detection is required if meet suction piping requirements.</li> <li>d. If suction piping requirements are not met, piping must have line tightness test every 3 years OR monitored monthly for releases described for pressurized piping. (40 CFR 280.41(a))</li> </ul> <p>Records are kept documenting compliance with inspection/monitoring/ testing requirements.</p>	
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	<p><b>8. Hazardous Substances USTs/Secondary Containment.</b> Secondary containment is designed/constructed/installed to:</p> <ul style="list-style-type: none"> <li>a. Contain substances released from tank system until they are detected and removed and prevent release to environment during operational life.</li> <li>b. Containment is checked for releases every 30 days. Records are kept of these inspections.</li> <li>c. Tank and piping designed with double-wall or external liners, including vaults to contain 100% capacity of largest tank.</li> <li>d. Pressurized piping is equipped with automatic line leak detector. (40 CFR 280.42)</li> </ul>	
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**USTs Installed BEFORE December 22, 1988**

	<p><b>9. Criteria.</b> Project involves the repair/reinstallation or closure of an UST which will meet one of the following standards: 1) UST will meet new tank systems described above; 2) UST will meet upgrading requirements described below; OR 3) UST will be closed. (40 CFR 280.21)</p>	
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**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

	<p><b>10. Release Prevention Upgrades.</b> If the UST is a steel tank it has:</p> <ul style="list-style-type: none"> <li>a. Internal lining which is inspected annually for 10 years/every 5 years thereafter;</li> <li>b. Cathodic protection which is installed and integrity of tank is ensured through internal inspection, monitoring every 30 days (if tank is less than 10 years old) OR tightness testing prior to installation of cathodic protection, and between 3 and 6 months (if tank is less than 10 years old); OR</li> <li>c. Alternative approved by regulatory agency. (40 CFR 280.21(b) and (c)).</li> <li>d. Piping that contains regulated substances and is in contact with ground has been upgraded by installing cathodic protection system described for new tanks (above in question 1), except that no dielectric material coating is required.</li> <li>e. Spill/overflow prevention equipment described for new tanks (above in question 2) has been installed.</li> </ul>	
	<p><b>11. Release Detection.</b> Depending upon when tank was installed, release detection/pressurized piping was installed according to timetable in regulations. Release detection includes ONE of the following.</p> <ul style="list-style-type: none"> <li>a. Every 30 days monitor release through automatic tank gauging/inventory control, vapor /groundwater /interstitial/ alternative approved monitoring;</li> <li>b. Weekly manual tank gauging (if tank is 550 gallons or less);</li> <li>c. If tank meets upgrade/new tank requirements, on a monthly basis use inventory control to detect release of at least 1% of flow-through plus 130 gallons, tightness testing every 5 years until 10 years old, then monitor every 30 days; OR</li> <li>d. If tank does not meet upgrade/new tank requirements, on a monthly basis conduct inventory control to detect release of at least 1% flow-through plus 130 gallons and tightness test EVERY year.</li> <li>e. If tank contains hazardous substances, secondary containment specified above for new tanks was installed. (40 CFR 280.40).</li> </ul> <p>Records of monitoring/inspections/tests are maintained in project files.</p>	



PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

		<p><b>12. Piping Release Detection.</b> Depending upon when tank was installed, release detection for piping has been installed according to timetable in regulations.</p> <p>a. Pressurized piping which is equipped with automatic line leak detector and EITHER tested annually for line tightness OR monitored monthly for releases by vapor /groundwater /interstitial/ agency-approved alternative monitoring; OR</p> <p>b. Suction piping requirements: below grade piping operates at less than atmospheric pressure and is sloped so that contents of pipe will drain back into tank if suction is released; only 1 check valve is included in each suction line and it is located directly below and as close as practicable to suction pump; and method is provided to check suction requirements.</p> <p>c. No release detection is required if meet suction piping requirements.</p> <p>d. If suction piping requirements are not met, piping must have line tightness test every 3 years OR monitored monthly for releases described for pressurized piping.</p> <p>e. Hazardous substance tanks must have secondary containment as described for new tanks. (40 CFR 280.40).</p> <p>Records of monitoring/inspections/tests are kept in files.</p>	
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**All UST Systems** (Applies to installation, operation, repair, maintenance, etc. of all UST tanks.)

		<p><b>13. Cathodic Protection System Operation/Maintenance.</b> Cathodic protection systems must be tested by qualified tester within 6 months of installation and every 3 years. Impressed current systems are inspected every 60 days. Records of operation of cathodic protection system are maintained in project files. (40 CFR 280.31)</p>	
		<p><b>14. Repairs.</b> Repairs must prevent releases due to structural failure or corrosion. Proper personnel, specific requirements for metal/FRP piping, and testing after repairs are being complied with. (40 CFR 280.33)</p>	
		<p><b>15. Compatibility.</b> UST system is compatible with substance stored. (40 CFR 280.32)</p>	
		<p><b>16. Filling.</b> When UST is being filled, the volume in tank is checked before transfer and transfer operation is constantly monitored to prevent spills/overfills. (40 CFR 280.30(a))</p>	



**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>17. Reporting.</b> Has a spill/overfill occurred at the project site? If so, was the following reported by the client or by TtEC in consultation with the client within 24 hours (<i>note that states may have more stringent requirements for spill reporting for their UST programs – check state reporting requirements</i>):</p> <ul style="list-style-type: none"> <li>a. Spills/overfill of 25 gallons of petroleum if released to environment.</li> <li>b. Spill of petroleum which causes sheen on surface water.</li> <li>c. Spills of more than RQ of hazardous substance.</li> </ul> <p>If not meet these criteria, was spill cleaned up within 24 hours or agency notified that cleanup was not conducted within 24 hours? (40 CFR 280.53)</p>	
		<p><b>18. Temporarily Out of Service.</b> Maintenance requirements specified in 40 CFR 280.70 must be met for USTs temporarily taken out of service. (40 CFR 280.70)</p>	
		<p><b>19. Conversion.</b> UST system is being converted to store nonregulated substances.</p> <ul style="list-style-type: none"> <li>a. The regulatory agency has been/will be notified 30 days prior to conversion.</li> <li>b. Tank is being emptied and cleaned by removing all liquids/accumulated sludges.</li> <li>c. Assessment is being performed to measure for contamination unless other monitoring indicates no release present.</li> <li>d. If release confirmed, notification has been made. (40 CFR 280.71 and .72)</li> </ul>	



**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

		<p><b>20. Records.</b> Project files contain the following applicable records <i>(Mark each applicable record contained in the file.):</i></p> <ul style="list-style-type: none"> <li>a. Corrosion expert’s analysis of site’s corrosion potential if corrosion protection is not used on steel tank.</li> <li>b. Proper operation of cathodic protection system -- last 2 inspections for operation of system; last 3 inspections if an impressed current CPS is used.</li> <li>c. Repairs made in compliance with 40 CFR 280.33.</li> <li>d. Performance claims pertaining to any release detection system used and manner in which those claims were tested/justified by manufacturer (5 years from installation).</li> <li>e. Schedules of required calibration/maintenance provided by manufacturer of release detection equipment (5 years from installation).</li> <li>f. Results of tank tightness test (until next test conducted).</li> <li>g. Calibration, maintenance, repairs of release detection equipment (1 year).</li> <li>h. Results of site investigation if permanent closure conducted.</li> <li>i. Copies of permits, notification forms, release reports, corrective action reports, other information submitted to regulatory agency. (40 CFR 280.34(b))</li> </ul>	
		<p><b>21. Reporting.</b> Project files contain the following applicable records <i>(Mark each applicable record contained in the file.):</i></p> <ul style="list-style-type: none"> <li>a. Notification for all UST systems (certification of installation).</li> <li>b. Reports of releases, suspected releases, spills/overfills and confirmed releases described in this checklist.</li> <li>c. Corrective action planned or taken -- initial abatement measure, initial site characterization, free product removal, investigation of soil/groundwater cleanup, corrective action plan.</li> <li>d. Notification prior to permanent closure or change in service. (40 CFR 280.34(a))</li> </ul>	



**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

<b>Investigation of Release/Corrective Action/Closure</b>		
	<p><b>22. Suspected Release Reporting.</b> The following was reported to regulatory agency within 24 hours:</p> <ul style="list-style-type: none"> <li>a. Discovery of released regulated substances at UST site.</li> <li>b. Unusual operating conditions unless equipment is found to be defective but not leaking and is repaired/replaced immediately.</li> <li>c. Monitoring results that indicate release may have occurred, unless monitoring device is defective and it is repaired/replaced and additional monitoring is satisfactory, or second month of inventory control does not confirm initial results. (40 CFR 280.50)</li> </ul>	
	<p><b>23. Investigation.</b> Suspected release is investigated and confirmed within 7 days using tightness testing of tank, piping or both. If environmental contamination is basis of suspected release and UST has passed tank tightness, sampling is conducted in area where release is most likely to have occurred. (40 CFR 280.52)</p>	
	<p><b>24. Confirmed Release Reporting.</b> Confirmed release has been reported by the client or by TtEC in consultation with the client to regulatory agency within 24 hours. (40 CFR 280.60)</p>	
	<p><b>25. Corrective Action.</b> Corrective action is being taken to cleanup spill. <i>Circle which of the following is included in Tetra Tech EC scope of work.</i></p> <ul style="list-style-type: none"> <li>a. Identification/mitigation of fire/explosion/vapor hazards,</li> <li>b. Removal of regulated substance from UST,</li> <li>c. Prevention of further migration of released substance,</li> <li>d. Investigation to determine presence of free product,</li> <li>e. Initial site characterization,</li> <li>f. Free product removal,</li> <li>g. Investigation for soil/groundwater cleanup,</li> <li>h. Development of corrective action plan. (40 CFR 280.60 - .66)</li> </ul>	
	<p><b>26. Closure.</b> The following steps were completed for closure of the UST. (40 CFR 280.71 and .72)</p> <ul style="list-style-type: none"> <li>a. <b>Notification.</b> Regulatory agency was notified 30 days prior to conducting closure. Notice is maintained in files.</li> </ul>	



PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	

			b. <b>Emptying.</b> UST was emptied of all product and sludges and cleaned. <i>Note: Sludges/product may be "hazardous" or "special" waste or "hazardous material" subject to specific management, handling, transportation, disposal, or reuse requirements. Complete applicable checklists to demonstrate compliance with these requirements.</i>	
			c. <b>Type of Closure.</b> UST was closed EITHER through permanent removal of all liquids and accumulated sludges OR by filling with inert material. <i>Please circle applicable activity.</i>	
			d. <b>Site Assessment.</b> Site assessment was performed to measure for contamination unless vapor or groundwater monitoring detected no release.	
			e. <b>Notification if Contamination Found.</b> If contamination was found during assessment, was notification provided to regulatory agency within 24 hours?	
			<b>27. Records.</b> Copies of permits, notification forms, release reports, corrective action reports, other information submitted to regulatory agency is maintained in project files. (40 CFR 280.34(b))	
			<b>28. Reporting.</b> The following reports have been submitted to regulatory agencies: a. Reports of releases, suspected releases, spills/overfills and confirmed releases described in this checklist. b. Corrective action planned or taken -- initial abatement measure, initial site characterization, free product removal, investigation of soil/groundwater cleanup, corrective action plan. c. Notification prior to permanent closure or change in service. (40 CFR 280.34(a))	

**Aboveground Storage Tanks** (*Applies if project involves the design/construction/repair/cleanup/closure of aboveground storage tanks that store hazardous substance/oil.*)

			<b>29. Installation/Repair.</b> Design/construction requirements for aboveground storage tanks that store petroleum/hazardous substances are dictated by Uniform Fire Code and state or local oil/hazardous substances regulations. Also, depending upon the size of the tank, an SPCC plan may be required. (UFC, state/local regulations) <i>Please also complete the "Oil and Hazardous Substances Management" Checklist.</i>	
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**ATTACHMENT C  
TETRA TECH EC, INC.**

**PESM INSPECTION CHECKLIST— UNDERGROUND/ABOVEGROUND STORAGE  
TANK INSTALLATION AND CLOSURE**

**CONFIDENTIAL**

<b>Project:</b>		<b>Inspector:</b>		<b>Date:</b>	
Yes	No	N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>	

			<p><b>30. Cleanup/Closure.</b> Project involves the cleaning/closure of aboveground storage tanks. ASME standards may apply. Closure of tank will likely be subject to state mini-CERCLA cleanup law if release or suspected release occurred. The state/local law may require that notifications, reports, sampling/analysis plans, QAPP plans, etc. be submitted for review and approval. (ASME, State/local regulations)</p>	
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Federal USTs (*This section applies to USTs owned by Federal Agencies and are a result of the Federal Policy Act of 2005*)

			<p><b>31. Inspection Requirements.</b> USTs not inspected since December 22, 1998 must be inspected by EPA or State every three years. The first three-year inspection cycle must be completed by August 8, 2010.</p>	
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			<p><b>32. Delivery Prohibition.</b> USTs must meet State eligibility requirements. (Note: Most states have set up tag programs where a green tag means that the UST is eligible to receive a delivery and a red tag means that the UST is ineligible to receive a delivery.)</p>	
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			<p><b>33. Operator Training.</b> States are to have UST operator training requirements developed by August 8, 2009. All UST operators must be trained by August 8, 2012. There are three classes of operators:</p> <p><b>Class A:</b> Personnel having primary responsibility to operate and maintain UST tank systems.</p> <p><b>Class B:</b> Personnel who are responsible for implementing UST state/federal regulatory requirements in the field.</p> <p><b>Class C:</b> Personnel who are responsible for the first line of response events indicating emergency conditions.</p>	
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			<p><b>34. Groundwater Protection.</b> Each new or replaced UST or piping system connected to a new or replaced UST, and new fuel dispenser system, that are located within 1,000 feet of an existing community water system or existing potable drinking water well, must be equipped with secondary containment (including under dispenser containment) and be monitored for leaks. (<b>Note:</b> Does not apply to repairs needed to maintain existing UST system.)</p>	
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**--End of Checklist--**

**Purpose:**

**Status:** Complete

**Approved By:** John DeFeis  
**Title:** Hoisting and Rigging

**Version Date - Type:** 07/28/1998 - New

**Original Issue** 07/28/98

**Category:** Company Procedures  
**Sub-Category:** Departmental/Discipline

**Date:**  
**Sections:** ESQ - Environmental Health & Safety Programs  
**Document** Procedure

**Keyword Index:**

**Type:**  
**Document** Skip Parry  
**Owner**

Reserved

See Construction Procedure CP-13 "Critical Lifts" for safe procedures during critical lifts.

Follow safe work practices included in the TtEC Project Rules Handbook, Sections 2.4, 2.5, 2.6, 2.8, and 2.13.

NOTICE OF OWNERSHIP AND CONDITIONS OF USE

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Proprietary Information

**Purpose:** The purpose of this procedure is to establish the Tetra Tech EC, Inc. (TtEC) Hearing Conservation Program to prevent hearing loss from on-the-job noise exposure and to comply with the requirements of Occupational Safety and Health Administration (OSHA) 29 CFR 1910.95 and 29 CFR 1926.52 regulations for occupational noise exposure.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
		<b>Title:</b>	Hearing Conservation
<b>Version Date - Type:</b>	11/16/2009 - Revised	<b>Original Issue</b>	02/01/95
		<b>Date:</b>	
<b>Category:</b>	Company Procedures	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
<b>Sub-Category:</b>	Departmental/Discipline	<b>Document</b>	Procedure
		<b>Type:</b>	
<b>Keyword Index:</b>	EHS Compliance/Waste Management, Monitoring, Operational Control, Training	<b>Document</b>	Skip Parry
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## 1.0 PURPOSE

The purpose of this procedure is to establish the Tetra Tech EC, Inc. (TtEC) Hearing Conservation Program to prevent hearing loss from on-the-job noise exposure and to comply with the requirements of Occupational Safety and Health Administration (OSHA) [29 CFR 1910.95 and](#) 29 CFR 1926.52 regulations for occupational noise exposure.

## 2.0 SCOPE

This procedure applies to all TtEC field or construction operations.

## 3.0 MINIMUM REQUIREMENTS

### 3.1 Definitions

**Audiogram** - A chart, table or graph resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

**dB (A) (A-Weighted Sound Level Scale)** - A quantity, in decibels, read from a standard sound level meter that is switched to the weighting network labeled "A." The A-weighted sound level measures the approximate relative "noisiness" of a given environment.

**Decibel** - The unit in which the levels of various acoustical quantities are expressed. Typical quantities so expressed are sound pressure level, noise level.

**Exchange Rate** - (also known as dose-trading relation, or doubling rate). When sound levels increase, the allowed exposure time must be decreased. The exchange rate is the amount by which the permitted sound level may increase if the exposure time is halved. OSHA uses a 5 db (A) exchange (or doubling) rate, NIOSH and ACGIH use a 3 db (A) exchange rate.

**Hearing Loss** - At a specified frequency, an amount, in decibels, by which the individual's hearing acuity is less than the selected norm.

**Noise Reduction Rating (NRR)** - A rating given to a hearing protector to assess the noise attenuation capability.

**Permissible Exposure Level - PEL** - refers to the sound pressure levels and exposure duration established by the USDOL-OSHA under 1910.95 and 1926.52 to which workers may be exposed.

**Standard Threshold Shift** - A change in the hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3,000, and 4,000 Hertz (Hz), in either ear. A Confirmed Shift caused by noise exposure is considered to be an OSHA recordable.

**Threshold Limit Values** - TLV refer to the sound pressure levels and durations of exposure that represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect on their ability to hear and understand normal speech.

## **3.2 Responsibilities**

### **3.2.1 Line Management**

Site Supervisors are responsible for:

Ensuring that hearing protection is both worn and worn in the proper manner when required.

Including consideration of noise operation and operator protection when obtaining construction heavy equipment and other tools.

### **3.2.2 Project Environmental Safety Manager (PESM)**

The PESH is responsible for:

Providing technical support and oversight to the Health and Safety Officer/Environmental Safety Supervisor (HSO/ESS).

Ensuring that the HSO/ESS has adequate training and experience to perform noise monitoring and hearing conservation duties.

Ensuring that confirmed Standard Threshold Shifts ([STS](#)) are recorded on the OSHA 300 log.

### **3.2.3 HSO/ESS**

Verifying that site employees are trained and have audiometric examinations prior to the start of work;

Providing hearing protection to workers and ensuring proper fitting of hearing protection devices;

Posting high noise warning and hearing protection signs in affected areas;

Conducting exposure monitoring of high noise areas;

Providing information to workers on the hearing conservative program;

Monitoring personnel or representative individuals to determine noise exposures, when activity or equipment changes occur;

Maintaining site hearing conservation program records;

Overseeing the requirements of the hearing conservation program at the site;

Informing the PESH and affected workers of any overexposures identified during monitoring;

Evaluating and Selecting Hearing Protection equipment, assuring an appropriate selection is available to workers;

Initiating an Event Report in accordance with EHS 1-7 when a [STS](#) of greater than 10 dB (A) in either ear has been reported by the Corporate Medical Consultant (CMC);

Notifying affected employees [and the PESH](#) of a [STS](#) upon notification by the CMC.

### **3.2.4 Medical Personnel**

The Corporate Medical Consultant (CMC) is responsible for:

Determining if a STS has occurred when reviewing the audiometric examination results;

Providing Director, Health and Safety with an annual summary of STSs which occurred to TtEC employees;

Conducting audiometric testing, reviewing results, [maintaining quality control over contractor audiometric test booth performance in accordance with 1910.95 and](#) maintaining records of audiometric tests; and

Notifying the HSO/ESS if an STS is observed.

## **4.0 PROCEDURES**

### **4.1 Applicable Regulations**

Unless noted otherwise, this procedure implements the OSHA [29 CFR 1910.95 and](#) 1926.52 requirements.

### **4.2 Hearing Conservation Program**

TtEC will maintain a Hearing Conservation Program for employees who are exposed to noise levels in excess of the action level (85 dB (A)). Engineering and/or administrative methods to maintain worker exposure below the action level will be used whenever feasible. Whenever these control methods are not feasible, employees are included in the Hearing Conservation Program which includes noise exposure monitoring, audiometric testing, use of hearing protective devices, and employee training and access to information and recordkeeping.

### **4.3 Action Level**

The action level is a noise exposure level equal to or greater than an 8-hour time weighted average (TWA) of 85 dB (A) slow response, 5 dB (A) exchange rate, or a dose equivalent of 50% as measured by a noise dosimeter without regard to any attenuation provided by the use of personal protective equipment.

### **4.4 Hearing Protection**

Hearing protection will be required when employee exposure exceeds the action level or while using equipment resulting in a noise exposure in excess of 90 dB (A), or when working in areas where warning signs indicate that the use of hearing protection is required. Workers must always use hearing protection when noise levels exceed 115 dB (A).

Whenever hearing protection is required workers will be offered a choice between one or two types of ear plugs and one type of ear muffs. All hearing protectors used must meet the noise attenuation requirements for the exposure.

The adequacy of hearing protection used will be evaluated by the ESS or designee.

### **4.5 Exposure Monitoring**

Noise exposure monitoring shall be conducted when information indicates that an employee's exposure may be equal to or greater than the action level.

Monitoring shall be conducted in accordance with the TtEC EHS Field Procedures Guides HSG1-5, Noise Monitoring, including the following components:

The identity of all workers that may be exposed to noise at or above the action level.

Area monitoring or representative personal monitoring. Personal Monitoring (noise dosimetry) will be used when area monitoring is not feasible due to worker mobility sound levels varying over time, or significant impulse noise exists.

All continuous, intermittent, and impulsive sound levels between 80 and 130 dB(A) will be integrated into noise measurement.

The use of properly calibrated instruments.

Repeat monitoring whenever workplace changes occur that may result in increased personnel exposure or render protective equipment inadequate.

Employee notification if they are exposed at or above the action level.

The opportunity for affected workers to observe exposure monitoring measurements.

#### **4.6 Audiometric Testing**

Audiometric testing will be provided to workers included in the Hearing Conservation Program. All such identified employees will undergo baseline and annual audiometric testing.

For the baseline audiometric testing, workers must be preceded by 14 hours without exposure to workplace noise (hearing protection may be used for a substitute for the 14 hour period). Workers will avoid high levels of non-occupational noise during the 14 hour period immediately preceding the audiometric examination.

##### General Requirements

Audiometric tests will be performed using qualified personnel meeting the requirements of 29 CFR 1910.95 (g) and (h).

Audiometric testing equipment will be operated and meet the requirements of 29 CFR 1910.95, Appendix C, *Audiometric Testing Instruments*, Appendix D, *Audiometric Test Rooms*, and Appendix E, *Acoustic Calibration of Audiometers*.

*Baseline Audiogram.* A baseline audiogram will be established for employees exposed above the action level within six months of exposure. The baseline audiogram forms the basis for comparison to subsequent audiograms.

*Annual Audiogram.* An audiogram will be repeated at least annually for affected employees. Results are compared to the baseline audiogram by the CMC to determine validity and any shifts in employee hearing acuity.

*Procedure for Standard Threshold Shift.* If an STS is observed, the affected employee will be retested within 30 days and the results reviewed by an audiologist, otolaryngologist, or qualified practitioner to determine if further evaluation is needed.

If an STS has occurred, the following actions will be taken:

1. The HSO/ESS informs the employee in writing of the condition within 21 days of receipt of results, informs the PESM, who ensures that the case is recorded on the OSHA 300 log as a recordable illness. A copy of the physician's report is furnished to the employee.
2. The individual is trained in the use and care of one or more hearing protective devices, is fitted for one or more devices, and is required by the ESS to wear the device(s) when on the job. If the employee already wears protective devices, retraining and refitting will be provided, and if necessary a more efficient device or devices will be supplied.
3. Additional testing may be advised if a medical pathology of the ear occurs, particularly if wearing hearing protection is suspected of causing the condition.

4. An annual audiogram will be substituted for the baseline audiogram when a threshold shift is persistent or there is significant hearing improvement.

#### **4.7 Employee Training**

Employees included in the Hearing Conservation Program shall receive hearing conservation training initially and at least annually. Training will consist of the following:

- Effects of noise on hearing;
- Purpose of hearing protectors;
- Advantages and disadvantages of various types of hearing protection;
- Instructions for selecting, fitting, using, and caring for hearing protection devices;
- Purpose of audiometric testing; and
- Explanation of audiometric test procedures;
- Results of recent area noise surveys

#### **4.8 Noise Reduction**

Engineering controls must be applied whenever possible to reduce or eliminate noise for the workplace. Engineering controls include the use of silencers, mufflers, sound barriers, dampers, isolators. Administrative controls include moving worker activities away from high noise sources and limiting the time in a high noise area (worker rotation).

#### **4.9 Hearing Protection**

Hearing Protection will be used when noise levels or a reduction in exposure time are not feasible.

##### **4.10 Warning Signs**

Warning signs indicating the presence of a high noise area and the requirement to wear hearing protection will be visibly posted and enforced at the work location whenever ambient noise level exceeds 85 dB (A).

##### **4.11 Recordkeeping**

*Audiometric Testing Records.* An accurate record of all audiometric testing in accordance with the 29 CFR 1910.95(m) is maintained by the CMC in the employee's medical record.

*Exposure Records.* Records of noise exposure monitoring are maintained in the project EHS records in accordance with EHS 1-9, Recordkeeping for a minimum of two years. The CMC will maintain the individual records for the 30 years required by OSHA.

*Training Records.* Hearing Conservation Program training records are maintained in the project EHS records by the ESS and in the employee EHS records by the Director, Health and Safety. Records will be maintained in accordance with EHS 1-9, Recordkeeping.

##### **4.12 Government Contracts**

Most government contracts have more stringent requirements as follows:

[United States Army Corps of Engineers \(USACE\)](#) - Military related contracts must implement EM 385 1-1 Section 0.5C, which generally implements American Conference of Governmental Industrial Hygienist (ACGIH) controls.

## **5.0 GUIDANCE**

### **5.1 Background**

Occupational Noise Exposure for construction is addressed in 29 CFR 1926.52 and General Industry is addressed in 29 CFR 1910.95. OSHA has maintained that Construction is covered by the less detailed 1926 standards; however, interpretations provided over the years on 1926 have referred back to the 1910 standards, such as for Hearing Conservation Programs.

The major differences between the OSHA standards, and the standards required for government contracts are the thresholds at which certain actions occur. The OSHA generally uses higher thresholds, including a 5 dB doubling rate. Government contracts use a 3 dB doubling rate. A comparison of the two systems is provided in Tables 1, 2 and 3. Table 3 also provides National Institute of Occupational Safety and Health (NIOSH) guidance.

Several states have also adopted some or all of the ACGIH recommendations. States have also imposed additional requirements, such as quarterly hearing protection audits that may be applicable.

Users should be aware of the standard(s) that are applicable to their project, and consult with their PESH to ensure that appropriate requirements are addressed.

### **5.2 Hearing Protection Noise Reduction Determinations**

Noise Reduction Rating (NRR) factors should be adjusted for field use. The NRR are determined in a laboratory, and typically, 7 dB (A) is subtracted to adjust to field use, and the remainder subtracted to determine the estimated exposure under the hearing protection (Example: An area has a measured noise level of 90 dB (A). An earplug indicates a NRR of 22. Subtract 7 dB to correct for field use. The remainder (15 dB) is the reduction that can be applied, resulting in a exposure of 75 dB (A). The highest NRR on earplugs is about 33.

If earplugs or earmuffs alone do not provide adequate protection, they may be used together as dual hearing protection. If dual protection is used, use the highest NRR of the two devices, subtract 7 dB (A) from that NRR, add 5 dB (A) to the resultant NRR and subtract this from the [A-weighted](#) TWA to determine the protected TWA (Example - an area has a noise level of 98 dB (A). Earplugs with a NRR of 32 are planned, with earmuffs having a NRR of 15. Subtracting 7 from 32 dB equals 25, plus 5 dB from the additional protection of the earmuffs equals a TWA reduction of 30 dB, reducing the TWA noise level to 68 dB).

Calculated values reflect realistic values only to the extent that the protectors are properly fitted and worn. NIOSH has proposed NRR reductions of hearing protectors (25% for muffs, 50% for formable earplugs, and 70% for other ear plugs). Consult with the PESH for the appropriate NRR adjustments.

Devices that do not have a NRR will not be allowed for use as hearing protection (e.g., AM/FM earmuffs, white noise muffs, entertainment type earbuds, earphones, and similar).

### **5.3 Additional Information**

29 CFR 1910.95, Occupational Noise Exposure (General Industry) requires a copy of the OSHA standard will be provided to affected employees upon request and posted at locations where the action level for noise is exceeded.

Noise reduction efforts - For heavy equipment, projects should consider "buy quiet" programs when purchasing or renting equipment. Selecting equipment that operates quieter, or has an operator cab

meeting newer ANSI standards will often eliminate the need to wear hearing protection and increase worker productivity.

Noise measurements in the area or under typical work conditions should be conducted to determine the noise levels, and durations. Worker Exposures above the TWA or action level indicate that hearing protection is required. Hearing protection should be selected and matched to the conditions. Using low protection will result in worker exposure over the TWA and eventual hearing loss. Using too high a protection will result in workers not being able to hear warnings, radio communications, etc. without removing the protection and exposing themselves unprotected to the ambient noise.

## 6.0 REFERENCES

### Please Describe Your Reference Here

1. 29 CFR 1910.95, Occupational Noise Exposure and Appendices
2. 29 CFR 1926.52, Occupational Noise Exposure
3. 29 CFR.1926.101, Hearing Protection
4. 2009 TLV and BEIs (American Conference of Governmental Industrial Hygienists)
5. EHS 1-9, Recordkeeping
6. HSG1-5, Noise Monitoring
7. EHS 1-7, Event Reporting and Investigation
8. U.S. Army Corps of Engineers Safety & Health Requirements Manual (EM-385-1.1, [September 2008](#), Section 0.5C
9. [National Institute for Occupational Safety and Health \(NIOSH\)](http://www.cdc.gov/NIOSH)

### Place Your Link in this Column

[http://www.osha.gov/pls/oshaweb/owadisp.show?p\\_table=STANDARDS&p\\_id=9735](http://www.osha.gov/pls/oshaweb/owadisp.show?p_table=STANDARDS&p_id=9735)  
[http://www.osha.gov/pls/oshaweb/owadisp.show?p\\_table=STANDARDS&p\\_id=10625](http://www.osha.gov/pls/oshaweb/owadisp.show?p_table=STANDARDS&p_id=10625)  
[http://www.osha.gov/pls/oshaweb/owadisp.show?p\\_table=STANDARDS&p\\_id=10625](http://www.osha.gov/pls/oshaweb/owadisp.show?p_table=STANDARDS&p_id=10625)  
 To Order: [www.acgih.org/](http://www.acgih.org/)

<http://www.usace.army.mil/publications/eng-manuals/85-1-1/c-5.pdf>

<http://www.cdc.gov/NIOSH>

## 7.0 TABLES

**Table 1 - Noise Exposure Limits When TWA Level = 90 dB (A)**

3 dB (A) Exchange Rate Allowable Level dB (A)	Maximum Permitted Daily Duration (hours)	5 dB (A) Exchange Rate Allowable Level dB (A)
90	8	90
93	4	95
96	2	100
99	1	105
102	0.5	110
105	0.25	115

**Table 2 - Noise Exposure Limits When TWA Level = 85 dB (A)**

<b>3 dB (A) Exchange Rate Allowable Level dB (A)</b>	<b>Maximum Permitted Daily Duration (hours)</b>	<b>5 dB (A) Exchange Rate Allowable Level dB (A)</b>
85	8	85
88	4	90
91	2	95
94	1	100
97	-	105
100	0.25	110

**Table 3 - Summary Comparison of Requirements and Recommendations**

<b><u>Agency Requirement or Recommendation Exchange Rate Threshold</u></b>	<b><u>ACGIH Recommendation</u></b>	<b><u>NIOSH Recommendation</u></b>	<b><u>OSHA Requirement</u></b>	<b><u>USDOE and USACE Requirement</u></b>
	<u>3</u> 85 for 8 hours; the allowable TLVs for noise range from 80 dB for a 24 hour period to 139 dB for 0.11 seconds	<u>3</u> 85 for 8 hours; an 8 hour Time Weighted Average (TWA) of 85 dB	<u>5</u> 90 for 8 hours; the allowable PELs for noise range from 8 hours at 90 dB* to 115 dB for 0.25 hours	<u>3</u> 85 for 8 hours; the allowable TLVs for noise range from 80 dB for a 24 hour period to 139 dB for 0.11 seconds
<b><u>Impulse/Impact noise Action Level to Trigger Hearing Conservation Program Attenuation</u></b>	<u>140 dB</u> <u>85dB</u>	<u>N/A</u> <u>85dB</u>	<u>140 dB peak</u> <u>85dB</u>	<u>140 dB</u> <u>85dB</u>
	<u>Hearing protection must be able to attenuate the exposure to a TWA of 85 dB</u>	<u>Hearing protection must be able to attenuate the exposure to a TWA of 85 dB</u>	<u>Hearing protection must be able to attenuate the exposure to a TWA of 90 dB or to 85 dB for those with a standard threshold shift/not had a baseline evaluation</u>	<u>Hearing protection must be able to attenuate the exposure to a TWA of 85 dB</u>
<b><u>Sound level for mandatory use of hearing protection</u></b>	<u>90dB</u>	<u>85dB</u>	<u>90dB</u>	<u>90dB</u>
<b><u>Voluntary use of hearing protection</u></b>	<u>N/A</u>	<u>N/A</u>	<u>85 dB</u>	<u>N/A</u>

\*All dB weightings are A scale unless otherwise noted.

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Proprietary Information

**Purpose:** The purpose of this procedure is to prevent heat and cold stress related injuries and illnesses at field operations.

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		<b>Document</b>	Skip Parry
		<b>Owner</b>	

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 [s](#) 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:

##### 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

Please Describe Your Reference Here

Place Your Link in this Column

1. ACGIH (American Conference of Government Industrial Hygienists) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2007
2. Fundamentals of Industrial Hygiene. Third Edition, 1988
3. National Safety Council
4. NIOSH (National Institute for Occupational Safety and Health)
5. NIOSH/OSHA/EPA/USCG/EPA
6. Occupational Exposure to Hot Environments, Revised Criteria 1986
7. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities - October 1985
8. EHS 1-1, Responsibilities for Program Implementation
8. EHS 1-9, Recordkeeping
9. EHS 3-2, Environmental, Health & Safety Plan(s)
10. US Army Corps of Engineers, Safety & Health Manual (EM 385-1-1) Nov 2003, Section 06.J.04

## 6.0 ATTACHMENTS

### Please Provide a Description of the Attachment

1. Heat and Cold Stress Information
2. Heat Stress Monitoring and Work/Rest Regimens
3. Cold Stress Monitoring and Work/Recovery Regimens
4. Example - WBGT Monitoring Form
- 5.

### Place Your Attachments Here



EHS 4-6, Attachment 1 final 11-8-08



EHS 4-6, Attachment 2 Final 11-11-



EHS 4-6, Attachment 3 final 11-8-08



Attachment 4 Example WBGT Monit

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## ATTACHMENT 1

### HEAT AND COLD STRESS INFORMATION

#### 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.

(Internal Note – this attachment is a total revision and no revision bars are shown)  
ATTACHMENT 2

## HEAT STRESS MONITORING AND WORK/REST REGIMENS

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### 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.

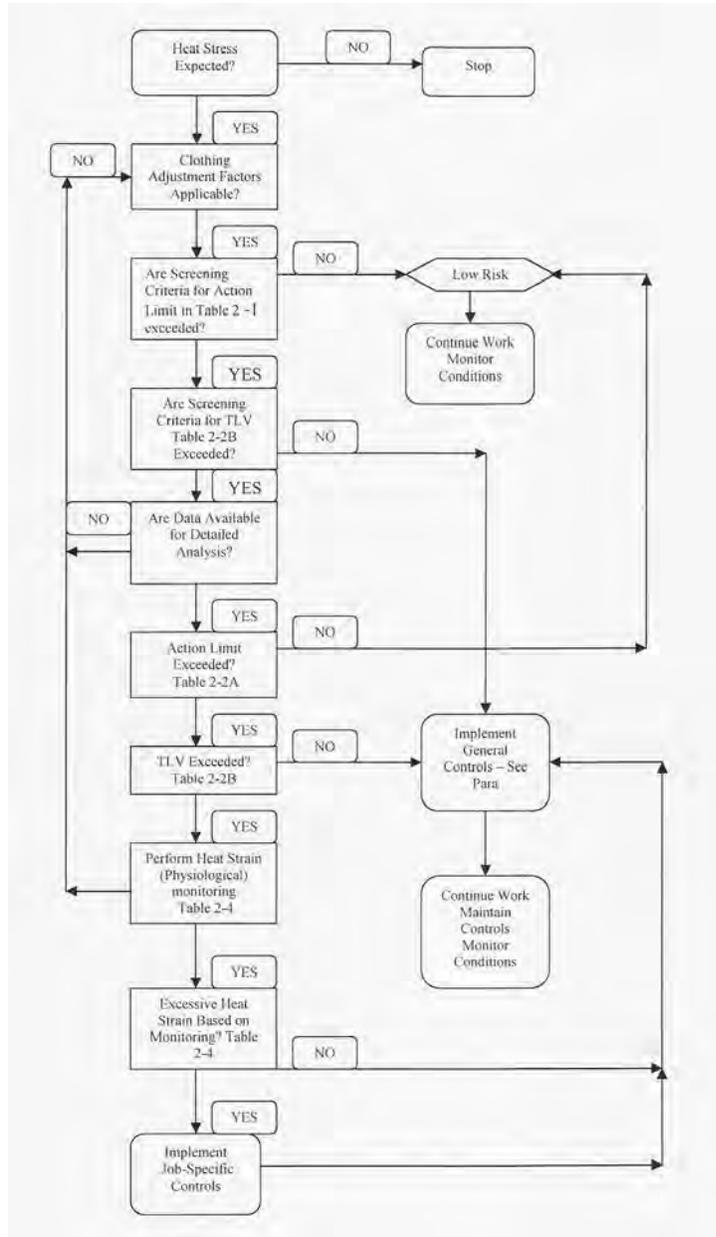
The WBGT, physiological monitors, and personnel heat stress monitors will be used in accordance with manufacturer's instructions. Personnel heat stress monitors will be approved for use by the PESM.

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 2-1 Clothing-Adjustment Factors for Some Clothing Ensembles**

Clothing Type	Addition to WBGT Index
Work Clothes (Long Sleeve Shirt and Pants)	0° F (0° C)
Cotton (woven material) Coveralls	0° F (0° C)
Double Layer woven Clothing	5.4° F (3° C)
SMS Polypropylene Coveralls	1.0° F (.5° C)
Polyolefin Coveralls	1.8° F (1° C)
Limited-Use Vapor Barrier coveralls	19.8° F (11° C)

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 2-2A Permissible Heat Exposure Action Limit Values**

(Values are given in °F and (°C) WBGT Index)\*

Allocation of Work in a Cycle of Work and Recovery	Work Load Category			
	Light	Moderate	Heavy	Very Heavy
75% to 100%	82.4 (28.0)	77.0 (25.0)		--
50% to 75%	83.3 (28.5)	78.8 (26.0)	75.2 (24.0)	--
25% to 50%	85.1 (29.5)	80.6 (27.0)	77.9 (25.5)	76.1 (24.5)
0% to 25%	86.0 (30.0)	84.2 (29.0)	82.4 (28)	80.6 (27)

**Table 2-2B Permissible Heat Exposure Threshold Limit Values)**  
(Values are given in °F and (°C) WBGT)\*

Allocation of Work in a Cycle of Work and Recovery	Work Load Category			
	Light	Moderate	Heavy	Very Heavy
75% to 100%	87.8 (31.0)	82.4 (28.0)	---	--
50% to 75%	87.8 (31.0)	84.2 (29.0)	81.5 (27.5)	--
25% to 50%	89.6 (32.0)	86.0 (30.0)	84.2 (29.0)	82.4 (28.0)
0% to 25%	90.5 (32.5)	88.7 (31.5)	86.9 (30.5)	86.0 (30.0)

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**

Categories	Example Activities
Resting	Sitting quietly
Light	Sitting with light manual work with and or hands and arms, and driving. Standing with some light arm work and occasional walking.

Moderate	Sustained moderate hand and arm work, moderate arm and leg work, moderate arm and trunk work, or light pushing and pulling. Normal walking.
Heavy	Intense arm and trunk work, carrying, shoveling, manual sawing, pushing and pulling heavy loads; walking at a fast rate.
Very Heavy	Very intense activity at fast to maximum pace,

## 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.

## ATTACHMENT 3

### COLD STRESS MONITORING AND WORK/RECOVERY REGIMENS

#### 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 be 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 be 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:
  - Proper rewarming procedures
  - First aid treatment
  - Proper eating and drinking habits
  - Recognition of impending frostbite
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
  - Safe work practices

### **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)\***

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

Air Temperature Sunny Sky		No Noticeable Wind		5 mph Wind (8 k/hr)		10 mph Wind (16 K/hr)		15 mph Wind (24 k/hr)		20 mph Wind (32 k/hr)	
°F (Approx)	°C (Approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max Work Period	Number of Breaks	Max Work Period	Number of Breaks	Max Work Period	Number of Breaks
-15 to -19	-26 to -28	Normal breaks	1	Normal breaks	1	75 min.	2	55 min.	3	40 min.	4
-20 to -24	-29 to -31	Normal Breaks	1	75 min.	2	55 min.	3	40 min	4	30 min.	5
-25 to -29	-32 to 34	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-Emergency work should cease	
-30 to -34	-35 to -37	55 min.	3	40 min.	4	30 min.	5	Non-Emergency work should cease			
-35 to -39	-38 to -39	40 min.	4	30 min.	5	Non-Emergency work should cease					
-40 to -44	-40 to -42	30 min.	5	Non-Emergency work should cease							
-45 & below	-43 & below	Non-Emergency work should cease									

**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.

**Purpose:** When required, this program provides the requirements to ensure a safe working environment within and around confined space operations by evaluating confined space hazards, implementing necessary controls, and regulating employee entry into confined spaces in accordance with 29 CFR 1910.146, Permit-Required Confined Spaces.

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## **1.0 PURPOSE**

When required, this program provides the requirements to ensure a safe working environment within and around confined space operations by evaluating confined space hazards, implementing necessary controls, and regulating employee entry into confined spaces in accordance with 29 CFR 1910.146, Permit-Required Confined Spaces.

Confined space entries should only be made if there is not a feasible method of performing the task from outside of the confined space.

## **2.0 SCOPE**

This program applies to all Tetra Tech EC, Inc. (TtEC) employees, operations, and subcontractors.

## **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 Acceptable Entry Conditions**

The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

### **4.2 Attendant**

An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

#### **4.3 Confined Space**

An enclosed area which exhibits the following characteristics:

- Is large enough and so configured that an employee can bodily enter;
- Has limited or restricted means for entry or exit; and
- Is not designed for continuous occupancy.

#### **4.4 Double Block and Bleed**

The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

#### **4.5 Engulfment**

The surrounding and effective capture of a person by a liquid or finely divided solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

#### **4.6 Confined Space Entry Permit**

The completed document which specifies the hazards, controls, and procedures for a confined space entry.

#### **4.7 Entry**

The action by which a person passes through an opening into a confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

#### **4.8 Entry Supervisor**

The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

#### **4.9 Hazardous Atmosphere**

An atmosphere which meets one or more of the following criteria:

- Flammable gas, vapor, or mist in excess of 10 percent of the lower explosive limit; or
- An airborne concentration of a dust at a concentration that meets or exceeds its lower explosive limit (rule of thumb - visibility obscured at a distance of 5 feet); or

- Atmospheric concentration of any substance which could result in employee exposure in excess of its recommended exposure limit, i.e., Permissible Exposure Limit (PEL), Threshold Limit Value (TLV), or manufacturer's limit; or
- Immediately dangerous to life or health (IDLH).

#### **4.10 Inerting**

The displacement of the atmosphere in a permit space by a noncombustible gas to such an extent that the resulting atmosphere is noncombustible.

#### **4.11 Isolation**

A pre-entry requirement which assures that the confined space has been completely taken out of service and insures that accidental introduction of hazardous substances into the confined space may not take place. Isolation may include blinding, double blocking with bleed valves, capping, and/or lockout/tagout.

#### **4.12 Line Breaking**

The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

#### **4.13 Non-permit Required Confined Space**

A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

#### **4.14 Oxygen Deficient**

An atmosphere containing less than 19.5 percent oxygen by volume.

#### **4.15 Oxygen Enriched**

An atmosphere containing 22.0 percent or more oxygen by volume. (Note: The 22% upper limit is an NFPA 306k, Certification of Hot Work, Consensus Standard.)

#### **4.16 Permit Required Confined Space**

A confined space which has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfment of the entrant; or
- Has an internal configuration that could trap or asphyxiate an entrant.

#### **4.17 Prohibited Conditions**

Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

#### **4.18 Retrieval System**

The equipment used for non-entry rescue of persons from permit spaces.

### **5.0 DISCUSSION**

#### **5.1 Responsibilities**

##### **5.1.1 Authorized Entrants**

Entrants are responsible for the following:

- Inspection of operability and integrity of all respiratory apparatus, safety equipment, and personal protective equipment (PPE) to be used/worn;
- Knowing hazards, mode of exposure, signs and symptoms, and consequences of hazardous exposure;
- Communicating with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space;
- Notifying the attendant of undetected / unnoticed hazards which could cause harm or injury to team personnel, warning signs and symptoms of exposure, and prohibited conditions;
- Wearing the designated respiratory apparatus, safety equipment, and PPE in accordance with EHS 5-2, Respiratory Protection and EHS 5-1, Personal Protective Equipment;
- Knowing the emergency procedures; and
- Exiting from the permit space when evacuation is ordered, warning signs or symptoms of exposure are noted, a prohibited condition is noted, or an alarm is activated.

##### **5.1.2 Attendants**

Attendants are required to assume the following duties and responsibilities:

- Inspection of operability and integrity of all respiratory apparatus, safety equipment, and PPE to be used/work in accordance with EHS 5-2, Respiratory Protection and EHS 5-1, Personal Protective Equipment;
- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Be aware of possible behavioral effects of hazard exposure in authorized entrants;

- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;
- Leave their position only after being physically replaced by another attendant. If required to leave their post and no replacement is available, they must evacuate all personnel from within the confined space before leaving;
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately if a prohibited condition is noted, if an authorized entrant shows behavioral effects of a hazard exposure, if a saturation develops outside the confined space that may endanger the entrants, or if the attendant cannot effectively and safely perform his or her required duties;
- Summon rescue and emergency services;
- Warn unauthorized persons that they must stay away from the permit space, advise them to exit immediately if they enter the permit space, and inform the entry supervisor if they enter the space;
- Perform non-entry rescues;
- Perform no duties that interfere with the attendant's primary duty to monitor and protect the authorized entrants;
- Remain in constant communication with the entrant at all times; and
- Perform atmospheric monitoring per the confined space permit under the direction of the entry supervisor, if trained to perform the monitoring.

### 5.1.3 Entry Supervisors

Entry supervisors have the following responsibilities:

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposures;
- Verifies by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Verifies that rescue services are available and that the means for summoning them are operable;
- Removes unauthorized individual who enter or who attempt to enter the permit space during entry operations;
- Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained;
- Ensures full compliance with TtEC and customer permit requirements;
- Ensures that all confined space pre-entry precautions have been taken;

- Ensures that atmosphere/personnel monitoring is performed at adequate frequencies to protect the safety and well being of the entry personnel;
- Ensures that emergency procedures and individual assignments are clearly defined, and to coordinate rescue procedures if necessary; and
- Terminates the entry and cancels the permit.

The entry supervisor may also serve as attendant.

#### **5.1.4 Line Management**

The Project Manager (PM) has the responsibility for:

- Ensuring implementation of the confined space entry program
- Ensuring that only trained, qualified, and medically fit personnel participate in confined space entry operations; and
- Ensuring that adequate, appropriate, and properly maintained equipment required to safely enter a confined space and successfully complete the task.

## **5.2 Procedure**

The following sections provide the requirements for pre-entry activities, pre-entry briefings, confined space operations, and program review requirements. Complete implementation of these requirements is necessary to ensure the health and safety of personnel during confined space operations.

No entries shall be made into confined spaces with:

- IDLH atmospheres;
- LEL readings in excess of 10% or a combustible dust atmosphere in excess of the LEL; or
- An oxygen content of less than 19.5% or greater than 22.0%.

#### **5.2.1 Hazard Evaluation**

Prior to the initiation of a confined space entry, a hazard evaluation of the space shall be conducted by the entry supervisor to determine what chemical and physical hazards are present. This review shall be documented on the entry permit and include, but not be limited to the following:

- Potential for oxygen deficient or enriched atmosphere;
- Presence of a flammable atmosphere;
- Presence of toxic air contaminants;
- Presence of physical hazards;
- Sources of hazardous energy that must be de-energized to effectively isolate the confined space;

- Other permits, such as hot-work or lockout/tagout, required to control hazards; and
- Acceptable entry conditions.

Various sources of information for hazard identification that may be used include blueprints, as-builts, client employee knowledge, past entry information, air monitoring data, and physical inspection. For each hazard identified, an effective means of control shall be documented on the confined space entry permit.

### **5.2.2 Atmospheric Testing**

The atmosphere of the confined space shall be tested to determine the initial concentrations of the following:

- Oxygen content;
- Flammable or combustible gases or vapors; and
- Toxic air contaminants.

Testing for the initial concentrations shall be conducted in the order given and documented on the entry permit. LEL, oxygen, and toxicity readings must be taken at least every 15 minutes. If isolation of the space is unfeasible because the space is large or part of a continuous system, the monitoring shall be continuous. Frequency for periodic monitoring during the confined space entry shall be specified and documented on the permit.

### **5.2.3 Ventilation**

Mechanical ventilation shall be initiated where necessary to prevent exposure of employees to hazardous atmospheres. The ventilation shall meet the following requirements:

- It shall be continuous;
- It shall be directed into the immediate area authorized entrants shall work in;
- The air supply shall be from a clean source and shall not increase the hazards in the area; and
- Employees shall not enter the space until the ventilation clears the hazardous atmosphere.

When ventilation practices cannot be used, a supplied air respirator must be utilized. Exceptions may be made by the Project Environmental and Safety Manager (PESM).

Ventilation equipment must be bonded and grounded prior to operation. Ventilator exhausts must be directed down wind from personnel and/or areas that contain buildings, equipment, etc.

### **5.2.4 Isolation**

All permitted spaces shall be removed from service and completely protected against the release of energy and material into the space. Means used to isolate the space include but are not limited to the following:

- Lockout/tagout in accordance with EHS 6-4;

- Disconnection of mechanical linkages and hazards;
- Blanking, blinding, or misaligning piping; or
- Double blocking and bleeding.

#### **5.2.5 Equipment Staging**

The following equipment shall be available as necessary and inspected prior to use:

- Testing and monitoring equipment;
- Ventilation equipment
- Communications equipment;
- Personal protective equipment;
- Lighting equipment (caged, waterproof, and low voltage);
- Barriers and shields;
- Ingress and egress equipment;
- Rescue and emergency equipment; and
- Any other equipment required to make safe entry into the space.

In spaces where the potential for flammable or combustible atmospheres exists, equipment shall be non-sparking and intrinsically safe. Electrical systems shall be GFCI protected.

### **5.2.6 Emergency and Rescue Procedures**

Based upon the location, hazards, and configuration of the confined space, the entry supervisor shall ensure that the following items are addressed:

- Rescue and emergency services to be used and means of summoning;
- Means of rescuing entrants;
- Rescue and emergency to be used at the site;
- Duties of personnel during emergencies; and
- Prevention of unauthorized entry during rescues.

### **5.2.7 Client/Contractor Coordination**

To ensure safe and efficient operations when TtEC personnel and client or subcontractor employees will make entry together into the same confined space, the following shall be completed by the entry supervisor:

- Inform TtEC contractors of existing confined spaces;
- Provide TtEC contractors with a copy of this program;
- Inform the contractor of known hazards in the space;
- Provide a list of controls implemented previously;
- Coordinate the entry of the personnel; and
- Debrief the contractor regarding this program and any hazards encountered.

When TtEC personnel are required to perform confined space entry in support of client work, the entry supervisor shall complete the following in addition to the above requirements:

- Obtain any available information on the space from the client;
- Coordinate the entry operations with client personnel; and
- Inform the client of entry hazards encountered.

### **5.2.8 Pre-Entry Briefing**

Prior to initiating a confined space entry, the entry supervisor shall conduct a safety briefing with the authorized entrants, attendants, and other relevant personnel. The briefing shall cover the following at a minimum:

- Hazard Communication (including the signs, symptoms, and modalities of chemical over exposure) in accordance with EHS 4-2, Hazard Communications;
- Physical hazards present;
- All hazard controls;

- Acceptable entry conditions;
- Emergency procedures;
- Rescue procedures;
- Duties of entrants and attendants during routine and emergency operations;
- Frequency and Types of air monitoring;
- Communications system and backup to be used;
- Review of work to be accomplished during entry;
- Decontamination procedures (if necessary);
- PPE disposal; and
- Potential emergencies that may occur outside the confined space.

Attachment A or an equivalent checklist shall be used to document pre-entry briefing.

At the end of the briefing, all personnel shall be given opportunity to ask questions and review the permit. After review, each authorized entrant and attendant shall print and sign his/her name on the permit. The completed permit shall be posted at the entry site and serve as a roster for monitoring entry and exit of personnel from the space.

### 5.2.9 Confined Space Operations

The following practices shall be adhered to during actual confined space entries:

- All confined spaces will be treated as permit-required confined spaces unless the PESM specifically provides an exemption in the EHS Plan, or by a field change request to the Plan. Prior to entry, a properly executed permit shall be in place and signed by the Entry Supervisor, Attendant, and each Entrant. Attachment B, or an equivalent form that is approved for use by the PESM, shall be used.

The Entry Supervisor shall certify that all equipment is in place and operable, acceptable entry conditions are present, all personnel have been fully briefed and all personnel have signed the permit prior to initiating entry.

- The work area outside the space shall be barricaded to prevent unauthorized personnel from interrupting the attendants or entering the space. Unauthorized personnel shall be asked to leave the barricaded area. If unauthorized personnel refuse to leave the area, operations shall be terminated.
- Atmospheric monitoring for oxygen, LEL, and toxic air contaminants shall be conducted at the frequency noted on the permit. Results shall be logged on the permit.
- No confined space shall be entered without:
  - A full body harness;
  - A 6' lanyard attached to the harness "D" ring; and

- A lifeline attached to the lanyard with the opposite end secured outside the confined space. The lanyard and lifeline must have double locking rings.

Note: Wristlets may be used in lieu of a full body harness if the body harness is infeasible or creates a greater hazard.

- Top entries with a fall potential greater than 5 feet shall be made with fall protection. Fall protection shall meet the criteria specified in 29 CFR 1926.502(d).
- At least one attendant is required for permit-required entries. The attendant shall maintain visual or voice communications with entrants at all times. Attendants shall not leave their post unless formally relieved by another authorized attendant. The replacement shall be fully briefed by the entry supervisor on all information covered in the pre-entry briefing. Entry supervisors may also serve as attendants.
- When any confined space is entered where the noise level or respirator used prevents voice communication, visual contact between the standby and workers must be maintained.
- Metal ladders, hand tools or other instruments which may spark or cause a source of ignition, are not to be used within confined spaces where any detectable amounts of LEL's are present.
- No burning, grinding, chipping, or other operation which produces heat, sparks, or ignition sources are to be performed without a hot work permit.
- One attendant shall be dressed in the same PPE as the authorized entrants, except for respiratory protection. Attendant supplied air shall be from a different source than that of authorized entrants.
- The entry supervisor shall terminate operations when the work is completed, an unacceptable entry condition is detected, or another emergency inside or outside the space is detected. Authorized entrants shall immediately evacuate upon notification of the termination.
- Attendants may monitor multiple sites only if they are able to maintain continuous visual or voice communications with entrants. If continuous communications cannot be maintained, additional attendants shall be used.
- Attendants shall perform non-entry rescues in emergencies using rescue equipment staged at the site.
- Upon completion of work and exit of the entrants, the permit shall be canceled by the entry supervisor and forwarded to the ESS. Permits shall be maintained as a part of the project file.

#### **5.2.10 Deviation From Program Requirements**

- Any deviation from this procedure requires the approval of the PESM.
- Approval for entry into permit-required confined spaces with air purifying respirators will be given if:
  - The composition of the hazardous substance(s) in the confined space is well defined;
  - The hazardous substance(s) have good warning properties;

- Short-term exposure to the hazardous substance(s) in excess of the recommended exposure limit will not result in serious physical harm;
- The efficiency of the cartridge versus the hazardous substance(s) is known;
- Forced air ventilation is utilized;
- Reliable monitoring methods are available; and
- Monitoring shows airborne concentrations to be less than the recommended exposure level for the contaminants.

#### **5.2.11 Identification of Confined Spaces**

A survey of the sites shall be performed prior to the start of work and documented to identify permit-required confined spaces. All permit-required confined spaces shall be identified with a sign. The sign shall contain the following wording of equivalent:

DANGER - PERMIT REQUIRED CONFINED SPACE

DO NOT ENTER

#### **5.2.12 Program Review**

The effectiveness of program implementation shall be reviewed by the PESM during site EHS inspections pursuant to EHS 3-3, Inspections, using the canceled permits and relevant incident information. The program will be modified, as necessary, on the basis of the PESM program reviews.

#### **5.2.13 Training**

Authorized entrants, attendants, and entry supervisors shall be trained in accordance with 29 CFR 1910.146 (g) including the following topics as appropriate:

- The contents of this procedure;
- Their respective duties;
- CPR /First Aid (attendants and entry supervisors if they are serving as rescue personnel);
- Hazards commonly found in confined spaces;
- Lockout/tagout procedures;
- Isolation practices;
- Ventilation of confined spaces;
- Supplied air respiratory protection and SCBAs;
- Self rescue;
- Methods of communication;
- Atmospheric monitoring; and

- Rescues.

Training shall establish employee proficiency in the skills required for confined space entry and the understanding and knowledge for the safe performance of all duties required by this procedure. Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

## **6.0 REFERENCES**

29 CFR 1910.146, Permit-Required Confined Spaces  
29 CFR 1926.502(d), Fall Protection.  
Environmental, Health & Safety - Programs Procedure EHS 1-9, Recordkeeping  
Environmental, Health & Safety - Programs Procedure EHS 3-3, Inspections  
Environmental, Health & Safety - Programs Procedure EHS 4-2, Hazard Communication  
Environmental, Health & Safety - Programs Procedure EHS 5-1, Personal Protective Equipment  
Environmental, Health & Safety - Programs Procedure EHS 5-2, Respiratory Protection  
Environmental, Health & Safety - Programs Procedure EHS 6-4, Lockout/Tagout  
OSHA (U.S. Department of Labor, Occupational Safety and Health Administration)

## **7.0 ATTACHMENTS**

[Attachment A - Pre-Entry Briefing Checklist](#)  
[Attachment B - Confined Space Entry Permit](#)

**EHS 6-1 ATTACHMENT A**  
**PRE-ENTRY BRIEFING CHECKLIST**

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EHS 6-1 Attachment A.doc

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**EHS 6-1 ATTACHMENT B**  
**CONFINED SPACE ENTRY PERMIT**

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## EHS 6-1 ATTACHMENT A



### CONFINED SPACE ENTRY PRE-ENTRY BRIEFING CHECKLIST

**Project Name:** \_\_\_\_\_ **Project Location:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_

**Completed By:** \_\_\_\_\_

**Attendee(s):** \_\_\_\_\_

- Hazard Communication (including the signs, symptoms, and modalities of chemical overexposure).
- Physical hazards present.
- All hazard controls.
- Acceptable entry conditions.
- Emergency procedures.
- Rescue procedures.
- Duties of entrants and attendants during routine and emergency operations.
- Frequency and Types of Monitoring.
- Communications system backup to be used.
- Review of work to be accomplished during entry.
- Decontamination procedures (if necessary).
- PPE disposal
- Potential emergencies that may occur outside the confined space.

**PRELIMINARY EHS 6-1 ATTACHMENT B**



**CONFINED SPACE ENTRY PERMIT**

**PERMIT VALID FOR ONE SHIFT ONLY. ALL PERMIT COPIES REMAIN AT SITE UNTIL JOB COMPLETED.**

DATE: \_\_\_\_\_ SITE LOCATION/DESCRIPTION: \_\_\_\_\_

PURPOSE OF ENTRY: \_\_\_\_\_

SUPERVISOR(S) IN CHARGE OF CREWS/TYPE OF CREW/PHONE #: \_\_\_\_\_

COMMUNICATION PROCEDURES: \_\_\_\_\_

RESCUE PROCEDURES AND PHONE NUMBERS: \_\_\_\_\_

Name of Emergency Service (ES)	Phone# of ES	Date/Time ES contacted	ES Available ? Y or N	Date/Time ES Response Made		Comments/Problems with Service
				Before Confined Space	After Confined Space	

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Breathing Apparatus	_____	_____	Line(s) Broken-Cappe Blank	_____	_____
Emergency Escape/Fall Retrieval Equipment	_____	_____	Protective Clothing	_____	_____
Fire Extinguishers	_____	_____	Purge-Flush and Vent	_____	_____
Full Body Harness w/ "D" Ring	_____	_____	Respiratory Protection	_____	_____
Lifelines	_____	_____	Secure Area (Post and Flag)	_____	_____
Lighting (Explosive Proof)	_____	_____	Standby Safety Personnel	_____	_____
			Ventilation	_____	_____

**Note: For items that do not apply, enter N/A in the blank. See page 2 to add any special requirements.**

**RECORD MONITORING RESULTS EVERY 1/4 HOUR**

<u>TEST(S) TO BE TAKEN</u>	<u>Permissible Entry Level</u>	<u>Time(s)</u>
PERCENT OF OXYGEN	19.5% to 22.0%	_____
LOWER FLAMMABLE LIMIT	Under 10 %	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

REMARKS: \_\_\_\_\_



**Purpose:** This program provides the requirements for activities involving excavations in accordance with 29 CFR 1926, Subpart P - Excavations.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
<b>Version Date - Type:</b>	07/03/2001 - Revised	<b>Title:</b>	Excavation and Trenching
<b>Category:</b>	Company Procedures	<b>Original Issue</b>	02/01/95
<b>Sub-Category:</b>	Departmental/Discipline	<b>Date:</b>	
<b>Keyword Index:</b>	EHS Compliance/Waste Management, Field Activities/Science, Operational Control, Training, Monitoring	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
		<b>Document</b>	Procedure
		<b>Type:</b>	
		<b>Document</b>	Skip Parry
		<b>Owner</b>	

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## **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 PESH 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**

29 CFR 1926, Subpart P, Excavations.  
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 6-3 Attachment A 04-03-03.doc

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**EHS 6-3 ATTACHMENT B  
SOILS ANALYSIS CHECKLIST**

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**EHS 6-3 ATTACHMENT A**



**TETRA TECH EC, INC.**

**DAILY EXCAVATION INSPECTION CHECKLIST**

**To be completed by a "Competent Person"**

Site location	_____		
Date	_____	Time	_____
		Competent Person	_____
Soil Type(s)	_____		
	Soil Classification(s)	Excavation depth	Excavation width
		_____	_____
Type of protective system used	_____		

*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   | Y | N | N/A |
| B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation        | Y | N | N/A |
| C. Hard hats worn by all employees   | Y | N | N/A |
| D. Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation                             | Y | N | N/A |
| E. Barriers provided at all remotely located excavations, wells, pits, shafts, etc.                                      | Y | N | N/A |
| F. Walkways and bridges over excavations 4 feet or more in depth are equipped with standard guardrails                   | Y | N | N/A |
| G. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic | Y | N | N/A |
| H. Warning system established and utilized when mobile equipment is operated near the edge of the excavation             | Y | N | N/A |
| I. Employees prohibited from working on the faces of sloped or benched excavations above other employees                 | Y | N | N/A |

**II. Utilities**

- |  |   |   |     |
|--|---|---|-----|
| A. Utility companies contacted and/or utilities located                              | Y | N | N/A |
| B. Exact location of utilities marked when approaching the utilities                 | Y | N | N/A |
| C. Underground installations protected, supported or removed when excavation is open | Y | N | N/A |

**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                     | Y | N | N/A |
| B. Ladders used in excavations secured and extended 3 feet above the edge of the trench                                 | Y | N | N/A |
| C. Structural ramps used by employees designed by a competent person  | Y | N | N/A |
| D. Structural ramps used for equipment designed by a registered professional engineer (RPE)                             | Y | N | N/A |
| E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with a no-slip surface | Y | N | N/A |
| F. Employees protected from cave-ins when entering or exiting the excavation  | Y | N | N/A |

**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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EHS 6-3 ATTACHMENT B



TETRA TECH EC, INC.

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

Particle type: \_\_\_\_\_ Fine Grained (cohesive) \_\_\_\_\_ Course grained (sand or gravel)

Water conditions: \_\_\_\_\_ Wet \_\_\_\_\_ Dry \_\_\_\_\_ Surface water present \_\_\_\_\_ Submerged

Previously disturbed soils? \_\_\_\_\_ Yes \_\_\_\_\_ No

Underground utilities? \_\_\_\_\_ Yes \_\_\_\_\_ No

Layered soils? \_\_\_\_\_ Yes \_\_\_\_\_ No

Layered soil dipping into excavation? \_\_\_\_\_ Yes \_\_\_\_\_ No

Excavation exposed to vibrations: \_\_\_\_\_ Yes \_\_\_\_\_ No

Crack-like openings or spallings observed? \_\_\_\_\_ Yes \_\_\_\_\_ No

Conditions that may create a hazardous atmosphere? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, identify condition and source: \_\_\_\_\_

Surface encumbrances: \_\_\_\_\_ Yes \_\_\_\_\_ No

Work to be performed near public vehicular traffic? \_\_\_\_\_ Yes \_\_\_\_\_ No

Possible confined space exposure? \_\_\_\_\_ Yes \_\_\_\_\_ No

MANUAL TEST

Plasticity: \_\_\_\_\_ Cohesive \_\_\_\_\_ Non-cohesive

Dry Strength: \_\_\_\_\_ Granular (crumbles easily) \_\_\_\_\_ Cohesive (broken with difficulty)

**EHS 6-3 ATTACHMENT B  
SOILS ANALYSIS CHECKLIST**

**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 determine 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.*

**Purpose:** The purpose of this program is to establish minimum requirements for boating safety.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
<b>Version Date - Type:</b>	01/27/2010 - Revised	<b>Title:</b>	Boating
<b>Category:</b>	Company Procedures	<b>Original Issue</b>	02/01/95
<b>Sub-Category:</b>	Departmental/Discipline	<b>Date:</b>	
<b>Keyword Index:</b>	Field Activities/Science, Training	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
		<b>Document</b>	Procedure
		<b>Type:</b>	
		<b>Document</b>	Skip Parry
		<b>Owner</b>	

Section

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- 2.0 SCOPE
- 3.0 MAINTENANCE
- 4.0 DEFINITIONS
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5.13 Training  
5.1.4 Operations

6.0 REFERENCES

7.0 ATTACHMENTS

## **1.0 PURPOSE**

The purpose of this program is to establish minimum requirements for boating safety.

## **2.0 SCOPE**

This procedure applies to all Tetra Tech EC, Inc. (TtEC) projects.

## **3.0 MAINTENANCE**

The Director, EHS 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.

## **4.0 DEFINITIONS**

### **4.1 Boat**

Any powered or nonpowered watercraft utilized for the transport of personnel on a body of water.

## **5.0 DISCUSSION**

### **5.1 Responsibilities**

#### **5.1.1 Line Management**

The Project Manager (PM) is responsible for coordinating with the appropriate TtEC Project Environmental and Safety Manager (PESM) to implement the requirements of this procedure. The PM shall provide the necessary management support and allocate sufficient project resources to permit project personnel to operate boats in a safe manner.

Site managers and supervisors are responsible for implementation of this boating safety program in the field.

#### **5.1.2 Environmental, Health and Safety Personnel**

The PESM shall ensure that the requirements of this program are incorporated into site Environmental Health and Safety (EHS) plans.

### **5.2 General Requirements**

### **5.2.1 Boat Towing and Launching**

TtEC personnel who will tow a boat on a trailer to the launching site will be experienced in this capacity and be responsible for reviewing the Boating Checklist (Attachment 1) prior to departure. Ensure that the boat is not loaded with project equipment that will overload the bearings and axle weight capacity. This equipment should be carried in another or the towing vehicle.

A person experienced in towing a boat, launching, or piloting a vessel must be designated by the Project Manager. This person must be designated by the Project Manager. This person must have the U.S. Coast Guard approved small boat safety training course.

Pre-launch checks will be done before the boat is backed into the water and includes checking the engine oil and/or fuel mixtures in the tanks. Any mixing of fuel and oil will be done in a separate UL approved flammable liquid storage container prior to filling the vessel tanks. This will ensure the gas/oil mixture is correct..

Whenever possible, perform fuel mixing and transfer in an environmentally safe area where spills can be easily cleaned.

To launch the vessel, back part way down the boat ramp, remove the rear tie down straps to the trailer, ensure the boat plug is installed and continue backing into the waters edge. Place the fenders/bumpers on the side that will be in contact with the pier to prevent damage. Ensure that the bow and stern lines are being handled by personnel on the pier as the vessel is backed further into the water until the vessel is floating freely. An alternative is to have the coxswain in the boat lower the engine and start it when the rear is in the water and floating free from the trailer. He can carefully back the boat with the engine clear of the trailer. Pull the truck and trailer forward and park and secure. Secure the bow and stern lines to the dock and load additional equipment. Lower the engine/out drive if necessary and start the engine. Once warm, turn off the engine and restart to ensure that the motor is working properly.

For vessel recovery, reverse the process listed above. Back the truck and trailer down the ramp and place the truck in park with the emergency brake on. Keep the bow winch connected to the vessel until the vessel is out of the water on the trailer. Raise the motor/outdrive and secure in the up position. The vessel is not to be towed or loaded with a person on the vessel. Once the vessel is trailered, remove additional equipment as necessary to reduce weight and secure the vessel to the trailer with bow and stern straps and the safety chain near the winch.

### **5.2.2 Boat Operators**

Only designated TtEC personnel who meet the training requirements under USACOE EM 385-1-1 section 19.F, shall operate a boat during the course of a project.

Boat operators shall possess basic knowledge to troubleshoot common mechanical problems that can occur on the board. The boat operator shall be responsible for the safety of all personnel on board the boat he or she is operating and for the integrity of all boat and safety equipment.

Each designated boat operator shall give a safety briefing to boat occupants prior to leaving shore. **Boats are to be occupied during use by not less than one qualified operator plus one additional person. In the event that the "additional person" is not a qualified operator, a basic safety and operations demonstration will be conducted before launching.**

### **5.2.3 Boat Passengers**

Project personnel riding as passengers in a boat shall comply with U.S. Coast Guard requirements.

### **5.3 Float Plan**

[A float plan shall be developed by](#) the Environmental and Safety Supervisor (ESS) or FOL [for all trips made by boat using the US Coast Guard example Float Plan located in Attachment 2.](#) The ESS or SM/FOL shall be aware of the location of all project boats and personnel using them at all times. If several boats and crews are involved or are traveling to remote areas, each designated boat operator shall file a written float plan with the ESS or SM/FOL. The float plan shall include the following:

- The names of the boat operator and passengers;
- A description and registration numbers of the boat;
- Radio call sign or cellular telephone number if boat is so equipped;
- A trip itinerary with [expected time and location of return](#);
- Steps the ESS or SM/FOL will take to initiate a search response if the expected time of return is exceeded; [and](#)

[A Float Plan shall be prepared by each designated boat operator and approved by the PM, and ESS, and/or qualified person prior to the activity.](#)

#### **5.4 Boat Registration and Numbering**

The ESS or SM/FOL shall ensure that all project boats meet U.S. Coast Guard or state boat registration and numbering requirements. The US Coast Guard requires that all motorized boats be numbered in the state of principal use. Many states also require that certain non-motorized boats be numbered (sailboats, rafts, and dinghies). A valid certificate or number showing the numbers issued to the boat is required to be on board the boat whenever the boat is in use. Boat registration numbers are required to be painted or permanently attached to each side of the forward half of the boat. Boat registration must be updated annually.

#### **5.5 U.S. Coast Guard-Approved Equipment**

All TtEC project boats will meet or exceed U.S. Coast Guard requirements for safety equipment. These requirements are summarized below for small craft (less than 12 meters in length). The ESS or SM/FOL shall consult with the PESM if larger craft are required.

##### **5.5.1 Flame Arresters**

All gasoline engines, except outboard motors, installed in a boat must have an approved flame arrester (backfire preventer) fitted to the carburetor.

##### **5.5.2 Sound Signaling Devices**

Although not required for small craft, all TtEC boats shall carry at least one air horn or similar sound-signaling device.

##### **5.5.3 Personal Flotation Devices**

All TtEC personnel and passengers shall wear an approved personal flotation device (PFD) at all times when operating or being transported in a boat. A positively buoyant wet suit or dry suit may be substituted for a PFD. PFDs shall be Type II or higher (capable of turning its wearer in a vertical or slightly backward position in the water) unless [the Project Environmental Safety Manager](#) approves Type III based on conditions. Automatic inflating PFDs can be used providing that [they are approved in the Health and Safety Plan](#), an AHA addresses its use, the PFD is not used by persons less than 90 pounds and, it is inspected, maintained and stored in accordance with the manufacturer's instruction. In addition, each boat [up to 26 feet in length](#) shall be equipped with at least one Type IV PFD, [ring buoy, 24 inches in diameter with 90 feet of buoyant line attached](#), designed to be thrown to a person in the water and grasped and held by the user until rescued. A buoyant boat cushion equipped with straps and a float ring are two common examples of [additional types of](#)

[life rings that can qualify as](#) a Type IV PFD [and help in a rescue](#).

#### **5.5.4 Fire Extinguishers**

Each boat used by TtEC personnel [less than 26 feet](#) shall carry at least one [1-A:10:BC](#) fire extinguisher (for use in gasoline, oil and grease fires) approved by Underwriters Laboratories (UL). [Motor boats or skiffs over 26 feet will have a minimum of two 1-A:10BC fire extinguisher available. Larger craft will have additional requirements.](#) Each fire extinguisher shall be inspected by the ESS or SM/FOL at least [once every week](#) to ensure that it is sufficiently charged and that the nozzles are free and clear. Discharged fire extinguishers shall be replaced or recharged immediately. [The number and sizes of extinguishers required will depend on the vessel size and applicable regulations.](#)

#### **0 5.5.5 Navigation Lights**

Each boat operated at night shall be equipped with navigation lights and these lights shall be utilized at all times when operating between sunset and sunrise. Navigational lighting shall be in compliance with U.S. Coast Guard requirements. Boats shall be operated at reduced speeds at night and when visibility is reduced.

#### **5.5.6 Visual Distress Signals**

All TtEC boats shall carry a selection of pyrotechnic and nonpyrotechnic visual distress signals. Pyrotechnic visual distress signals include red flares, orange smoke, and aerial red meteor or parachute flares. Nonpyrotechnic visual distress signals include an orange distress flag and a flashlight or other electric distress light. No single signaling device is ideal under all conditions and for all purposes. Pyrotechnic visual distress signals shall not be used past the expiration date.

#### **5.5.7 Pollution Control**

The Refuse Act of 1989 prohibits the throwing, discharging, or depositing of any refuse matter of any kind (including trash, garbage, oil, and other liquid pollutants) into the waters of the United States. The Federal Water Pollution Control Act prohibits the discharge of oil or hazardous substances in quantities that may be harmful into U.S. navigable waters. No person may intentionally drain oil or oily wastes from any source into the bilge of any vessel. Larger vessels equipped with toilet facilities must be equipped with a U.S. Coast Guard-approved marine sanitation device.

TtEC employees shall report any significant oil spills to water to the PESM who must report the spill to the U.S. Coast Guard or other applicable regulatory agency. The procedure for incident reporting and investigation shall be followed when reporting the spill. (See EHS 1-7, [Event](#) Reporting and Investigation).

#### **5.6 Load Capacity**

Boats shall not be loaded (passengers and gear) beyond the weight capacity printed on the U.S. Coast Guard information plate attached to the stern. In addition, several factors must be considered when loading a boat: distribute the load evenly, keep the load low, do not stand up in a small boat or canoe, and do not overload the boat.

#### **5.7 Tool Kit**

All TtEC motorized boats shall carry a tool kit sufficient for the boat operator to troubleshoot common mechanical problems such as fouled spark plugs, flooded carburetor, electrical shorts, etc. Boats operated in remote areas shall also carry appropriate spare parts (propellers, shear pins, patch kits, air pumps, etc). The tool kit shall be maintained by the boat operator [with](#) supplies replaced immediately [upon use](#).

#### **5.8 Survival Kit**

All TtEC boats utilized in remote areas shall carry a survival kit. The survival kit shall contain, at a minimum,

a first aid kit, high-energy canned or preserved foods, drinking water, blankets, a heat source, signaling devices, waterproof matches, and other items as necessary to ensure survival for a minimum of 24 hours for the entire crew. Survival suits may be required by the EHS plans for operations in cold environments.

## **5.9 Communications**

All TtEC boats operated in remote areas shall carry a two-way radio or cellular telephone that enables communication back to the field camp or other pre-established location. Exceptions to this requirement must be negotiated with the PESM. [Additional communication and locating methods may be utilized such as SPOT Messenger, GPS and satellite telephones.](#)

## **5.10 Boating Accident Report**

The U.S. Coast Guard requires filing of a boating accident report within 24 hours of an accident. TtEC personnel involved in a boating accident shall follow the procedure outlined in EHS plans and EHS 1-7, [Event Reporting and Investigating for accident and injury reporting](#). This procedure will provide for proper notification of the U.S. Coast Guard.

## **5.11 Good Housekeeping**

TtEC personnel using a boat shall properly stow and secure all gear and equipment against unexpected shifts when underway. Decks and open spaces must be kept clear and free from clutter and trash to minimize slip, trip, and fall hazards.

## **5.12 Fuel Management**

TtEC personnel shall utilize the "one-third rule" in boating fuel management. Use one-third of the fuel to get to the destination, one-third to return, and keep one-third in reserve.

## **5.13 Training**

Boat operators shall be trained on and [pass the test of](#) U.S. Coast Guard boating safety requirements. All operators and passengers shall be trained on the requirements of this program. Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

## **5.14 Operations**

[Operations of motor boats/skiffs in can be hazardous to personnel considering other boaters, weather conditions, the task assigned and the condition of the boat/skiff you are operating. Ensure Attachment 1, Work Boat Inspection Checklist is completed before departing the launch area.](#)

[When operating in restricted waters, near shipping channels, in rough fast flowing water or near obstacles that could damage or capsize the boat, plan for emergency rescue in case the boat motor falls or you become incapacitated from operating the boat and you are in personal danger. Consideration would be for a second motor or a safety boat operating in the area or other rescue capability available.](#)

## **6.0 REFERENCES**

**Please Describe Your Reference Here**

**Place Your Link in this Column**

1. 33 CFR Subchapter S, Boating Safety
2. Environmental, Health & Safety Programs, Procedure EHS 1-7 Event Reporting & Investigation
3. Environmental, Health & Safety Programs, Procedure EHS 1-9 Recordkeeping
4. U.S. Department of Transportation, U.S. Coast Guard
5. <http://www.floatplancentral.org>
- 6.
- 7.

<http://www.floatplancentral.org>

**Please Provide a Description of the Attachment**

- 1. Attachment 1, Boating Checklist
  
- 2. Attachment 2, U.S. Coast Guard Float Plan
  
- 2.

**Place Your Attachments Here**



EHS 6-6 Boat Inspection List 12-08-09 PLBgc12



USCG Float Plan.pdf

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## WORK BOAT INSPECTION CHECKLIST

Date of Inspection:		Boat Owner / Operator:		
Boat Registration No.:		Inspected by (Signature):		
		Yes	No	N/A
1	Is the vessel's registration and certification current?			
2	Is the maximum number of passengers that can be safely transported posted?			
3	Is the hull in satisfactory condition? (any obvious leaks?)			
4	Are navigation lights working properly?			
5	Are visual distress signaling devices (day and night) present and up to date? (i.e. signal flares).			
6	Is a signal device provided on the vessel to give signals required by applicable navigation rules? (i.e. air horn.)			
7	Are paddles and/or oars on board and in good condition?			
8	Is bilge pump and discharge (if so equipped) properly located and in good operating condition?			
9	Is a fully stocked first aid kit of the proper size on board?			
10	Has a Type I, II or III or V USCG personal flotation device (PFD) been provided to all boat passengers and properly worn?			
11	Are PFDs inspected for defects?			
12	Are survival suits available for each passenger, where necessary?			
13	Are all PFDs in use equipped with retro-reflective tape?			
14	Is each boat equipped with at least one USCG approved life ring or ring buoy with at least 90 feet of "solid braid polypropylene" line or equal attached?			
15	Is the motorboat equipped with a kill switch?			
16	Are boat seats securely bolted to the boat deck?			
17	Are all launches and motorboats equipped with fire extinguishers of at least the size and rating(s) specified? (Type 1-A:10-B:C)			
18	Are all gasoline engines that are equipped with carburetor have a backfire trap or flame arrestor?			
19	Are fuel tank overflow, fill, and vent pipes so equipped that liquid or vapor cannot escape inside hull or cabin, and will flow overboard?			
20	Are boats that are powered by internal combustion engines, (located within compartments or confined spaces) equipped with a vent fan with fan intakes within one foot of the engine compartment bottom?			
21	Are the lights properly maintained, assuring that they are visible between sunset and sunrise?			
22	Is the boat equipped with a white stern light having a 32 point, 2 mile visibility?			
23	Is the condition of the fuel supply hose satisfactory?			
24	Is there an anchor with adequate line in place and attached to the boat?			
25	Is the boat equipped with a functional radio?			
26.	Is there sufficient fuel to follow the one third rule?			

Other:

LIFEBOAT AND SKIFF INSPECTION CHECKLIST		Yes	No	N/A
1	Is a life saving skiff available where people are working over or near water?			
2	Does the skiff have the following equipment?			
	a. Four oars or equivalent means of propulsion. (two if skiff is motor powered ).			
	b. Oar locks attached to oars or gunwales.			
	c. One ball pointed boat hook.			
	d. One ring buoy with 90 feet of 3/8 inch polypropylene or equivalent line attached.			
	e. Personal flotation devices.			
3	Is a suitable motorboat provided where use of oars is impractical?			
4	Is the life skiff kept afloat or is a means for instant safe launching provided?			
5	Are trained persons kept at ready for launching and operating the life skiff?			
6	Is the skiff used for other purposes than drills or emergencies?			
7	When a motor boat is used as a skiff, is it equipped with a compatible fire extinguisher?			
8	Is the maximum capacity of boat posted? (Capacity should be no less than 3.)			
9	Does the horsepower of the motor conform with the capacity plate?			
10	Is the fuel supply hose in satisfactory condition?			
11	Is the hull in good condition? (No obvious leaks.)			



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# FLOAT PLAN

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue organization, should you not return or check-in as scheduled. If you have a **change of plans** after leaving, be sure to notify the person holding your Float Plan.

Do **NOT** file this plan with the Coast Guard.



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## VESSEL

### IDENTIFICATION:

Name & Home Port \_\_\_\_\_  
Doc. / Registration No. \_\_\_\_\_  
Year & Make \_\_\_\_\_  
Length \_\_\_\_\_ Type **PWR** Draft \_\_\_\_\_ (Inch/CM) Hull Mat. **Fiber**  
Hull Color(s) \_\_\_\_\_  
Prominent Feature(s) \_\_\_\_\_

### TELECOMMUNICATIONS:

Radio Call Sign \_\_\_\_\_  
DSC MMSI Number \_\_\_\_\_  
Radio-1: Type **VHF-FM** Ch / Freq. Monitored \_\_\_\_\_  
Radio-2: Type \_\_\_\_\_ Ch / Freq. Monitored \_\_\_\_\_  
Cell Phone \_\_\_\_\_  
Pager \_\_\_\_\_

### PROPULSION:

Primary - Type **Gas IO** No. Eng. \_\_\_ Fuel Capacity \_\_\_\_\_  
Auxiliary - Type **none** No. Eng. \_\_\_ Fuel Capacity \_\_\_\_\_

### NAVIGATION: (Check all on board)

Maps  Charts  Compass  GPS / DGPS  
 Radar  Loran C  Sounder  \_\_\_\_\_

## SAFETY & SURVIVAL

### VISUAL DISTRESS SIGNALS:

Day Only type  
 Night Only type  
 Day & Night type

### AUDIBLE DISTRESS SIGNALS:

Horn / Whistle  
 Bell  
 \_\_\_\_\_

### OTHER GEAR / SUPPLIES:

Lifeboat / Life Raft  Flashlight / Searchlight  
 Dinghy / Skiff  Signal Mirror  
 Food / Water  Drogue / Sea Anchor  
 EPIRB **none**  \_\_\_\_\_  
 Foul Weather Gear  \_\_\_\_\_

### PFDs: (Do not count Type IV devices)

\_\_\_ Quantity on board

### GROUND TACKLE:

Anchor - line length \_\_\_\_\_ ft.

## PERSONS ON BOARD

### OPERATOR:

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip code \_\_\_\_\_  
Vehicle (Year, Make & Model) \_\_\_\_\_  
Where will trailer be parked? \_\_\_\_\_

Age M/F Notes (Special medical condition, Can't swim, etc.)

Experience: w/Boat  w/Area   
Home Phone \_\_\_\_\_  
Vehicle License No. \_\_\_\_\_  
Trailer License No. \_\_\_\_\_

### PASSENGERS:

Name & Home Phone

Age M/F Notes (Special medical condition, Can't swim, etc.)

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

Attach Supplemental Passenger List if additional passengers on board.

## ITINERARY

	DATE	TIME	LOCATION	MODE OF TRAVEL	REASON FOR STOP	CHECK-IN TIME
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						

Attach Supplemental Itinerary if additional space required.

Contact 1 \_\_\_\_\_ Phone Number \_\_\_\_\_  
Contact 2 \_\_\_\_\_ Phone Number \_\_\_\_\_

If you have a genuine concern for the safety or welfare of any persons on board this vessel, who have not returned or checked-in within a reasonable amount of time, then follow the step-by-step instructions on the **Boating Emergency Guide** included with this plan, or on the World Wide Web at:

<http://www.uscgaux.org/~floatplan/BoatingEmergencyGuide.htm>

# BOATING EMERGENCY GUIDE

You will need the following items before you begin: 1) The **Float Plan**, if one was given to you; 2) **Pen or Pencil**; 3) Clean sheet of **paper or writing tablet**; and 4) **Telephone Directory**.

## Step 1

Is there a genuine concern for the safety or welfare of any persons on board the vessel, who have not returned or checked-in within a reasonable amount of time?

If YES, continue with **Step 2**. If NO, then **Stop**. No further action is required at this time.

## Step 2

Were you given a prepared Float Plan by anyone onboard the vessel?

If YES, continue with **Step 3**. If NO, then go to **Step 5**.

## Step 3

On the Float Plan, locate the two contact lines, below the "Itinerary" at the bottom of the Float Plan. Call the telephone number of Contact-1.

IF:	THEN:						
A person answered the phone...	Take notes during your conversation.						
	1. Let the person know that you are responding to a late return or check-in by the individuals designated on the Float Plan.						
	2. Determine if the person you are talking to, or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.						
	3. Are you still concerned about the safety or welfare of any persons on board the vessel?						
	<table border="1"> <thead> <tr> <th>IF:</th> <th>THEN:</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>Continue with <b>Step 4</b>.</td> </tr> <tr> <td>No</td> <td><b>Stop</b>. No further action is necessary at this time.</td> </tr> </tbody> </table>	IF:	THEN:	Yes	Continue with <b>Step 4</b> .	No	<b>Stop</b> . No further action is necessary at this time.
IF:	THEN:						
Yes	Continue with <b>Step 4</b> .						
No	<b>Stop</b> . No further action is necessary at this time.						
Otherwise...	Continue with <b>Step 4</b> .						

## Step 4

Call the telephone number for Contact-2.

IF:	THEN:						
A person answered the phone...	Take notes during your conversation.						
	1. Let the person know that you are responding to a late return or check-in by the individuals designated on the Float Plan.						
	2. Determine if the person you are talking to, or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.						
	3. Are you still concerned about the safety or welfare of any persons on board?						
	<table border="1"> <thead> <tr> <th>IF:</th> <th>THEN:</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>Continue with <b>Step 6</b>.</td> </tr> <tr> <td>No</td> <td><b>Stop</b>. No further action is necessary at this time.</td> </tr> </tbody> </table>	IF:	THEN:	Yes	Continue with <b>Step 6</b> .	No	<b>Stop</b> . No further action is necessary at this time.
IF:	THEN:						
Yes	Continue with <b>Step 6</b> .						
No	<b>Stop</b> . No further action is necessary at this time.						
Otherwise...	Continue with <b>Step 6</b> .						

## Step 5

Take a moment to jot down the facts you know about each item in the checklist below:

Do not speculate! Speculation of a fact may mislead search and rescue personnel and add to the overall search and rescue time, adversely affecting the outcome.

- Period of time the vessel has been overdue.
- Purpose of the trip or voyage.
- Description of vessel (color, size, shape, etc.)
- Vessel's departure point and destination.
- Places the vessel planned to stop during transit.
- Navigation equipment on board (such as GPS, Compass, Maps, Charts, LORAN C, etc.)
- Survival equipment on board (life jackets, EPIRB, flares, etc.)
- Number of people on board the vessel, as well as personal habits e.g. dependability, reliability, etc.
- Was the vessel already moored, or did a vehicle tow it to the location?
- License plate number and description of the vehicle of the towing and/or crew transport vehicle.
- Communications equipment on board including radio frequencies monitored, cellular telephone numbers of people aboard.
- Additional points of contact in the area.
- Were there any pending commitments (work, appointments, etc.)?

Continue with **Step 6**.

## Step 6

1. Contact your local Law Enforcement agency.
  2. Let the dispatcher know that you are responding to a late return or check-in by the persons on board.
    - a. The dispatcher will guide you from there. The dispatcher will provide you with the necessary contact or agency connection (if one was not given on the Float Plan) to get a Search And Rescue (SAR) mission started. This is usually handled this way because it puts you closest to the agency conducting the rescue mission, eliminating an unnecessary middleman.
    - b. The dispatcher will let you know if they would like a follow-up call from you on the outcome.
  3. The dispatcher will instruct you from there.
- Continue with **Step 7**.

## Step 7

Be patient... you've done everything you can possibly do for now. Stay off of the phone, so emergency personnel can contact you with additional information and/or questions concerning the Search And Rescue (SAR) effort.

**End of Guide**

**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 Vision  
SM  
'.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
<b>Version Date - Type:</b>	10/16/2009 - Revised	<b>Title:</b>	Construction Tools and Equipment
<b>Category:</b>	Company Procedures	<b>Original Issue</b>	
<b>Sub-Category:</b>	Departmental/Discipline	<b>Date:</b>	
<b>Keyword Index:</b>		<b>Sections:</b>	Construction
		<b>Document</b>	Procedure
		<b>Type:</b>	
		<b>Document</b>	Tom DelMastro
		<b>Owner</b>	

- 1.0 PURPOSE
- 2.0 SCOPE
- 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

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<sup>®</sup>', 'Client Service Quality<sup>®</sup>', and 'Shared

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

### **3.1 Definitions**

#### **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 TtEC'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 TtEC-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 TtEC if TtEC bears the risk of loss or if TtEC 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 TtEC 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 TtEC, 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 to the equipment purchase order file. Documentation should include

entries for date and time of receipt, condition of equipment, mileage or engine hours at time of receipt, information on next scheduled maintenance, and a record of operating and maintenance manuals received with the equipment. Photographs or a video record of the equipment on receipt should be taken if conditions are noted that would warrant further documentation.

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 carries) 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.

Disposition 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.

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

### **3.3.8 Protection from Environmental Extremes**

Consideration shall be given to the environmental conditions to which the construction equipment will be exposed to during its time at the project site or during transportation. The manufacturer's instructions shall be reviewed and followed to ensure adequate protection from damage due to environmental conditions.

Adequate protection to the construction equipment's cooling system shall be verified by ensuring that the appropriate coolant/antifreeze mixture, as recommended by the manufacturer, has been used.

Appropriate procedures for operating or storing construction equipment, such as water treatment systems, shall be developed in accordance with the manufacturer's instructions. Measures such as draining and venting the system, providing auxiliary heat sources (e.g., heat tape), dry storage, shaft rotation, fluid levels, shall be taken to protect construction equipment subject to damage from environmental conditions.

Manufacturer's instructions concerning periodic operation of construction equipment shall be followed.

A means of ensuring that appropriate protective measures are instituted and performed as required should be implemented through the establishment of site procedures, logs, and/or checklists.

### **3.3.9 Equipment Inspections**

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.](#)

Government property control procedures usually require the implementation of a vehicle utilization log for vehicles when used on government projects; other projects should also implement a similar system for logging use of these vehicles. The log should be kept in the vehicle and an entry made for each use, including name of the driver, purpose of the trip, starting mileage, ending mileage, fuel purchased, maintenance performed, and any damage incurred. The log sheets should be transmitted as required in the contract documents and the project's documentation plan. Copies of the log sheets will be maintained and filed as discussed in Section 3.3.12 of this procedure.

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 TtEC 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, releases, and discharges) are not created by delays in correcting deficiencies noted on the Daily Equipment Inspection Forms.

Rigging equipment, wire rope, nylon or KEVLAR slings and chokers shall be inspected by a competent person prior to use each shift; particular attention shall be paid to the rigging condition and presence of load/certification tags.

Cranes (weight handling equipment) shall be subjected to annual and certification inspections per OSHA guidelines. Mobile and crawler cranes shall be inspected on a monthly basis; a sample checklist form is included as Attachment 3 to this procedure.

Construction equipment to be demobilized shall be given a final inspection, similar to the receipt inspection, to identify and document, by means of written description and pictures, the condition of the equipment as it leaves the project site. Where possible, a concurrent inspection by the vendor is preferred. Additionally, some projects, particularly USACE projects, require a certificate of decontamination prior to the equipment leaving the site.

### **3.3.10 Operator Qualifications**

TtEC employees operating vehicles or construction equipment on public rights of way shall be required to have in their possession a valid driver's license appropriate to the location where the item is being operated and containing the appropriate endorsement for the type of vehicle or construction equipment being operated. A Commercial Driver's License (CDL) may be required for operation of some construction equipment on public rights of way, or as a specific requirement of a client's safety program. In addition, individual states may require specific licenses or certifications for operators of certain equipment, such as forklifts, and hoisting equipment. Additionally, the client's safety program may include license or certification requirements for personnel operating equipment on their property. The contract documents should be reviewed carefully to ensure that any such requirements are incorporated into the project's Work Plan or EHS Plan. The Site Superintendent shall verify that the operator possesses the required license(s). Copies of licenses should be maintained in the on-site project employee file.

Any agreements for the rental or lease of vehicles or equipment should be reviewed for any provider's requirements for licensing or certification of operators to ensure that any such requirements are incorporated into the project's Work Plan or EHS Plan.

Operators shall be required to demonstrate their proficiency in operating the construction equipment to be assigned to them prior to being allowed to work. Crane operators shall have qualifications for the type of crane to be operated.

Operator proficiency may be demonstrated through a performance test such as those developed by the International Union of Operating Engineers, or by equipment manufacturers such as Caterpillar. These performance tests include exercises developed to demonstrate operator proficiency in various aspects of equipment operation, including daily operator inspections, ability to follow directions, ability to understand equipment limitations and operating guidelines, safety, and productivity. Also included are checklists that assist an observer in evaluating all of the various aspects of equipment operation. Attachment 4 is an example of Operator/Driver Observation Checklist.

Where it is not possible or practical to demonstrate operator proficiency through a performance test as described above, there should be a period of observation of the operator during the initial period of performance, whether the operator is a new employee or a current employee who is being assigned to a different type of equipment than previously operated on the project site. This observation may be performed by a knowledgeable member of the management team or a designated craft employee such as a foreman or steward. The above referenced checklists could be used for this observation in lieu of the performance test.

### **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 be 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 TtEC's construction equipment shall be documented and a record of the repairs maintained in the project files. Copies of the repair records are to be forwarded to the equipment yard for TtEC-owned equipment.

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 operator which contains documentation that the operator has the proper qualifications, licenses/certificates, and training to perform his/her job function. Records may include training identified in EHS plans (e.g., OSHA, DOT, Waste Management training), vehicle operator licenses, results of site-administered proficiency testing, and any other special licenses/certificates required by state/local law or the client.

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.

## **4.1 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 American Society of Mechanical Engineers (ASME) provides guidance in the B30 committee volumes – Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings.

The United States Department of Energy (DOE) provides guidance for safe lifting operations in Technical Standard DOE-STD-1090 – Hoisting and Rigging.

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 plans.

#### Please Describe Your Reference Here

Place Your Link in this Co

1. Accounting/Finance Procedure AF-8, Fixed Assets
2. ASME B30 committee publications "Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings" available at [www.ihserc.com](http://www.ihserc.com) Note that this is a commercial subscription and requires a User ID and Password available from the TtEC Librarian
3. DOE Technical Standard DOE-STP-1090 Hoisting and Rigging available at [www.directives.doe.gov](http://www.directives.doe.gov) (select the Tech Standards tab, select DOE Technical Standards, select Approved Standards and select DOE\_STD\_1090 from the menu)
4. Environmental, Health & Safety - Programs Procedure EHS 2-1, Emergency Preparedness
5. Environmental, Health & Safety -Programs Procedure EHS 3-4, Site and Contaminant Control
6. Environmental, Health & Safety -Programs Procedure EHS 6-2, Drill Rigs
7. Environmental Management System (EMS)
8. Labor Relations Guidelines LR-8, Pre-Job Conferences
9. NAVFAC P-307 Management of Weight Handling Equipment, Available via <http://www.safetycenter.navy.mil/instructions/osh/navfacP307.pdf#search=%22NAVFAC%20P-307%22>
10. The OSHA publications below are available at [www.osha.gov/](http://www.osha.gov/) select Regulations, select OSHA Regulations (Standards - 29 CFR), select Part 1926 Safety and Health Regulations for Construction
11. OSHA 29 CFR Part 1926 Subpart I Tools - Hand and Power
12. OSHA 29 CFR Part 1926 Subpart N Cranes, Derricks, Hoists, Elevators and Conveyors
13. OSHA 29 CFR Part 1926 Subpart O Motor Vehicles, Mechanized Equipment and Marine Operations
14. OSHA 20 CFR Part 1926 Subpart W Rollover Protection Structures Overhead Protection
15. OSHA 29 CFR Part 1910.178 Powered Industrial Trucks
16. OSHA 29 CFR Part 1910.180 Crawler Locomotive and Truck Cranes
17. Project Initiation/Operations Procedure PO-1, Project Management Planning
18. Project Initiation/Operations Procedure PO-2, Task Initiation
19. Project Initiation/Operations Procedure PO-12, Government Property Control

## Please Provide a Description of the Attachment

1. Sample Equivalent/Vehicle Inspection Report
2. Sample Daily Equipment Inspection Form
3. Mobile and Crawler Crane Monthly Checklist
4. Operator/Driver Task Observation Checklist
5. Insurance Request for Leased Equipment

## Place Your Attachments Here



CP-7 Att-1 -mod 20090924.doc



CP-7 Att-2 Daily Equip Insp\_m



CP-7 Att-3 FJ.doc



CP-7 Att-4 Operator Observatio



CP-7 Att-5 FJ.doc

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TETRA TECH EC, INC.

### Equipment/Vehicle Inspection Report

Date: \_\_\_\_\_ Unit Number: \_\_\_\_\_ Description: \_\_\_\_\_  
 \_\_\_\_\_ Miles or \_\_\_\_\_ Hours: \_\_\_\_\_ MFG: \_\_\_\_\_  
 Unit to be taken from: \_\_\_\_\_ to: \_\_\_\_\_

	Good	Satisfactory	Repair Req.	N/A		Good	Satisfactory	Repair Req.	N/A
1. Tires/Track <u>%<sup>1</sup></u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Brakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. Glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Steering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19. Wipers/Review Mirrors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Undercarriage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20. Heater/AC/Defroster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Suspension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21. Safety Equipment/Belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Engine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22. Signal Lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Drive Train	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23. Mounted Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Fuel System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24. Mounted Attachments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cooling System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25. Blade/Bucket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Electrical System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26. Boom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Exhaust System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Outriggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Hydraulic System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28. Fire Ext./First Aid Kit <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Transmission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29. Horn/Backup Alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Clutch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30. <u>Manufacturer Operating</u> Manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31. <u>Head/Tail/Brake Lights</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ROP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32. <u>Cleanliness</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1</sup> Note estimated percentage of tread/track usefulness remaining

<sup>2</sup> 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.

	If Good (✓)	NA	Correction Needed
<b>Steering Mechanisms<sup>1*</sup></b>	_____	_____	_____
<b>Service Brakes<sup>2</sup></b>	_____	_____	_____
<b>Emergency Brakes<sup>1</sup></b>	_____	_____	_____
<b>Parking Brake<sup>1</sup></b>	_____	_____	_____
<b>Transmission &amp; Controls</b>	_____	_____	_____
<b>Suspension &amp; Springs</b>	_____	_____	_____
<b>Hydraulic Leaks</b>	_____	_____	_____
<b>Exhaust System</b>	_____	_____	_____
<b>Warning Gauges</b>	_____	_____	_____
<b>Windshield<sup>1</sup> &amp; Wipers</b>	_____	_____	_____
<b>Lights (Head &amp; Tail)</b>	_____	_____	_____
<b>Brake Lights<sup>1</sup></b>	_____	_____	_____
<b>Mirrors</b>	_____	_____	_____
<b>Seat and Seat Belts<sup>1</sup> (w/ ROPS)</b>	_____	_____	_____
<b>Tires/Tread<sup>1</sup></b>	_____	_____	_____
<b>Regular Horn</b>	_____	_____	_____
<b>Audible Back-up Alarm<sup>1</sup></b>	_____	_____	_____
<b>Steps, Hand-holds</b>	_____	_____	_____
<b>Fire Extinguisher</b>	_____	_____	_____
<b>Engine Coolant</b>	_____	_____	_____
<b>Engine Oil</b>	_____	_____	_____
<b>Hydraulics &amp; Operating Controls</b>	_____	_____	_____
<b>Fenders/Mudflaps</b>	_____	_____	_____
<b>Heater/defroster</b>	_____	_____	_____
<b><u>All items in cab or bed secured</u></b>	_____	_____	_____
<b><u>Cleanliness inside and outside</u></b>	_____	_____	_____

Remarks:

<sup>1</sup> Items required to be operational by OSHA 1926.602 before use.

<sup>2</sup> 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: \_\_\_\_\_

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

# MOBILE AND CRAWLER CRANE MONTHLY CHECKLIST

Crane Number / ID \_\_\_\_\_

Date \_\_\_\_\_

Project Name/No: \_\_\_\_\_

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

/

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature



# OPERATOR/DRIVER TASK OBSERVATION CHECKLIST

Project Name \_\_\_\_\_ Project Number \_\_\_\_\_  
 Operator's Name \_\_\_\_\_ Observer's Name \_\_\_\_\_  
 Date of observation \_\_\_\_\_ Type/make of equipment operated \_\_\_\_\_

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



Operating Safety Observations	S	U	NA	Comments
<b>C. Operation</b>				
1. Before moving, places the bucket, bowl, blade, etc., into the transport position and secures all accessory equipment.				
2. Obeys traffic & other posted/published site safety practices & rules.				
3. Maintains control of equipment at all times.				
4. Gives right-of-way to loaded machines or trucks.				
5. Minimizes engine overspeed on downgrades & when shifting.				
6. Does not transport passengers without proper provisions.				
7. Does not engage in horseplay.				
8. Crosses ditches at an angle, proceeding slowly.				
9. Avoids large obstacles, deep holes & soft edges.				
10. Slows down before turning.				
11. Stays in gear on a downgrade.				
12. When running across a hillside, proceeds slowly. Never turns sharply uphill or downhill.				
13. Obeys flagmen & spotter signals.				
14. Maintains safe stopping distance behind other equipment.				
15. Shifting				
a. Always stops the machine/truck and runs the engine at low idle speed to shift from forward into reverse.				
b. Downshifts one speed range at a time.				
c. Applies the retarder and/or service brakes to reduce speed before entering sharp turns, fill areas, and downgrades.				
d. For machines, always leaves the shift lever in neutral position when stopped.				
16. Braking				
a. Avoids applying brake continuously on a downgrade unless system is so designed.				
b. Uses the engine for additional brake force-or, if so equipped, the auxiliary retarder.				
c. Anticipates grade and selects proper gear range accordingly.				
d. Brakes firmly in one application. Avoids fanning the brake pedal.				
e. Uses each brake system only for its intended purpose.				
17. Turning				
a. Does not cut corners too close when making sharp turns.				
b. Maintains engine speed high enough for normal steering.				
c. Downshifts when necessary or appropriate.				
d. For machines, carries the load as low as conditions permit to maintain stability.				
18. Hauling				
a. Regulates speed to road conditions. Reduces speed before turning. Avoids over speeding the engine.				
b. Downshifts when approaching a downgrade. Downshifts when necessary on an upgrade to avoid stalling the engine.				
c. Obeys traffic rules and spotters.				
19. Parking Precautions				
a. Selects level ground whenever possible.				
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.				
c. Parks a reasonable distance from other equipment.				
d. When parking on haul roads, picks the safest place, where the equipment is visible from both directions.				



Operating Safety Observations	S	U	NA	Comments
20. Demonstrates proficiency through smooth operation of controls (e.g., speed of operation appropriate for the conditions, not jerky or hesitant).				
21. Maintains eye contact with other operators, drivers, and ground personnel.				
22. Responds appropriately to signals from flaggers, spotters, operators directing equipment movements.				
23. Stops operation when ground personnel are out of line-of-sight.				
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).				
25. Barricades, cones, tape set up to maintain clear zone within swing radius of counterweight.				
26. Maintains safe work area (e.g., windrow at edge of stockpiles, safe slopes).				
<b>D. Shutdown</b>				
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.				
<b>E. Overall Appraisal</b>				
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:

LOCATION:

TO: **Dan Fisher**

LOCATION: **Morris Plains**

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

**PO/Subcontract attached**   
**Terms and conditions attached**

*If guidance is needed, please call Dan Fisher @ (973) 630-8198.*

*Version 6.*

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**APPENDIX D**  
**FIELD INSPECTION FORMS**

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EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
<b>Weather Conditions at time of Inspection</b> _____.		
<b>Work Conditions</b>		
1. Housekeeping		
2. Walking/Working Surfaces		
3. Aisles and Passageways		
4. Platforms/Scaffolding		
5. Ladders		
6. Stairs, Guardrails, Toe-boards		
7. Exits/Egress		
8. Roadways		
9. Ventilation i think this can go away since I don't know what it refers to.		
10. Lighting		
11. Noise Exposure		
12. Ergonomics (EHS 3-1, Attachment B)		
13. Site Perimeter and Control Zones Identified		
<b>Equipment</b>		
14. Hand/Portable Tool Condition, Storage and Use		
15. Machine, Conditions/Guarding		
16. Mobile/Heavy Equipment a. Physical inspection of equipment b. Review of daily inspection reports c. Review of equipment deficiency corrections logs/records		
<b>Material Handling Equipment</b>		
17. Hoisting and Rigging		
18. Lifting Aids Used When Possible		
19. Proper Lifting Techniques Used		
<b>Electrical Safety</b>		
20. Power Cords		
21. GFCI		
22. Generators		
23. Breaker Box Access/Clearance		
<b>Hazardous Materials</b>		
24. Hazardous Chemical List Current		
25. MSDS		



**ATTACHMENT B  
TETRA TECH EC, INC.**

**EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT**

Inspection Type:     Weekly         Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
26. Labeling		
27. Signs/Postings/Color Coding		
28. Proper Storage and Segregation of Hazardous Materials		
29. Compressed Gas Storage and Use		
<b>Emergency Systems</b>		
30. Emergency phone numbers posted		
31. Evacuation routes, rally points shown on site map		
32. Fire extinguishers inspected monthly		
33. Eyewashes and showers periodically inspected, units flushed, and fluids periodically changed		
34. First Aid Kits/Stations		
35. Emergency Rescue Equipment		
<b>Protective Equipment</b>		
36. PPE used, stored, and maintained in accordance with EHS plan		
37. Respirator use, storage, and maintenance		
<b>Hazardous Waste Storage Area (HWSA)/Satellite Accumulation Area (SAA)</b>		
38. If HWSA are present, they are being inspected and documented weekly.		
39. Findings are being corrected.		
40. Wastes stored in designated, secured area with "Hazardous Waste" signage. For SAA, area is marked "SAA". SAA located at the point of generation.		
41. Containers of hazardous waste marked with the words "hazardous waste"		
42. Wastes accumulated onsite are within allowed time limits (e.g., < 90 days for large quantity generators) - check accumulation start dates on containers in HWSA and compare to tracking log.		
43. Waste in SAA limited to max of 55 gallons and when full, moved to HWSA within 3 days.		
44. Hazardous Waste Container Standards:		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
i. DOT-spec. containers (for wastes to go off-site only)		
ii. Intact/in good condition		
iii. Waste compatible with containers (e.g., no evidence of corrosion, softening, bulging)		
iv. Securely closed and stored to prevent rupture/leaking, except when add/remove waste.		
45. Reactive/ignitable wastes stored at least fifty (50) feet from property.		
46. Liquid wastes within secondary containment (BMP, check WMP to determine state requirements).		
47. Incompatible wastes separated by a dike, wall, berm or other device.		
48. In HWSA, containers are separated by minimum 36 inch aisle space. Labels and markings are visible and legible on all containers.		
<b>Hazardous Waste Tank Storage Area</b>		
49. Daily written inspection is being conducted and is maintained on site. The inspection requirements in the plan are being documented as required.		
<b>Waste/Stockpiles</b>		
50. Refer to: 1. Attachment C – Hazardous Waste Less Than 90 Days For Hazardous Waste Stockpiles; 2. Attachment C – Solid Waste For State Regulated/Non-Hazardous Stockpiles; and/or 3. Attachment C – PCB for PCB Stockpiles		
<b>TSCA PCB Wastes</b>		
51. Inspected every 30 days at a minimum. Refer to Attachment C - PCB Checklist for < 30 day or less than 1 year storage area requirements and general PCB container storage requirements		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:  Weekly  Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
<b>Spill Prevention and Preparedness</b>		
52. Outside of containers or tanks (as applicable) show no signs of deterioration, leaks, or discharges at seams, gaskets, piping, pumps, valves, rivets, or bolts.		
53. Appropriate containment materials are available and accessible, which may include: drip pans, dikes, berms, retaining walls, curbing, other barriers, spill diversion ponds, retention ponds, or integrated secondary containment structures.		
54. Spill control and response materials are available, which may include: designated spill response kits, drip pans, sorbent materials, oil retention booms (floating or sorbent), sand bags/temporary curbing devices, fuel recovery pumps/collection hoses, fuel recovery tank trucks, and tools.		
55. Is there any evidence of a sheen or discoloration on the ground? Are hazardous materials stored properly in a manner that minimizes potential for spills?		
56. Emergency Contact Lists are current and posted.		
57. People have received training.		
58. Does the project have a Spill Response, Control, and Countermeasures (SPCC) Plan? If yes, are inspections being performed and documented as required in the plan? Has the plan been updated as required?		
<b>Stormwater Pollution Prevention and Erosion Controls</b>		
59. Are site activities causing land disturbance being performed (grading, excavating, clearing and grubbing, demolition and foundation removal, etc?)		



EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Inspection Type:     Weekly         Monthly

Project/Location:	Inspector/s:	Time/Date:
TOPIC	OBSERVATIONS	FINDING (Y/N)
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?		
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?		
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?		
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.?		
62. Does the project have a total land disturbance = or > 1 acre or is the project part of a larger or common plan of development that could exceed an acre of disturbance?		
63. Does the project have a Stormwater Pollution Prevention Plan (SWPPP)? If yes, are inspections being performed and documented as required in the plan?		
64. Fugitive Dust – Appropriate BMPs are instituted for fugitive dust emissions.		
<b>Other Conditions or Work Practices</b>		
65.		
66.		
67.		
68.		



ATTACHMENT B  
TETRA TECH EC, INC.

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Project/Location:	Inspector/s:	Time/Date:	
ACTION ITEM	RESPONSIBLE PARTY	SCHEDULE	DATE COMPLETED
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

Reviewed by: \_\_\_\_\_  
Site Superintendent/ Site Manager

\_\_\_\_\_ Date

cc: Project Manager (monthly only)  
PESM (monthly only)

## WORK BOAT INSPECTION CHECKLIST

Date of Inspection:		Boat Owner / Operator:		
Boat Registration No.:		Inspected by (Signature):		
		Yes	No	N/A
1	Is the vessel's registration and certification current?			
2	Is the maximum number of passengers that can be safely transported posted?			
3	Is the hull in satisfactory condition? (any obvious leaks?)			
4	Are navigation lights working properly?			
5	Are visual distress signaling devices (day and night) present and up to date? (i.e. signal flares).			
6	Is a signal device provided on the vessel to give signals required by applicable navigation rules? (i.e. air horn.)			
7	Are paddles and/or oars on board and in good condition?			
8	Is bilge pump and discharge (if so equipped) properly located and in good operating condition?			
9	Is a fully stocked first aid kit of the proper size on board?			
10	Has a Type I, II or III or V USCG personal flotation device (PFD) been provided to all boat passengers and properly worn?			
11	Are PFDs inspected for defects?			
12	Are survival suits available for each passenger, where necessary?			
13	Are all PFDs in use equipped with retro-reflective tape?			
14	Is each boat equipped with at least one USCG approved life ring or ring buoy with at least 90 feet of "solid braid polypropylene" line or equal attached?			
15	Is the motorboat equipped with a kill switch?			
16	Are boat seats securely bolted to the boat deck?			
17	Are all launches and motorboats equipped with fire extinguishers of at least the size and rating(s) specified? (Type 1-A:10-B:C)			
18	Are all gasoline engines that are equipped with carburetor have a backfire trap or flame arrestor?			
19	Are fuel tank overflow, fill, and vent pipes so equipped that liquid or vapor cannot escape inside hull or cabin, and will flow overboard?			
20	Are boats that are powered by internal combustion engines, (located within compartments or confined spaces) equipped with a vent fan with fan intakes within one foot of the engine compartment bottom?			
21	Are the lights properly maintained, assuring that they are visible between sunset and sunrise?			
22	Is the boat equipped with a white stern light having a 32 point, 2 mile visibility?			
23	Is the condition of the fuel supply hose satisfactory?			
24	Is there an anchor with adequate line in place and attached to the boat?			
25	Is the boat equipped with a functional radio?			
26.	Is there sufficient fuel to follow the one third rule?			

Other:

LIFEBOAT AND SKIFF INSPECTION CHECKLIST		Yes	No	N/A
1	Is a life saving skiff available where people are working over or near water?			
2	Does the skiff have the following equipment?			
	a. Four oars or equivalent means of propulsion. (two if skiff is motor powered ).			
	b. Oar locks attached to oars or gunwales.			
	c. One ball pointed boat hook.			
	d. One ring buoy with 90 feet of 3/8 inch polypropylene or equivalent line attached.			
	e. Personal flotation devices.			
3	Is a suitable motorboat provided where use of oars is impractical?			
4	Is the life skiff kept afloat or is a means for instant safe launching provided?			
5	Are trained persons kept at ready for launching and operating the life skiff?			
6	Is the skiff used for other purposes than drills or emergencies?			
7	When a motor boat is used as a skiff, is it equipped with a compatible fire extinguisher?			
8	Is the maximum capacity of boat posted? (Capacity should be no less than 3.)			
9	Does the horsepower of the motor conform with the capacity plate?			
10	Is the fuel supply hose in satisfactory condition?			
11	Is the hull in good condition? (No obvious leaks.)			



DAILY EQUIPMENT INSPECTION

PROJECT \_\_\_\_\_

MANUFACTURER TYPE \_\_\_\_\_

UNIT # \_\_\_\_\_ MODEL \_\_\_\_\_ DATE \_\_\_\_\_

ENGINE HRS/MILEAGE \_\_\_\_\_ / \_\_\_\_\_ SHIFT \_\_\_\_\_

Check appropriate column and describe correction needed.

	If Good (✓)	NA	Correction Needed
Steering Mechanisms <sup>1*</sup>	_____	_____	_____
Service Brakes <sup>2</sup>	_____	_____	_____
Emergency Brakes <sup>1</sup>	_____	_____	_____
Parking Brake <sup>1</sup>	_____	_____	_____
Transmission & Controls	_____	_____	_____
Suspension & Springs	_____	_____	_____
Hydraulic Leaks	_____	_____	_____
Exhaust System	_____	_____	_____
Warning Gauges	_____	_____	_____
Windshield <sup>1</sup> & Wipers	_____	_____	_____
Lights (Head & Tail)	_____	_____	_____
Brake Lights <sup>1</sup>	_____	_____	_____
Mirrors	_____	_____	_____
Seat and Seat Belts <sup>1</sup> (w/ ROPS)	_____	_____	_____
Tires/Tread <sup>1</sup>	_____	_____	_____
Regular Horn	_____	_____	_____
Audible Back-up Alarm <sup>1</sup>	_____	_____	_____
Steps, Hand-holds	_____	_____	_____
Fire Extinguisher	_____	_____	_____
Engine Coolant	_____	_____	_____
Engine Oil	_____	_____	_____
Hydraulics & Operating Controls	_____	_____	_____
Fenders/Mudflaps	_____	_____	_____
Heater/defroster	_____	_____	_____
<u>All items in cab or bed secured</u>	_____	_____	_____
<u>Cleanliness inside and outside</u>	_____	_____	_____

Remarks:

<sup>1</sup> Items required to be operational by OSHA 1926.602 before use.

<sup>2</sup> 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: \_\_\_\_\_

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**APPENDIX E**  
**MISHAP HEADS-UP INITIAL NOTIFICATION**

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**CONTRACTOR INCIDENT REPORT SYSTEM (CIRS) INSTRUCTIONS**  
**Complete Only Sections Appropriate to Incident (Rev. 03/11).**

**NOTE: THE ATTACHED CIRS 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 pages 5-6. A report needs to be completed for all OSHA recordable accidents and property damage cases. Please type or print legibly. Appropriate items shall be Checkd/Bolded, 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: (Check/Bold)**

**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.

## **Incident Information**

**Section 1 Contract Information - Incident Information**

**Prime Contractor:** Name as it appears on contract documents.

**Cage Code:** If known.

**Contract Number:** Number as it appears on the contract documents.

**Installation:** Name of installation where incident occurred.

**Task Order #:** Insert number if applicable.

**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.).

**Contractor Contact Information:** (Contractor point of contact information for the individual responsible for completing the form) Self Explanatory

**Section 2 Incident Type:** Check/Bold most applicable category, if you select Industrial you must Check/Bold at least one additional category from the **Industrial Incident Additional Information Section.**

**Section 3 General Information Incident Information**

**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.).

**Describe the Accident in Detail in your words:** 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 4 (Fully Explain What Allowed or Caused the Incident - Incident Information) below before completing.

**Exact Location of Accident:** Enter facts needed to locate the accident scene (e.g. installation/project name, building/room number, street, direction and distance from closest landmark, etc.).

**Were Hazardous Material(s) Involved**      Yes      No

**If Yes, Explain What Hazardous Materials Were Involved and Why:** Check or Bold appropriate block and list name(s) and quantities of hazardous materials spilled/released during the mishap. List why the hazardous chemicals were being used.

**Activity at the time of incident:** What type of work/task was being performed by the injured when the injury took place or property damage occurred.

**Personal Protective Equipment–** Check/Bold appropriate items 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.)

**Section 4 Fully Explain What Allowed or Caused the Incident - Incident Information**

**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).

**Additional Action Taken:** Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue in the additional box and or on additional sheets of paper if necessary to fully explain and attach to the completed report form.

**Please Include a Begin Date and Estimated Completion Date in Description**

(1) Begin: Enter the date when the corrective action(s) identified above will begin.

(2) Est. End Date - Enter the date when the corrective action(s) identified above will be completed.

**Section 5 Contributing Factors Incident Information**

Check/Bold appropriate items fill in information where required  
**Other Contributing Factors:** Describe in detail any additional contributing factors not listed in previous information provided.

**Section 6 Attached Documents**

Provide the appropriate information for each document/file attached or uploaded.

**Injured Data Person #**

Complete Pages 5 and 6 for each injured person At the upper right hand corner of page 5 and 6 differentiate between each person by using a numerical value (e.g. Person #1, Person #, Person #3, etc.)

**Section 1 Injured Data:** Fill in all applicable information, Check/bold appropriate responses.

**Section 2 General Information:**

Check/bold appropriate responses

**Section 3 Injury/Illness/Fatality Information:**

Check/bold appropriate responses

**Part of Body 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:** Describes the manner in which the injury or illness was inflicted or produced. It attempts to answer the broad question of "how" work injuries and illnesses occurred. (e.g. Fall, Struck By, Caught By, Repetitive Motion, Rubbed or Abraded By, etc.)

**Event or Exposure:** Describes what was produced by the injury or illness was produced or inflicted. (e.g. Infectious Parasitic Diseases, Traumatic Injuries and Disorders, Open Wounds, Burns, Intracranial Injuries, etc.)

**Source of Injury Illness:** Identifies the object, substance, bodily motion, or exposure, which directly produced or inflicted the previously identified injury or illness. (e.g. Acids, Chemical Products, Furniture and Fixtures, Machinery, Structures and Surfaces, Tools Instruments and Equipment, etc.)

**General Location Description:** Describes where the injury occurred (e.g. Industrial Facilities, Operational Industrial Building Plant , Roadway, etc.)

**Injury Activity Code:** Describes what the injured person was doing when the injury occurred. (e.g. Operating Type of Equipment, Construction Activity Being Performed, Industrial Operation Being Conducted, etc.)

#### **Section 4 License**

**Are Appropriate License and Certification/Medical Current:** Did the injured employee have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

**Describe/Explain:** Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. "Powdered Actuated Tools, Hilti DX-350, License issued 11/29/2011, expires 3-years from issue date." "Respirator Semi Annual Medical Evaluation, conducted 12/30/2011, expires on 12/30/2013", etc.)

**Attach Image of License or Certification:** Self-Explanatory

#### **Section 5 Training**

**Was all the contract-required training provided to the employee:** Self-Explanatory

**Explain:** If no, to the previous questions explain why the employee was not trained.

#### **Section 6 Attached Documents**

Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

## **Property Damage**

**Section 1 Involved Person Data:** Fill in all applicable information, Check/bold appropriate responses.

#### **Section 2 Attached Documents**

Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

#### **Section 3 Property Damaged**

Check/bold appropriate responses. Other Headings Self-Explanatory.

#### **Section 4 License**

**Are Appropriate License and Certification/Medical Current:** Did the equipment operator have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

**Describe/Explain:** Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. "State Issued Driver, License issued 11/29/2011, expires on MM/DD/YYYY)" "Scissor Lift, JLG Model 260MRT conducted 12/30/2011, does not expire.")

**Attach Image of License or Certification:** Self-Explanatory

#### **Section 5 Training**

**Was all the contract-required training provided to the employee:** Self-Explanatory

Initial Report  
 Follow-up Report  
 Final Report  
 Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

### Contractor Incident Report System (CIRS)

1. Contract Information		Incident Information
Prime Contractor:	Cage Code:	
Contract Number:	Installation of Incident:	
Task Order #:	Contracting Activity/ROICC Office:	
Contractor Contact Information		
Name (Last, First):	Phone #:	
Email Address:	Date Notified:	
2. Incident Type (Please Check/Bold All That Apply)		
<input type="checkbox"/> Assault/Violent Act	<input type="checkbox"/> Extreme Environmental Exposure	<input type="checkbox"/> Man over the side (No water entry)
<input type="checkbox"/> Diving	<input type="checkbox"/> Falls, slip, trip, or bodily exertion	<input type="checkbox"/> Man Overboard - Water Entry
<input type="checkbox"/> Electrical Shock/Burns	<input type="checkbox"/> Fires - All Types	<input type="checkbox"/> Material Handling Equipment
<input type="checkbox"/> Equipment Installation/Repair	<input type="checkbox"/> Hazardous Material (any type)	<input type="checkbox"/> Ordnance-Related (Explosive)
<input type="checkbox"/> Explosion, Non-Ordnance	<input type="checkbox"/> <b>Industrial</b> (Select Additional Below)	<input type="checkbox"/> Vehicle (Government or Private)
Industrial Incident Additional Information (Please Check/Bold All That Apply)		
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Hand and Power Tools	<input type="checkbox"/> Work Platforms and Scaffolding
<input type="checkbox"/> Demolition/Renovation	<input type="checkbox"/> Rigging	<input type="checkbox"/> Underground Construction, Shafts, and Caissons
<input type="checkbox"/> Trenching/Entrapment	<input type="checkbox"/> Cranes and Hoisting Equipment	<input type="checkbox"/> Concrete, Masonry, Steel Erection and Residential Construction
<input type="checkbox"/> Traffic Control	<input type="checkbox"/> Floating Plant and Marine Activities	<input type="checkbox"/> Tree Maintenance and Removal
<input type="checkbox"/> Welding and Cutting	<input type="checkbox"/> Pressurized Equipment and System	<input type="checkbox"/> Airfield and Aircraft Operations
<input type="checkbox"/> Control of Hazardous Energy	<input type="checkbox"/> Fall Protection	

**3. General Information****Incident Information**

Date of Accident:

Time of Accident:

Describe the accident in detail in your words: *(Use the back of page if you need additional space)*

Exact Location of Accident:

Were Hazardous Material(s) Involved  Yes  No

If Yes, Explain What Hazardous Materials Were Involved and Why:

Who Provided Clean-up?  Onsite  Base  Public

Activity of the injured person at the time of incident:

Personal Protective Equipment: (Check/Bold Response)

 Available and used  Available and not used  Not Required Not related to Mishap  Wrong PPE for job

List PPE Used:

**4. Fully Explain What Allowed or Caused the Incident:****Incident Information**

Direct Cause:

Indirect Cause:

Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description)

Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description) *(Use the back of page if you need additional space)***5. Contributing Factors:**Was Visibility Restricted?  Yes  No

Distance Visibility was restricted:

Unit of Measure (Check/Bold):  Feet  Yards  Meters  Miles  Nautical Miles

Visibility Restricted By: (Check/Bold all that apply)

 Fog  Smoke  Rain  Sleet  Snow Mist  Dust  Sandstorm  Unknown Object  Other:

Lighting Conditions at Site of Mishap:

(Please Check)

 Adequate  Inadequate  Unknown

Was Noise Level a Factor:

(Please Check)

 Yes  No  Unknown

Was Carbon Monoxide (CO) a Factor: (Please Check)

 Yes  No

If Yes CO Alarm Manufacturer:



1. Injured Data		(if applicable) Person #	
Age:	Gender: (Check/Bold) <input type="checkbox"/> Male <input type="checkbox"/> Female	Prime Contractor Company Name:	Subcontractor Company Name:
<b>2. General Information</b>			
Drug or Alcohol Involved: (Check/Bold all that apply)			
<input type="checkbox"/> None	<input type="checkbox"/> Unknown	<input type="checkbox"/> Alcohol	<input type="checkbox"/> Drugs <input type="checkbox"/> Alcohol and Drugs
Who Provided First Aid? <input type="checkbox"/> Onsite <input type="checkbox"/> Base <input type="checkbox"/> Public			
Was Ergonomics a Factor: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No			
Type of Ergonomic Injury: (Check/Bold All That Apply)			
<input type="checkbox"/> Lifting	<input type="checkbox"/> Positioning	<input type="checkbox"/> Bending	<input type="checkbox"/> Equipment Placement Office
<input type="checkbox"/> Equipment Placement Industrial	<input type="checkbox"/> Repetitive Motion	<input type="checkbox"/> Impact Strain	
<b>3. Injury Illness/Fatality Information</b>			
Severity of Injury/Illness: (Check/Bold)			
<input type="checkbox"/> Fatality	<input type="checkbox"/> Lost Workday Case Involving Days Away From Work		
<input type="checkbox"/> Temporary Disability	<input type="checkbox"/> Recordable Workday Case Involving Restricted Duty		
<input type="checkbox"/> Permanent Total Disability	<input type="checkbox"/> Other Recordable Case	<input type="checkbox"/> Recordable First Aid Case	
<input type="checkbox"/> Permanent Partial Disability	<input type="checkbox"/> Non-Recordable Case	<input type="checkbox"/> No Injury	
Where There Days Lost: (Check/Bold)	Where There Days Hospitalized: (Check/Bold)	Where There Days Restricted Duty: (Check/Bold)	
<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Part of Body Affected:			
Nature of Injury or Illness:			
Event or Exposure:			
Source of Injury or Illness:			
General Location Description:			
Injury Activity Code:			

**4. License** (if applicable) **Person #**

Are Appropriate License and Certification/Medical Current: (Check/Bold)  Yes  No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

**5. Training**

Was all the contract-required training provided to the employee: (Check/Bold)  Yes  No

Explain:

**6. Attached Documents**

Attached Documents Name/Description:	Date Added:	Uploaded By:



**4. License (if applicable) Property Damage**

Are Appropriate License and Certification/Medical Current: (Check/Bold)  Yes  No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

**5. Training**

Was all the contract-required training provided to the employee? (Check/Bold)  Yes  No

Explain:

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**APPENDIX F**  
**MEDICAL DATA SHEET**

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

Project \_\_\_\_\_  
Name \_\_\_\_\_ Home Telephone \_\_\_\_\_  
Address \_\_\_\_\_  
Age \_\_\_\_\_ Height \_\_\_\_\_ Weight \_\_\_\_\_  
Person to notify in the event of an emergency: Name: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Drug or other Allergies: \_\_\_\_\_  
Particular Sensitivities: \_\_\_\_\_

Do You Wear Contacts? \_\_\_\_\_

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

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

---

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

HIPAA 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

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**ATTACHMENT 1**  
**DIVING OPERATIONS PLAN**

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**DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC  
REMEDIAL ACTION CONTRACT (RAC)  
CONTRACT NO. N62470-13-D-8007  
CONTRACT TASK ORDER NO. WE01**

**FINAL  
DIVE OPERATIONS PLAN**

**TIME CRITICAL REMOVAL ACTION  
AT  
SOLID WASTE MANAGEMENT UNIT 3 – PIER 10 SANDBLAST YARD  
JOINT EXPEDITIONARY BASE LITTLE CREEK, VIRGINIA BEACH, VIRGINIA**

**October 2013**

*Prepared for*



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

*Prepared by*

Tetra Tech EC, Inc.  
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<u>Revision</u>	<u>Date</u>	<u>Prepared by</u>	<u>Approved by</u>	<u>Pages Affected</u>
0	10/25/13	J. Peters	S. Patselas	All

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## APPROVALS

By their signature, the undersigned hereby certify that this Dive Operations Plan has been reviewed and approved for use during the Time Critical Removal Action at Solid Waste Management Unit 3 – Pier 10 Sandblast Yard, Joint Expeditionary Base Little Creek, in Virginia Beach, Virginia.

TtEC Project Manager: Stavros Patselas



Date: 10/24/13

TtEC Diving Safety Manager: Stephen Neill



Date: 10/24/13

NAVFAC MIDLANT  
Designated Dive Coordinator: James Hewitt

HEWITT.JAMES.MO  
NROE.III.104859885  
0

Digitally signed by  
HEWITT.JAMES.MONROE.III.1048598850  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=USN,  
cn=HEWITT.JAMES.MONROE.III.1048598850  
Date: 2013.12.04 09:03:59 -05'00'

Date: \_\_\_\_\_

## APPROVALS

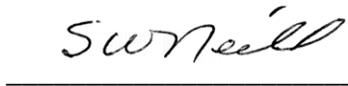
By their signature, the undersigned hereby certify that this Dive Operations Plan has been reviewed and approved for use during the Time Critical Removal Action at Solid Waste Management Unit 3 – Pier 10 Sandblast Yard, Joint Expeditionary Base Little Creek, in Virginia Beach, Virginia.

TtEC Project Manager: Stavros Patselas

  
\_\_\_\_\_

Date: 10/24/13

TtEC Diving Safety Manager: Stephen Neill

  
\_\_\_\_\_

Date: 10/24/13

NAVFAC MIDLANT  
Designated Dive Coordinator: James Hewitt

  
\_\_\_\_\_

Date: 12/03/13

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## ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit
AED	automatic external defibrillator
AHA	activity hazard analysis
APP	Accident Prevention Plan
CFR	<i>Code of Federal Regulations</i>
CPR	cardiopulmonary resuscitation
DAN	Diver Alert Network
DDC	Designated Dive Coordinator
DSPM	Dive Safe Practices Manual
EC	Emergency Coordinator
EM	Engineer Manual
JEB	Joint Expeditionary Base
NAVFAC MIDLANT	Mid Atlantic Naval Facilities Engineering Command
MLLW	mean lower low water
NAVFAC	Naval Facilities Engineering Command
NTR	Navy Technical Representative
PM	Project Manager
RPM	Remedial Project Manager
SHM	Safety and Health Manager
SSHO	Site Safety and Health Officer
SWMU	Solid Waste Management Unit
TBD	to be determined
TCRA	Time Critical Removal Action
TtEC	Tetra Tech EC, Inc.

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## **1.0 INTRODUCTION**

This Dive Operations Plan addresses the health and safety practices and controls that will be implemented by all subcontractors participating in the diving operations during the Time Critical Removal Action (TCRA) at Solid Waste Management Unit (SWMU) 3 – Pier 10 Sandblast Yard, Joint Expeditionary Base (JEB) Little Creek, in Virginia Beach, Virginia.

Activities to be performed under this Dive Operations Plan comply with applicable sections of Occupational Safety and Health Administration Standard 29 *Code of Federal Regulations* (CFR) 1910.120, 29 CFR 1910 Subpart T – Commercial Diving Operations, the American Academy of Underwater Sciences Standards, Engineer Manual (EM) 385 1-1 Section 30.G (USACE 2008), and the TtEC Dive Safe Practice Manual (DSPM), EHS 2-2 (included as Appendix A to this plan) which addresses all the required elements of Section 30.A.16 of EM 385 1-1). The subcontractor selected to complete the diving portion of this project will provide their DSPM and Safety and Health Dive Plan to the PM for review and approval of TtEC Diving Safety Manager and the NAVFAC MIDLANT Navy Designated Diving Coordinator (DDC). This DSPM will be used in conjunction with the TtEC DSPM. The state of Virginia has adopted the Federal OSHA regulations pursuant to § 2.2-4103 of the Code of Virginia, Commercial Diving Operations, General Industry.

This Dive Operations Plan is not meant to be a stand-alone document. This plan will be implemented in conjunction with the Accident Prevention Plan (APP), which is the overarching safety plan for the project. Sections of the APP are referenced (or duplicated when required) in this Dive Operations Plan. Both documents will be available and accessible to personnel during diving activities. Diver personnel will be familiarized with both the APP and this Dive Operations Plan before beginning fieldwork.

If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the DDC and TtEC Dive Safety Manager will be contacted in order to review and accept the alteration prior to actual operation.

## **2.0 DESCRIPTION OF PROJECT**

### **2.1 Site History**

JEB Little Creek covers approximately 2,215 acres in the northwest portion of Virginia Beach, Virginia, adjacent to the Chesapeake Bay (Figure 1 -1). JEB Little Creek Naval Amphibious Base Little Creek) began operations as a permanent base in 1946.

SWMU 3, the Pier 10 Sandblast Yard, is located in a developed area on the west side of Little Creek Harbor. SWMU 3 was used for sandblasting activities between 1962 and 1995. Boats, anchors, and chains were sandblasted on a concrete pad located on the western side of Building 1263 between 1962 and 1995. In 1995, the concrete pad was removed and a new sandblasting area was constructed in the northwestern corner of the site. The use of this new area was

discontinued in 1996 when sandblasting activities were moved to an indoor facility. Little Creek Harbor is located east of the SWMU 3 historic sandblasting areas. A marina for base personnel is located south of SWMU 3 and Little Creek Channel, leading to the Chesapeake Bay, is located east of Little Creek Harbor. Little Creek Channel has been regularly dredged since 1928, and in 1995 approximately 2 to 5 feet of sediment were removed from the area around Pier 10. Historical releases at SWMU 3 likely occurred from accumulation of sandblast residue laying directly on the ground surface. Prior to 1993, runoff from sandblasting operations occurred as sheet flow to Little Creek Harbor. In 1993, a catch basin was constructed that transported surface water drainage to a permitted outfall.

## **2.2 Work Description**

During the TCRA, a reactive amendment and sequestration agent called AquaBlok® AquaGate+PAC (hereinafter called “agent”), which consists of activated carbon and clay (bentonite)/aggregate composite particle material) will be placed by barge and crane with clamshell bucket in a layer over the existing sediments in grid areas identified in the Work Plan as being contaminated. This agent is being placed to address potential ecological risks associated with metal contaminants (lead, copper, nickel, tin, and zinc) that are present within the sediments due to prior runoff and accumulation of sandblast grit by reducing the bioavailability of these contaminants to ecological receptors. Where the barge cannot enter or otherwise place and spread the AquaBlok™ agent onto the sediments (e.g., under docks, floats, or existing boats in the marina that cannot be moved or temporarily relocated), the material may need to be placed by handheld suction dredge, which will require underwater diver assistance.

The AquaBlok™ agent will be transferred on the barge from the supersacks into a large “Hopper device”, (See Drawing 1-A), attached to the side of the barge. The agent shall funnel down into the device where it will be picked up by the attached dredge, and distributed by the diver to the required areas. The diver will use the discharge end of the 6” hose in the placement area. There will be a dive tender in place at all times, and at least one standby diver. The diving operations will be overseen by the Dive Supervisor.

A small boat will be used to support the diver operations as necessary and will be available at the worksite for diver retrieval in the event of an emergency. Otherwise, divers will enter the water from an existing dock. Boats or dock platforms that divers use will have a water-level platform to allow safe entry and egress by divers. Boats or locations on the dock where divers enter and exit the water will house the emergency supplies, communication equipment, spare air tanks, dive gear, and this Dive Safety Plan.

Diving operations are scheduled to start in November 2013 and be completed in December 2013 (anticipated). Divers will perform diving operations Monday through Friday from 0700 until 1730. Approximate depth for diving operations will vary from 5 to 12 feet with an average depth of 10 feet. None of the dive will be a decompression dive. Maximum anticipated dive times will average 190 minutes. Bottom conditions generally are sand and silt. Currents are normally between 0 to 1 knot and primarily related to rise and fall of the tide as this work is within a harbor and marina area. Visibility is generally about 5 to 10 feet; however, it is anticipated that the bottom will be disturbed, and visibility may be reduced to zero at times during this work.

Suspension of work may be required when lack of visibility hinders work and to allow sediments to settle enough for divers to inspect the placement of the material periodically.

It is anticipated that the diving support tasks performed during the TCRA will require the use of surface supplied air and associated diving ensemble. The scope of work for the dive-related tasks include:

- Setup of work areas, equipment and materials
- Agent loading into the hopper device using a barge mounted crane
- Operation and use of dredge, including operational testing at startup, and evaluation of adequacy of material placement by divers
- Demobilization of equipment and personnel

An AHA has been prepared to cover the diver related tasks and is included as an Appendix to this Dive Safety Plan. In addition to this AHA, other AHAs included in the APP cover related work tasks such as barge and crane activities and boating safety and will also be referred to for these operations.

Pre- and post-diving inspection checklists and divers certifications are included as Appendix C and Appendix D of this Dive Operations Plan, respectively. The diver's certifications are of Precon Marine, Inc. professionals who have been subcontracted to perform sediment amendment placement using divers. A small boat inspection checklist is included as a form in Appendix E of the APP. Upon field task completion, the diving subcontractor will ensure demobilization of equipment and supplies from the site.

### **3.0 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES**

TtEC is the prime contractor for this project. TtEC's subcontractor, Precon Marine, Inc, will perform the barge, crane, and diving activities during the TCRA. The subcontractor will provide the Dive Supervisor for all diving operations on this project. The Dive Supervisor is TBD. The Dive Supervisor is the Designated Person in Charge for all aspects of the diving operations affecting the health and safety of dive team members. As such, the Dive Supervisor will be physically at the dive location where the dive operations are conducted. The dive location is defined as is the surface or vessel from which a diving operation is conducted.

Each dive team will be made up of no less than four persons as follows.

Each diver will be continuously tethered while in the water, with one diver per tender. The diver will deliver the material from the hopper while holding the discharge end of the 6" hose in the placement area. There will be at least one standby diver at all times and the diving operations will be overseen by the Dive Supervisor. The divers and standby divers (at least one standby diver will be suited up and prepared for entry into the water at all times) will be rotated to allow for rest periods and rescue should it be required. A designated person (does not need to be a diver) will operate the air supply.

Support crew for these activities will include a boat operator, a barge superintendent, a deckhand, and a crane operator. Each boat will have all applicable up-to-date boat safety and emergency equipment, and the boat operator(s) will have the required qualifications and training as specified in the APP.

Should this approved Dive Operations Plan require modification or should any of the diving procedures or activities change, any changes must be approved by the TtEC Diving Safety Manager, Steven Neill and the Mid Atlantic Naval Facilities Engineering Command (NAVFAC MIDLANT) DDC.

## **4.0 SITE CHARACTERIZATION**

The primary hazards associated with diving include drowning, dive related illnesses (e.g., bends, arterial gas embolism, barotrauma), hypothermia or heat stress, being carried away by strong surface currents or into hazardous areas, encountering dangerous marine life, severe weather or currents, and being struck by surface vessels. These hazards, as well as boating related hazards and other physical hazards related to the tasks being performed, are described below and as necessary, referenced to the appropriate section of the APP. In addition, the hazards and mitigation strategies to follow to minimize potential injuries on a task specific basis are also addressed in the AHA which is included in Appendix B to this Dive Operations Plan.

Before beginning work, all site personnel will be informed of these hazards and the means that will be taken to control them. In addition, the full requirements of the APP will be reviewed with all site personnel.

### **4.1 Project Hazards**

#### **4.1.1 Slips, Trips, and Falls**

There is a potential for site personnel to fall while walking to and from the dive site, including ramps and docks. Slips and falls can also occur on boat and barge decks if workers trip on material or equipment or are not paying attention to where they are going. In addition, boat, barge, and dock surfaces may be slippery when wet and may have space limitations, lines, and other equipment onboard that have trip hazards or otherwise limit ability to maneuver. Good housekeeping will be maintained in work areas, and workers will wear sturdy deck shoes on docks, barges, and on boats. Carrying loads (like air tanks) while suited up in diving equipment can be cumbersome and easily result in a loss of footing. These concerns will be addressed by monitoring the loads being transported and staging equipment to the extent practical prior to donning of diving gear. Good housekeeping will be maintained in work areas, and workers will wear sturdy deck shoes on docks, piers, and on boats.

#### **4.1.2 Drowning**

Falls overboard into the water from boats, barges, and docks can result in drowning, and drowning is a potential hazard during diving operations. Personal flotation device (PFD) use on docks, barges, and boats is described in the APP and in each AHA. Drowning hazards during

diving operations could result from running out of breathing air (kinked hose, loss of compressor function, cut hose, or when divers have no reserve air supply and divers otherwise cannot access the surface). In addition, a diver could suffer a medical emergency (e.g., heart attack) or suffer disorientation or panic in an emergency. Procedures in this plan will be followed to minimize the potential for drowning under these scenarios and include use of qualified and experienced commercial divers, regular inspection, servicing, and maintenance of dive gear; procedures that control dive times; use of certified Grade D breathing air; diver carried reserve air supply for emergencies; dive team configuration and buddy system observation; and evaluation of diver fitness through an OSHA-approved medical surveillance program.

### **4.1.3 Diver Related Illnesses**

The maximum depth of the dives during this project is about 12 feet and the average depth of dives is anticipated to be about 10 feet. All dives at this site will be “no decompression” dives. Although rare at shallow depths, divers could suffer the effects of decompression sickness or an arterial gas embolism or barotrauma if they surface improperly, run out of breathing air, or do not follow the dive tables and safety precautions. These illnesses can be prevented by following the procedures in this plan and those in the TtEC Dive Safe Practice Manual (Appendix A). In addition, emergency equipment for the dive team will include oxygen, which can be administered by qualified persons for diving emergencies. As a precaution, Table 5-1 includes the location and telephone numbers of recompression chambers in the Virginia Beach area.

### **4.1.4 Thermal Stress**

Water temperatures in Chesapeake Bay near Virginia Beach range from 48 to 80 degrees Fahrenheit (°F) depending upon the season and other conditions such as protection in coves and harbors. For most of the year, temperatures should range between 60 and 80 °F. Underwater temperature conditions can also change from thermoclines and currents where present. Because of the relatively low water temperatures compared to diver body temperatures, there is a risk that divers could develop cold stress from immersion in the water. The likelihood of this occurring depends on environmental conditions, the level of work activity, and the control measures that are used to manage body heat (work/rest cycles, physical conditioning, and protective clothing). In addition, exertion during work activity, exacerbated by wearing of the dive ensemble, could also lead to heat stress and loss of hydration.

Appropriate control measures will be taken to manage these thermal stress concerns as described in the Thermal Stress Monitoring Plan in the APP. The Dive Supervisor will monitor water temperatures in the work area and will monitor the effectiveness of the personal protective gear and modify these controls as needed to provide for diver safety and comfort. Rotation of diver personnel may also be used as necessary to allow divers to warm up or rest between dives. In addition, ambient air temperatures may range depending upon the season. Workers could be exposed to thermal stress from hot or cold temperatures at the surface, including effects of wind chill or solar heat load. Ambient air temperatures and wind conditions will also be monitored by the Dive Supervisor and appropriate control measures will be taken to manage these stress concerns as described in the Thermal Stress Monitoring Plan in the APP.

#### **4.1.5 Strong Currents and Severe Weather**

Little Creek Harbor is not influenced by particularly strong currents that could transport a diver out of the work zone or into hazardous areas; however, tidal fluctuations do occur and mild tidal currents could be felt by the divers, who could require more exertion to stay in position during ebb or rise. Severe weather (strong wind or thunderstorms) could occur in the area. Severe weather hazards are addressed in the APP. Weather conditions and water conditions will be monitored before and during dives. Dives will be suspended during inclement weather that could lead to unsafe conditions including heavy winds, wave action on the water, and thunderstorms. If severe weather is predicted, a decision will be made as to whether to start operations on that day and when to suspend current activities in advance of the storm.

#### **4.1.6 Boating**

Operating boats or vessels on the water carries the risk of having a crew member fall overboard and possibly drown, striking or being struck by other vessels operating in the area, losing power or steering and drifting into hazardous areas (e.g., shore, piers), or onboard fires or other vessel emergency. The risk of a boating accident can be reduced by ensuring the boat operators are experienced, and when applicable, licensed; operating the vessel in compliance with U.S. Coast Guard rules and regulations; maintaining the vessel in good mechanical order; avoiding bad weather and dangerous seas; and ensuring emergency equipment is available on-board (life vests, life rings, life boats, fire extinguishers, communication equipment, first aid equipment, etc.). Dive team members will be trained in first aid and cardiopulmonary resuscitation (CPR) through the American Red Cross or an equivalent course. A first aid handbook will be available on-site for reference as needed.

All work conducted from small vessels will comply with the TtEC Boating Safety Procedure (EHS 6-6), and applicable U.S. Coast Guard regulations. Boat operation and inspection are addressed further in the APP. The boat operator will be responsible for the safety of all personnel on the boat and for the integrity of the vessel and its safety equipment. The boat operator, at a minimum, will have successfully completed a boating safety course meeting the criteria of the U.S. Coast Guard Auxiliary and National Association of Safe Boating Law Administrators or equivalent, and will have motorboat handling training, based on the type of boat the operator will use.

#### **4.1.7 Boat Strikes**

Divers could be struck by boats, including propellers if engaged and operating. In addition, other boats could come into the work area where dive operations are being conducted. To minimize the potential for injury to divers from boat traffic, work zone controls will be established during diving operations. An "ALPHA" flag and red and white "diver down" flag will be displayed at the dive site.

When divers enter or are retrieved from the water by a boat, all motors will be in the neutral position or in the off position so that potential strikes from propellers do not occur.

#### **4.1.8 Hazardous Sea Life**

Hazardous sea life is not abundant, nor is it anticipated to present a real risk to divers working in Little Creek Harbor. There are 5 more common species of shark that can be found in Chesapeake Bay, including Sandbar shark, Bull shark, Sand Tiger shark, and several species of dogfish. Of the five types, the Bull shark has the most reputation for being a hazard to man as they are most often the ones that are found in proximity to humans.

The most hazardous sea life anticipated to be encountered during diving would be the Sea nettle which may be common to Chesapeake Bay, especially during summer months. Sea nettle encounters can result in contact with tentacles that have stinging cells called nematocysts, which are coiled like springs and, when contact is made, send a stinger into the skin with a toxin. The Lion's Mane jellyfish can also be present in these waters and produce a painful yet less severe sting and reaction. Persons who have skin or eye contact with the nematocysts often have painful rashes and in rare but severe cases, can have an allergic reaction to the toxins which could be life-threatening.

Most jellyfish stings can be treated by first removing any remaining tentacles using a towel or gloved hand, followed by rinsing the area with hot water (not scalding hot); if hot water is not available, use salt water rather than fresh water, as fresh water may cause more pain. Soaking the affected area in hot water and over-the-counter medications such as acetaminophen or ibuprofen may help with the pain. For mild stings, use a solution of vinegar and water to help alleviate the pain. Always seek medical attention if signs and symptoms of anaphylaxis are observed with any sting.

#### **4.1.9 Other Hazardous Conditions**

Other hazardous conditions, though not as likely to occur as the above during the diving activities, include:

- Underwater Obstacles – Underwater obstacles such as debris (concrete, metal, abandoned fishing or buoy lines) may be present in the harbor in and around the docks where diving will be performed. This debris, if present can pose entanglement hazards to divers or, if divers are working around larger debris, debris could shift and could trap a diver. Each location where divers will work will be evaluated for debris hazards and safety concerns if debris is present and the hazard will be eliminated if possible (e.g., lines cut and removed).
- Electrical Shock – Electrical shock is rare under or in the water but may occur when using power equipment underwater or topside. A ground fault interrupter must be used with electrical equipment employed on the boat or barge, both on the surface and in the water.
- Sonar – Additional precautions may be required when diving in the vicinity of vessels that employ active sonar (not anticipated to be a hazard in the harbor). Ships use low frequency sonar for object location and depth finding. It is a dense, high-energy pulse of sound that can cause damage to divers' ears. Avoid diving in the vicinity of low frequency sonar and approach no closer than 600 yards. The optimal separation distance

is 3,000 yards. Additionally, the U.S. Navy Diving Manual has a worksheet to compute actual time and distance restrictions for various types of sonar. This worksheet takes into account such variables as depth, time, diving apparatus, and wetsuit hoods. High frequency (greater than 100 kilohertz), short duration sonar, such as used with side-scan and hand-held sonar, poses little danger to the diver. The diver will abort the dive if active low frequency sonar is energized while a diver is in the water.

- **Pollution and Bacteria.** Divers could encounter potentially dangerous or unpleasant forms of pollution in Little Creek Harbor, which is part of larger Little Creek Channel and includes two other coves and marina areas. Though not known to be present, it is possible that low-level fecal coliform bacteria may be present in the bay from adjacent septic or sewer outfalls that may have malfunctioned or seeped into the cove or from boats that do not comply with the required discharge of onboard sanitary devices. Low levels of heavy metals are known to be present in the sediments; however should not pose a risk to divers performing work in protective diving gear. The precautions for potential low-level bacterial contaminants in the water and contaminants in the sediments will be handled by giving access to showers for divers at the end of shift or as required. In addition, a hand washing station will be located in the dive support zone so divers can wash hands and face.
- **Unanticipated Contamination.** It is also possible that other unforeseen contamination could be discovered (e.g., unknown sheen or discoloration of the water, drums, or other potentially hazardous material) during the course of the investigation. In these instances, the dive team shall not conduct the diving until the hazard is properly evaluated and does not pose a hazard to the divers. If unanticipated hazards are discovered that may affect diver safety, they will be reported by the Dive Supervisor to the SSHO who will report it to the Dive Safety Manager (Steve Neill), and the Navy Technical Representative (NTR). The PM will notify the Navy Remedial Project Manager (RPM). If contamination gets onto the diver, the Diving Safety Manager will be notified, and the diver(s) will shower to remove any contaminants and decontaminate the diving gear and equipment as required.
- **Crane Operations in Support of Diving Operations.** Cranes operations are addressed the APP and specific AHAs have been developed for crane related activities to comply with Section 16 of EM 385 1-1 which will be reviewed by those involved in the hoisting and rigging and crane operation activities. The AHA prepared for diving operations also includes requirements for coordinating with topside crane operations and the hazards associated with these operations. All working dives require communications between the divers and topside to direct crane load movements if required. The crane operator will take direction from the tender or Dive Supervisor directly in communication with the diver. It is anticipated that for placement of and removal of the skids by crane, that the divers will be at the surface and away from the skid before the skid is moved by the crane. It is also anticipated that there will be no need for the divers to unhook any rigging from the skid. Cranes will be idled and locked in position with neutral tension upon the hoisting and rigging during dive operations. Crane operations where the load is placed or removed underwater are considered to be Critical Lifts and the diver and load director will participate in preparation of the Critical Lift Plan as outlined in Section 16.H.

- **Tools and Equipment.** Divers using hand tools and man operated suction dredges can be exposed to hazards including being struck by equipment that bucks or moves suddenly; having body parts sucked into the dredge hose or having the dredge hose make suction with the diver and render the diver unable to remove the suction. On the other end of the hose, the hose could buck and jerk suddenly and also strike the diver. In addition, use of this equipment can cause diver fatigue and repetitive motion injuries if used for long periods of time or when divers struggle with buoyancy and holding the dredge. Two-way communication between divers and divers and the surface are critical. Rotation of divers will be done to address fatigue, and work methods will be developed to reduce strain to divers and reduce the potential for injury in using the equipment properly.

#### 4.2 Site Conditions in Little Creek Harbor

Surface & Underwater Conditions	Visibility	Water Temperature	Thermal Protection	Currents
Little Creek Harbor: Protected inland waterway cove protected by a channel to Chesapeake Bay. Shallow depth in work area from 5 to 12 feet. Maximum depth of about 20 feet in marina cove work area. Substrate ranges from sand in shallower areas to mud and silt at deeper depths.	5 to 10 feet (seasonally variable) visibility; upon sediment disturbance can decrease visibility to zero	48–80°F winter to summer. Average range 60-80°F	Dry suit or wet suit with suitable thermal undergarments, neoprene dive gloves, dive hood/helmet	Weak tidal fluctuations 0–1 knot

#### 4.3 Diver Qualifications and Training

All divers who perform diving operations to place or verify placement of the AquaBlok® agent will be qualified commercial divers who have received their training from a commercial diving school, military school, federal school, an Association of Commercial Diving Educators accredited school, or an in-house training program that meets the requirements contained in ANSI/ACDE-01, or in the Association of Diving Contractors International Consensus Standards.

In addition to the certification or qualification documentation, each dive team member shall have training and experience consistent with the performance requirements of this scope of work and shall have at least one year of commercial experience and have at least four working dives with similar decompression techniques using the particular diving techniques and equipment to be used on this project. At least one of the four qualification dives must be within the last six months prior to contract award date.

All divers have current First aid/CPR training and the use of emergency oxygen systems, and if provided at the dive site, AED training.

The dive team members other than the Dive Supervisor will rotate during each dive event as required to offset the effects of fatigue and cold or heat stress and will be trained in the duties, roles, and responsibilities that each position on the team is assigned (diver, tender, etc.). The Dive Supervisor, under the direction of the Diving Safety Manager (Steven Neill), who reviews and approves all divers used on TtEC projects, will verify that all divers have proper certification and training as well as the required medical clearance for performing diving activities during this project. Diver credentials will be submitted by the subcontractor to the TtEC Dive Safety Manager for review and approval for work on this project. The Dive Supervisor will also verify that all parties involved in these activities have reviewed and are familiar with the APP and AHAs as well as this Dive Operations Plan by signature.

All divers will be determined to be medically fit by a licensed physician annually and the certification records shall be on-site.

A copy of each diver certifications, medical clearance, and first aid/CPR credentials, including emergency oxygen administration will be sent to the Diving Safety Manager, and copies will be submitted to the NAVFAC MIDLANT DDC. If divers are replaced by new divers or other divers are added to the team, all the required submittals above must be approved prior to the diver performing any dive work. The names of this dive team are as follows:

- Dive Supervisor – Martin Kane/Martin Smith
- Diver 1 – Travis Grey
- Diver 2 – Lenny Brightman
- Diver 3 – Austin Lester
- Diver 4 – Jeff Huff
- Diver/Tender – Cody Shires
- Diver/Tender – Jordan Johnson
- Diver/Tender – Jessica Fuller

Dive-specific equipment is listed below:

- Divers will wear appropriate thermal protection consisting of a wet suit or a dry suit and sufficient undergarment layering for warmth. The dry suit will also help to minimize potential skin contact with marine life such as jellyfish. Neoprene gloves, dive helmet, and boots will also be worn. Diver gloves may have Kevlar (or suitable equivalent) palm lining for handling of material to minimize potential for wear and tear.
- A professional-grade diving mask or helmet with communications capability to communicate with surface and other dive team members. The helmet will have a non-return valve and exhaust valve at the attachment point between helmet and hose which will close readily and will have the capability to turn on reserve breathing supply if necessary.
- Swim fins.
- Dive knife.

- Weights and harnesses. Safety harness will have a positive buckling device, attachment point to the safety line, and a lifting point that keeps the diver vertical if used for retrieval.
- Dive light.
- Depth gauge.
- Timekeeping device (with Dive Supervisor and/or tenders).
- Compass.
- Surface supplied certified breathing air and a reserve breathing air supply integral or in-line with the primary air source. Copies of certificate of analysis showing that the breathing air meets the acceptable air purity standards will be submitted to the DDC and the TtEC Diving Safety Manager.
- Breathing supply hoses specifically manufactured for surface supplied air use with corrosion resistant connectors that meet or exceed the hose pressure ratings and remain positively attached to the hose. Umbilicals will be marked at 10-foot increments, beginning at diver's end as specified in EM 385 1-1 Section 30, Table 30-1.
- Electronic communication systems with external speaker so entire dive team can monitor communications. Backup communication consisting of line-pull signals if voice communications are lost.
- Appropriate code alpha and recreational dive flags will be displayed as per EM 385 1-1, Section 30.F.11c.

Emergency and first aid equipment will also include:

- An industrial first aid kit and bloodborne pathogens kit;
- An oxygen resuscitation system capable of delivering oxygen for a minimum of 30 minutes or until emergency medical assistance can be administered;
- A stokes litter or backboard with flotation capability.

All dive equipment used on this project is subject to a Diving Equipment Preventive Maintenance Program. This program ensures that equipment is inspected and serviced to meet the manufacturer's maintenance interval. In addition, equipment will be maintained in compliance with the manufacturer's recommendations. Damaged or worn equipment will be repaired or replaced as required prior to being put into service.

All dive equipment and safety gear will be inspected daily before use. Damaged equipment will be taken out of service and repaired or replaced. After use, equipment will be cleaned (with light soapy water and rinse according to manufacturer instructions) and will be stored in a dry location when not in use.

#### **4.4 Pre-Diving Activities**

Pre-diving activities are as follows:

- The SSHO will verify all team personnel, including divers and supervisors, boat operators, and barge/crane personnel have attended site-specific APP and Dive Safety

Plan training and have reviewed the AHAs in Appendix B, and that copies of all certifications and training are on-site (prior to first dive and all new divers).

- The SSHO and Dive Supervisor will hold a briefing each day with the dive team and support personnel to discuss personnel assignments, techniques, and equipment to be used, and to review the AHAs and emergency procedures.
- Diving equipment will be inspected each day by the divers and prior to the dive by the Dive Supervisor. Appropriate thermal protection will be worn under the dry suit.
- The Dive Supervisor will review EHS 2-2, Attachment 1 (Supervisor Dive Plan) to ensure the proper checks are made and documented each day prior to starting dive activities.
- The pre-dive checklist in Appendix C of this Dive Operations Plan will be filled out daily by the Dive Supervisor prior to commencing diving activities. Daily before diving and during diving, the Dive Supervisor will evaluate conditions, as necessary, such as temperature (water and air), tide (high and low), current speed/direction, wind speed/direction, sunrise and sunset times, and wave action (height and direction). The Dive Supervisor will monitor the weather forecast or be in communication with the SSHO who will monitor the weather forecast.
- The Dive Supervisor will ensure divers have not flown within the last 12 hours prior to a dive.
- A small boat inspection checklist in the SSHP will be filled out by the boat operator daily (form is in the APP).
- A working means of communication will be verified (cell phone [waterproof phones] between boats and the Dive Supervisor and shore personnel, and marine radio channel 16) before starting the project and daily to ensure that communications work in the area and that communications are working between the boats, barges, and the other team members.
- Review emergency signals, including air/boat horn signals, hand signals, and line tug/ping signals (see Attachment 8 of the Dive Safe Practice Manual). If the divers need to be recalled for an emergency (divers without communication devices or have malfunctioning devices), four pulls will be given on the line to signal to come to the surface.
- Check diver's physical condition.
- Go over anticipated hazards of the dive.
- Ensure a Stokes litter or backboard with flotation is available for emergency retrieval of an injured or unconscious diver onto boat or dock.
- Review emergency procedures, contacts, and numbers, and ensure a vehicle is available at (or within proximity to) the designated evacuation site for transportation to the hospital if required. Ensure the team knows the location of the emergency numbers, the emergency evacuation areas and routes to the hospital which are included on Figures 5-1 and 5-2 (see Section 5.0).
- Review dive techniques and equipment to be used to accomplish the task. Review information and procedures from the Work Plans and the specifications for placement of the AquaBlok™ agent with the divers on the tasks to minimize the need for rework and to ensure proper task procedures are followed.

## 4.5 Diving Procedures

The diving procedures are as follows:

- When the team arrives at the dive site, if boats will be used, the boat captain will position the boat between the diving work zone and potential other boat traffic, and place the motor in neutral or hold position as required. On piers or on boat, the divers will suit up and don required safety equipment and gear.
- Prior to entry into the water, the Dive Supervisor will ensure the boat operator has the boat motor in neutral (if boats are used) and that personnel are entering the water so that the propeller is not engaged. The Dive Supervisor will notify the boat operator when divers are not in proximity to the propeller and when it is safe to engage the propeller. During dive operations, boats not tendering the divers will keep a distance from dive operations.
- A tended standby diver will be readily available at the dive site in case of emergency.
- Diving will be discontinued if sudden squalls, electric storms, heavy seas, or any other condition exists that, in the opinion of the Dive Supervisor, jeopardizes the safety of the team. At no time will diving be conducted in poor weather conditions, when currents exceed 1 knot, or in marginal visibility conditions.
- The boat will be located between the divers and any potential boat traffic to minimize potential for vessel strikes.
- A red and white “diver down” and a Code Alpha flag (international diver signal) will be displayed at the dive site as required depending on whether diving is from boats or from the dock (See EM 385 1-1 Section 30.F.11c).
- All dives will be “no decompression” dives.
- A ladder extending below the surface of the water and handrails 3 feet minimum above the diving platform will be provided to assist the divers on entry and exit from the water
- The propeller of the vessel will be stopped before the diver enters or exits the water.

## 4.6 Post-Diving Procedures

The Dive Supervisor will check the physical conditions of the divers between rotations and at the end of shift. Any adverse health problems, however minor they may seem (including any rashes, itching, etc.), must be reported to the Dive Supervisor and SSHO as soon as the diver has knowledge of the condition. Additionally, all divers will report sightings of abundant jellyfish populations in the area or other conditions that could present a potential hazard to the divers so appropriate measures can be taken to remove or minimize the potential for exposure:

- The Dive Supervisor must follow the Post-Dive Checklist in Appendix C.
- Clean and stage equipment for next day’s diving event and shower at the shower facility.
- Complete the Dive Profile Log for each dive (see Attachment 6 of the Dive Safe Practice Manual).
- Forward copies of the Dive Profile Log to the Diving Operations Manager (Steve Neill).
- Review information from daily dives and evaluate progress. Plan for the next day’s diving.

## 5.0 EMERGENCY MANAGEMENT PLAN

The following Emergency Management Plan includes the required elements of EM 385-1-1 Section 30 for commercial diving activities. Additional general and site-specific emergency procedures (fires and explosions, medical emergencies, spills, injuries, severe weather, man overboard, and abandon ship) are contained in detail in the APP (which will also be present at the dive site as follows:

- Emergency Response Plans (Section 9.2 of APP)
- Procedures and Tests (Section 9.2.1 of APP)
- Emergency Evacuation Routes (Figures 5-1 and 5-2 in this plan)
- Spill Plans and Response (Section 9.2.2 of APP)
- Firefighting Plan (Section 9.2.3)
- Emergency Telephone Numbers (Table 5-1 in this plan)
- Man Overboard/Abandon Ship (Section 9.2.5 of APP)
- Medical Support (Section 9.2.6 of APP)
- Contingency Plan for Severe Weather (Section 9.12 of APP)

In addition, EHS 2-2, Attachment 4 contains the following emergency procedures for diving operations that will be reviewed with all divers and includes:

- Decompression sickness
- Fire in Equipment
- Explosive detonation with divers in the water
- Boat breakdown
- Variations in ascent rate
- Unplanned ascents
- Emergency Evacuation
- Loss of breathing media
- Loss of communications
- Fouled or trapped diver
- Injury in the water
- Severance of diver's air supply
- Severance of complete umbilical

Because this project involves diving operations, local recompression chamber locations and Dive Alert Network information are provided in this plan (see Table 5-1 of this plan).

### 5.1 Emergency hospital and Coast Guard Information

The nearest emergency services provider is the Sentara Leigh Hospital located at 830 Kempsville Road, Norfolk, Virginia. Their telephone number is **757-395-8000**. **For emergencies, dial 911**. Figure 5-1 shows the site layout and emergency evacuation areas on-site, and Figure 5-2 shows the emergency route to the hospital.

Local ambulance service, dispatched via the 911 system will be used to transport the injured worker to the hospital in emergency situations. Inform them that the location is the Little Creek Harbor at the JEB Little Creek Base. Should the emergency situation warrant rescue operations in the bay that are not able to be handled by TtEC and the subcontractor, the U.S. Coast Guard will be notified via marine radio channel 16. The U.S. Coast Guard Sector Hampton Roads (24-hour regional contact for emergencies) can be reached at **757-688-5555 (Option 1) or via marine radio channel 16.**

## **5.2 Emergency Notification and Transport Plan**

During diving events, the Dive Supervisor is considered the Emergency Coordinator (EC). If the Dive Supervisor is involved in the emergency, the alternate EC will be one of the two designated dive tenders. The designated alternate EC will be assigned daily and as required. The EC will be responsible for initiating any evacuation activities, safely retrieving divers, coordination of diver emergency procedures, emergency treatment, emergency transport of the injured (as necessary) to a safe location, and notification of emergency response units. The EC shall designate someone to notify the SSHO as soon as immediate emergency response actions are taken. The EC shall conduct an inspection of emergency response equipment on a daily basis and communicate the emergency response plan to the dive team personnel.

Communication of evacuation routes and assembly points shall occur initially and as necessary daily during the tailgate safety briefing. Communication of hospital routes and emergency telephone numbers will be through the posting of this information at the dive site.

In the event of serious personal injury (fatality, patient unconscious, possibility of broken bones, severe bleeding that will not stop, severe burns, blood loss, drowning, shock, trauma, chest pain, difficulty breathing, seizure, electrocution, disorientation, suspected poisoning), the first responder shall immediately take the following steps:

- The EC will establish the safety and location of all personnel (in-water personnel first) and direct the administration of first aid.
- The injured party will be brought on board the dive boat or dock (if emergency occurs in the water) by project team personnel using the ladder or stokes-type stretcher with flotation as necessary. The diver observer/tender may be required to enter the water to assist in rescue and securing the victim in the sling or stretcher; however, bringing the injured party onto the boat or dock will likely require assistance of personnel on the boat. The Dive Supervisor will immediately notify the support boat to come for aid and for transport to shore egress cannot be achieved via the dock. First aid and CPR will be initiated, as required, by first aid/CPR qualified persons (all dive team members are first aid/CPR, AED [if on-site], and emergency oxygen qualified).
- The Dive Supervisor (or designee) will use the cellular telephone to call 911 to report the emergency, giving details such as the nature of the emergency, location of the emergency, injured party information and vitals, boat identification number, what

location the injured party will be taken to, and any other requested information. Stay on the line with the 911 dispatcher.

- In the event the cellular telephone is not functioning or another cellular telephone is unavailable (e.g., on the support boat), the marine radio (Channel 16) will be used to call the U.S. Coast Guard for emergency assistance. If the emergency requires rescue services, the U.S. Coast Guard will be contacted via marine radio channel 16.
- Keep the injured party in the stretcher/litter if already in the stretcher, if possible (depending upon on the nature of the emergency, which may dictate removal from the stretcher if it inhibits the administration of first aid or CPR) to minimize the amount of movement during transport.
- Transport the injured party to the nearest accessible location with road access (field decision) and ensure emergency dispatch is informed of the intended location. Assist the emergency responders as necessary to facilitate movement of the injured party to the ambulance.
- If not notified already, notify the SSHO.
- Provide a copy of the injured party's medical data sheet (see the APP) to responding medical personnel.
- Designate someone to accompany the injured party to the hospital.
- Notify the PM and NTR.
- PM notifies the RPM and Diving Safety Manager
- Follow up on the injured party and complete the TtEC Incident Report and Investigation form and Navy event report forms (see APP for forms) as appropriate.

### **5.3 Emergency Equipment**

A means of routine and emergency communication (waterproof cellular telephone) for contacting emergency services will be immediately available at the dive site, each boat, and the barge. Boats will have a marine radio with Channel 16. In addition, a cellular telephone (protected with waterproof casing or waterproof phone) will be available and used for emergency communication. Working radio and cellular telephone communications will be verified in the field at the start of the project and daily.

- A copy of the APP and this Dive Operations Plan will be immediately available on the at the dive site during diving activities. Emergency numbers in Table 5-1 will be posted and the location known to all team members.
- A first aid kit meeting the requirements of American National Standards Institute Z308.1 and any appropriate optional fill contents based on the hazard assessment will be available in dive site.
- A throw bag and/or life ring buoy (Type V PDF) will have at least 90 feet of line.
- A floating stokes-type stretcher will be provided to assist an injured diver from the water.
- A device will be used that minimizes the possibility of entanglement of the diver's tether in the propeller of the vessel (if boats are used).
- All safety equipment any boat will be as required by the U.S. Coast Guard and EM 385-1-1 as outlined in the APP. Small boat inspection checklist will be followed for performing the daily boat inspection.

## 5.4 Personnel Emergency Contact Information

**Table 5-1. Emergency Contact List.**

Ambulance/Fire/Police (cellular or land line)		<b>911</b>
Medical	<b>Hospital: Sentara Leigh Hospital 830 Kempsville Road, Norfolk, VA (See Figure 9-2)</b>	<b>911</b> (757) 395-8000 (Emergency Services)
Diver	Sentara Leigh Hospital 830 Kempsville Road, Norfolk, VA (recompression chamber)	(757) 261-4325
Rescue	USCG Hampton Roads Sector	757-688-5555 (Option 2) Marine Radio channel 16 Emergency or Rescue in water
WorkCare <sup>®</sup> Case Intervention		1-800-455-6155 1-888-449-7787
Poison Control		1-800-222-1222
Diver Alert Network (for members)		1-919-684-9111
Navy NTR, Pete Fovargue		(757) 462-1019
Navy RPM, Bryan Peed		(757) 341-0480
Navy ET, Mike Welch		(757) 462-1024
Navy Contracting Officer, Zane Parry		(757) 322-4777
TtEC PM, Stavros Patselas		(215) 702-4099 (office phone) (267) 688-9967 (cellular phone)
TtEC SHM, Roger Margotto, CIH		(619) 471-3503 (office phone) (619) 988-0520 (cellular phone)
TtEC Dive Safety Manager, Stephen Neill		(770) 330-7068 (cellular phone)
TtEC SS, Jon Cary		(757) 652-9232 (cellular phone)
TtEC SSHO, Louie McTall		(757) 581-0023 (cellular phone)
Precon Marine Dive Supervisor		(757) 545-4400
Dive Operations Manager, Martin Kane		(757) 513-1807
Dive Superintendent, Allen Cutler		(757) 449-8405
Assistant Dive Superintendent, Martin Smith		(757) 531-5583
Director of Environmental Health and Safety, M. Scott Rupe		(757) 754-0769

*Abbreviations and Acronyms:*

CIH – Certified Industrial Hygienist  
 ET – Engineering Technician  
 NTR – Navy Technical Representative  
 PM – Project Manager  
 RPM – Remedial Project Manager

SS – Site Superintendent  
 SSHO – Site Safety and Health Officer  
 SHM – Safety and Health Manager  
 TtEC – Tetra Tech EC, Inc.



## **FIGURES**

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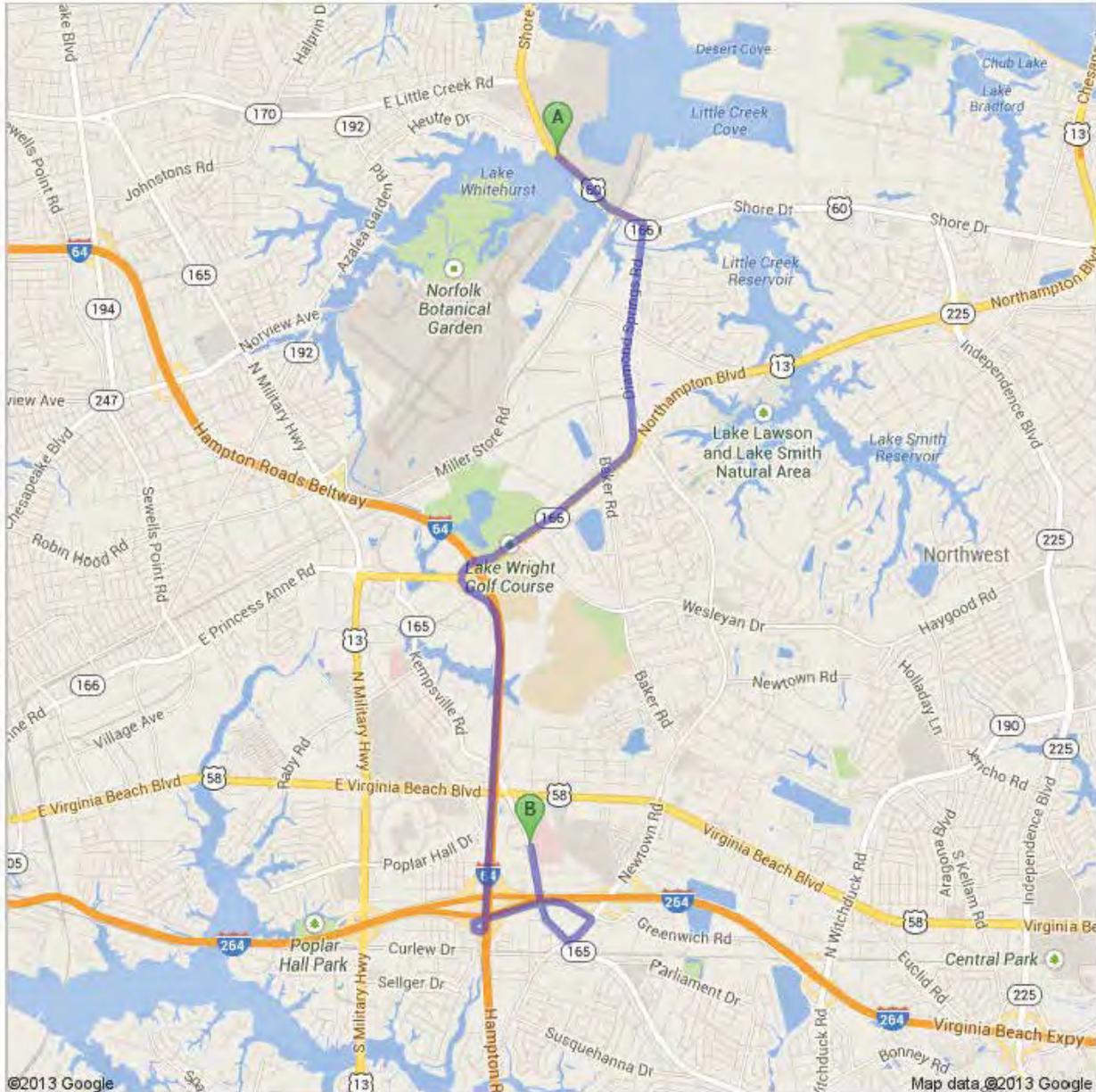


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Figure 5-2 Emergency Route to Sentara Leigh Hospital



**Directions to Sentara Leigh Hospital**  
830 Kempsville Rd, Norfolk, VA 23502  
7.4 mi – about 11 mins



**Directions to Sentara Leigh Hospital**

1. Head southeast on Shore Drive
2. Turn right onto Diamond Springs Road
3. Take the ramp to I-64
4. Merge onto Northampton Blvd
5. Merge onto I-64E via the ramp to Chesapeake/Suffolk
6. Take exit 284B for Newtown Road
7. Keep left at the fork, follow signs for Interstate 264E
8. Take exit 15A for Newtown Rd S
9. Keep right at the fork, follow signs for Newtown Road S and merge onto Newtown Rd
10. Turn right onto Kempsville Road
11. Destination will be on the right

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## **APPENDIX A**

### **EHS 2-2, DIVE SAFE PRACTICE MANUAL**

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**Purpose:** This document establishes the Tetra Tech EC, Inc. (TtEC) Diving Safe Practices Manual (DSPM) as required in 29 CFR, Subpart "T". This document provides guidance and procedures to conduct safe diving operations by all employees of TtEC Inc. or under the auspices of TtEC. This DSPM is based on those rules and recommendations as offered by the following agencies, the Occupational Safety and Health Administration (OSHA), the American Academy of Underwater Sciences (AAUS), U.S. Army Corps of Engineers (ACOE) and the U.S. Navy.

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This document establishes the Tetra Tech EC, Inc. (TtEC) Diving Safe Practices Manual (DSPM) as required in 29 CFR, Subpart "T". This document provides guidance and procedures to conduct safe diving operations by all employees of [TtEC Inc.](#) or under the auspices of TtEC. This DSPM is based on those rules and recommendations as offered by the following agencies, the Occupational Safety and Health Administration (OSHA), the American Academy of Underwater Sciences (AAUS), [U.S. Army Corps of Engineers \(ACOE\)](#) and the U.S. Navy.

This document contains procedures applicable to all [TtEC, Inc.](#) projects conducting underwater operations that employ the use of divers [or snorkeler's](#) to perform work or scientific research. The procedures in this document are a combination of the requirements in 29 CFR 1910 Subpart T – Commercial Diving Operations and The American Academy of Underwater Sciences, Standards for Scientific Diving. Specific or special requirements for scientific diving that are not specifically included in this Dive Safe Practices Manual will be included in the Project Specific [Health and Safety](#) Dive Plan ([HASDP](#)). When contracted to dive [for](#) a client like the [ACOE](#), additional equipment, procedures, and review requirements will be addressed in the Project Specific [HASDP](#). The specific [ACOE](#) requirements are identified in Section 30 of EM 385-1-1, [15 SEP 2008](#), Safety and Health Requirements Manual. If there are any conflicts between this manual, OSHA regulations, [AAUS](#) and State OSHA regulations, the most stringent regulations take precedence provided safety is not compromised. [All conflicts will be detailed and procedures provided in the Site Specific Health and Safety Diving Plan.](#)

### 3.1 General

It is the policy of TtEC to consistently provide safe diving operations to meet the client's required level of

work, that are in compliance with applicable laws and/or regulations, and that are consistent with the project-defined scope, schedule, budget and level of quality. To accomplish this objective TtEC will provide the appropriate qualified personnel, resources and guidance to operating units where diving is required. Such resources may include specialized diver expertise that may be located in another office, corporate affiliate or subcontracted to the appropriate company.

This Diving Safe Practices Manual addresses procedures for the safe [utilization of Self Contained Underwater Breathing Apparatus \(SCUBA\)](#) and surface supplied diving operations. Mixed gas diving is not authorized for employees [covered](#) under these procedures. All dives will be planned to adhere to standard air and no decompression tables set forth in the US Navy Diving Manual.

The [individual state](#) requirements will be reviewed and incorporated into the project specific [HASDP. As of this revision date of the manual those States are California, Michigan, Oregon, and Washington.](#) This [review](#) will be prior to commencing any diving operations within the affected State. [Prior to diving,](#) the project specific Dive Safety Plans must be approved by the Chairman of the [TtEC Diving Review Board \(DRB\) for construction diving or the Scientific Diving Safety Officer for scientific diving, with the approved copy forwarded to the TtEC Chairman of the Diving Review Board.](#)

### **3.1.1 Scientific Diving Standards**

[The TtEC Diving Safety Practice Manual \(DSPM\) provides for the development and implementation of policies and procedures that will enable TtEC scientific divers to safely manage local diving conditions and comply with the AAUS scientific diving standards. For the purposes of these standards the auspices of TtEC as an AAUS Organizational Member is for the purposes of scientific diving in which TtEC is connected because of ownership of equipment, locations, or relationship with the individual\(s\) concerned. This includes all cases involving the operations of employees of TtEC, where such employees are acting within the scope of the employment, and the operations of other persons who are engaged in scientific diving with TtEC, or are diving as members of an organization recognized by TtEC.](#)

[TtEC's DSPM shall adhere to and/or include the following:](#)

[AAUS standards may be used as a set of minimal guidelines for the development of an organizational member's Dive Safe Practice Manual which will include both construction and scientific divers. AAUS Standards Volume 1, Sections 1.00 through 6.00 and its appendices are required for all dive manuals. AAUS Standards Volume 2, Section 7.00 is applicable only when TtEC engages in those activities. This dive manual meets the requirements of AAUS Standards for scientific diving and OSHA Subpart T, and ACOE Diving Operations \(EM 385-1-1 \[15 Sept 08\]\) for construction diving, and includes compliance with each section applicable to TtEC diving policies. Sections of the AAUS Standards which are not included in this dive manual are not allowed under TtEC safe dive practices.](#)

[Emergency evacuation and medical treatment procedures.](#)

[Criteria for diver training and certification.](#)

[Standards written or adopted by reference for each diving mode utilized which include the following:](#)

[Safety procedures for the diving operation.](#)

[Responsibilities of the dive team members.](#)

[Equipment use and maintenance procedures.](#)

[Emergency procedures.](#)

### **3.1.2 Scientific Diving Definition**

[Scientific diving is defined as diving performed solely as a necessary part of a scientific, research, or](#)

educational activity by employees whose sole purpose for diving is to perform scientific research tasks (29 CFR 1910.402).

### **3.1.3 Scientific Diving Exemption**

OSHA has granted an exemption for scientific diving from commercial diving regulations under the following guidelines (Appendix B to 29 CFR 1910 Subpart T):

The Scientific Diving Control Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operation.

The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.

The tasks of a scientific diver are those of an observer and data gatherer. Construction and trouble-shooting tasks traditionally associated with commercial diving are not included within scientific diving.

Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment and therefore, are scientists or scientists-in-training.

In addition, the scientific diving program shall contain at least the following elements (29 CFR 1910.401):

Diving safety manual which includes at a minimum: procedures covering all diving operations specific to the program, including procedures for emergency care, recompression and evacuation, and the criteria for diver training and certification.

Scientific Diving Control Board, with the majority of its members being active scientific divers, which shall at a minimum have the authority to: approve and monitor diving projects, review and revise this diving safety manual, assure compliance with the manual, take disciplinary action for unsafe practices, and assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

### **3.1.4 Consequences of Violation of Regulation by TtEC Scientific Divers**

Failure to comply with the regulations of TtEC's diving safety manual may be cause for the revocation or restriction of the diver's scientific diving certification by action of the DSO and Diving Review Board.

### **3.1.5 Consequences of Violation of Regulations by AAUS Organizational Members**

Failure to comply with the regulations of the AAUS Standards may be cause for the revocation or restriction of TtEC's recognition as an Organizational Member of AAUS.

## **3.2 Responsibilities**

The UXO/Diving Safety Manager, under the Environmental Health and Safety (EHS) Department, is designated the Chairman of the Diving Review Board and is responsible for updating this procedure. The Chairman of the Diving Review Board will maintain the qualification records of those personnel approved for diving and approve all other divers and subcontractors involved in diving on TtEC projects.

This procedure will be reviewed by the Vice President of UXO Operations for technical content involving UXO diving, the EHS representative for environmental, health and safety and the Scientific Diving Safety Officer for the Science Divers. They will ensure diving operations are conducted in a safe and efficient manner throughout he company.

The Administration/Compliance Department will review for compliance with appropriate laws and regulations.

Approval authority rests with the [TtEC](#) Chief Executive Officer, with review by the [Director, EHS Services Department](#).

Suggestions for revision will be submitted to the Chairman, Diving Review Board through the Director, EHS Services. The Chairman, Diving Review Board is responsible for all required [corporate](#) record keeping in accordance with this manual and maintenance of all identified references.

[For UXO diving, the Vice President for UXO operations](#) will review and approve all [TtEC](#) employees and subcontractor personnel [involved in UXO diving](#).

[For scientific diving the Scientific Diving Safety Officer along with the Scientific Diving Control Board will review and approve the qualifications and authorized diving depth for science divers yearly.](#)

No Diving Safe Practice Manual (DSPM) will ever exist that can substitute for [prior planning](#), sound judgment and a continuing concern for maximum safety. Safety is not a rulebook; it is a state of mind. However, not all circumstances or situations can be explained and detailed in this DSPM, and in light of [that](#) fact, [TtEC](#) recommends that deviation from these guidelines should be undertaken only when, in the opinion of the Diving Supervisor/[Lead Diver](#), an emergency situation exists where the health and safety of personnel are in immediate danger. The Diving Supervisor/[Lead Diver](#) will have final authority as to safe conditions on the dive site. A written [event](#) report will be submitted to the Chairman [of the](#) Diving Review Board within 48 hours of the deviation from the DSPM to document possible changes to this manual and conform to OSHA requirements.

#### [Definitions used in this manual:](#)

[Chairman Diving Review Board - ESQ Department member which manages and oversees the Diving Review Board](#)

[Diving Review Board - Has the overall responsibility to review and manage all diving operations within TtEC](#)

[Diving Safety Officer - For the scientific divers, manages the TtEC science diving program and represents the science divers on the Diving Review Board](#)

[Diving Control Board - The group of scientific divers overseeing the AASU certified diving program within TtEC](#)

### **3.2.1 [UXO/Diving](#) Safety Manager/Chairman, Diving Review Board**

The [UXO/Diving](#) Safety Manager, under the [Director, EHS Services](#) is the Chairman of the TtEC Diving Review Board. The Diving Review Board is made up of a qualified diver from the UXO Group and the Sciences [Diving Safety Officer](#) as assigned by the appropriate manager. The Chairman, Diving Review Board is responsible for managing the TtEC Diving Program in conjunction with the assigned board members and he/she will maintain the diving logs and references as required by OSHA 29 CFR Subpart "T" and the American Academy of Underwater Sciences, Standards for Scientific Diving. The Chairman [of the](#) Diving Review Board will maintain qualifications and physical records for all TtEC divers. He will review and approve divers, including subcontractors who are assigned to individual projects.

### **3.2.2 [Vice President of UXO Operations](#)**

The [TtEC](#) Vice President of UXO Operations as a permanent [Diving Review Board](#) member is responsible for the safe conduct of UXO and construction diving operations. He is responsible for the appropriate diver training and qualifications [for UXO operations](#). He will submit to the Diving Review Board names of qualified [UXO](#) divers to be certified by TtEC to work on the company projects. He will maintain a recent copy of the US Navy Diving Manual. All applicable governing legislation (OSHA, USCG, ANSI, and applicable local regulations), and the Association of Diving Contractors International Consensus and Technical standards. He will make these manuals available to the Diving Supervisors as required.

The Vice President of UXO Operations identifies Diving Supervisors and designates them in writing after review board concurrence.

### **3.2.3 Science Group Diving Review Board Member**

The Science [Diving Safety Officer will be a permanent member of the TtEC Diving Review Board and](#) will monitor and advise on all TtEC scientific diving projects. Coordinate approval of authorized divers and submittal of individual diving records and dive logs to the Chairman of the Diving Review Board. Review and approve the EHS [2-2 Safe Diving Practice Procedures](#) and [science](#) project-specific Dive Safety Plans. Ensure that an approved Diving Supervisor/[Lead Diver](#) is assigned and that they meet the requirements of paragraph [3.2.6](#) below. Coordinate project operations with the assigned Diving Supervisor/[Lead Diver](#) to assign the diving team members and develop the Diving Plan to meet the requirements of the project and this procedure.

### **3.2.4 Scientific Diving Safety Officer**

[The TtEC Scientific Diving Safety Officer \(DSO\) serves as a member of the Diving Review Board member and the Scientific Diving Control Board. This person should have a broad technical and scientific expertise in research related diving.](#)

#### Qualifications

[Shall be appointed by the responsible administrative officer or designee, with the advice and counsel of the Scientific Diving Control Board.](#)

[Shall be trained as a scientific diver.](#)

[Shall be a full member as defined by AAUS.](#)

[Shall be an active underwater instructor from an internationally recognized certifying agency.](#)

[Shall be qualified as a TtEC Environmental Safety Supervisor \(ESS\)](#)

#### Duties and Responsibilities

[Shall be responsible, through the Scientific Diving Control Board, to the responsible administrative officer or designee, for the conduct of TtEC's scientific diving program. The routine operational authority for this program, including the conduct of training and certification, approval of dive plans, maintenance of diving records, and ensuring compliance with this standard and all relevant policies of TtEC, rests with the DSO.](#)

[Will forward all approved dive plans when approved and before diving commences and diving records at the completion of each weeks diving to the Chairman of the Diving Review Board as the Corporate POC for diving.](#)

[May permit portions of this program to be carried out by a qualified delegate, although the DSO may not delegate responsibility for the safe conduct of the local diving program.](#)

[Shall be guided in the performance of the required duties by the advice of the Scientific Diving Control Board, but operational responsibility for the conduct of the local diving program will be retained by the DSO.](#)

[Shall suspend diving operations considered to be unsafe or unwise.](#)

### **3.2.5 Senior UXO Supervisor**

A Senior UXO Supervisor (SUXO) will be assigned and designated in writing by the Vice President of UXO

Operations for projects that have an UXO removal/investigation requirement as well as a diving requirement. The SUXO will coordinate all ordnance response requirements and establish safe procedures for the removal of the UXO hazard. On larger joint diving/UXO operations the Diving Supervisor/[Lead Diver](#) will normally supervise the diving evolution and the SUXO will oversee the UXO response. The SUXO and Diving Supervisor/[Lead Diver](#) can be the same person if that person has both qualifications on smaller projects. The SUXO will be a qualified [TtEC](#) ESS person.

### **3.2.6 Diving Supervisor/[Lead Diver](#)**

A qualified person will be designated in writing, to be in charge of each diving operation. This person will be designated based on knowledge, experience, and level of training.

The Diving Supervisor/[Lead Diver](#) is in charge of the overall diving operation, and is responsible for the planning and execution of the dive, as well as the safety and health of the dive team. The Diving Supervisor/[Lead Diver](#) will be a qualified TtEC ESS person. In carrying out these duties his responsibilities will include, but will not be limited to [ensuring that:](#)

All dive team members who are exposed to, or control the exposure of others to, hyperbaric conditions will be trained in diving-related physics and physiology.

Each dive team member will be assigned tasks in accordance with the employee's experience or training. Limited additional tasks may be assigned to an employee undergoing training, provided that these tasks are performed under the direct supervision of an experienced dive team member.

A dive team member will not be required to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.

A dive team member will not be permitted to dive or otherwise be exposed to hyperbaric conditions for the duration of any physical impairment or condition which is known and is likely to adversely affect the safety or health of a dive team member.

Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility.

Take appropriate corrective action to reduce the probability of recurrence of decompression sickness.

Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within [10](#) days of the incident of decompression sickness.

Being fully aware of all relevant governmental regulatory agency regulations that apply to the diving operation and the diving mode employed.

[Be](#) in immediate control and available to implement emergency procedures during diving operations. The Dive Supervisor is not permitted to dive unless another qualified dive supervisor is present and has been appointed and designated to assume this responsibility.

Ensuring, prior to diving, that all additional parties are informed that diving operations are about to be undertaken. These parties include but are not limited to, craft masters, boat pilots, harbor masters, managers of pipelines, and managers for civil engineering sites and inland waterways.

Ensuring that diving operations are conducted from a suitable and safe location on the surface. [Refer to Section 3.3 for additional diving procedures.](#)

Establishing a project-specific Dive Safety and Health Plan, ensuring that sufficient air supply, supplies and proper equipment are available for the safe and timely completion of the job task. [This must be approved by the Scientific Diving Safety Officer prior to conducting any diving evolution.](#)

Briefing the dive team as to the plan of attack and soliciting suggestions per Attachment 1. During the briefing the supervisor will make team assignments, designate required equipment, review diving signals, establish a positive diver recall method, and cover emergency procedures.

[Use Attachments 2 and 3 for pre-dive and post-dive checklists.](#)

Ensuring all members of the diving team are familiar with the emergency procedures contained in Attachment 4.

Being aware of the procedures to follow and the routes to take to obtain medical support in the event of an accident, either diving or non-diving related.

Ensuring that a two-way communication system is available and tested.

[Ensuring that the Emergency Phone Numbers Checklist, Attachment 5, is completed and posted at the dive site.](#)

Determining the qualifications and proficiency of all personnel and permitting no dives to be made by any person who is not qualified.

Verifying that all equipment required is on scene and in working order.

Ensuring that all-relevant operating instructions, manuals, decompression schedules, treatment tables and regulatory publications are available on the dive site.

Maintaining a dive profile log for each diver to include depth bottom time and [residual nitrogen time](#) per Attachment 6.

Terminating diving operations at any time when, in his opinion, safe diving procedures are not being followed or conditions prevent safeguarding the divers. The Diving Supervisor/[Lead Diver](#) will not resume diving operations until the unsafe conditions have been removed or corrected.

Ensuring that after every dive the post-dive checklist, Attachment 3, is used.

Ensuring after any treatment or unplanned dive conducted outside the no-decompression limits that the diver is instructed to stay awake and remain in the vicinity of the chamber for at least one hour.

Reporting all accidents or incidents involving personnel as required by [TtEC](#) procedures and relevant governmental regulations.

Ensuring all reports and paperwork are completed and submitted at the end of the diving day.

Maintain certification in [cardiopulmonary resuscitation](#) (CPR), First Aid ([American Red Cross or equivalent](#)) and [automated external defibrillator](#) (AED), and [O<sub>2</sub> administration](#).

### **3.2.7 Diver(s)/Snorkel(s)**

A diver will be at least 18 years old, be medically certified "fit to dive", and have a knowledge of diving theory, diving related physics and physiology. [He will provide the Chairman of the Diving Review Board copies of his certifications before being allowed to dive.](#) On diving projects involving UXO operations the minimum age of the diver is 21 years, per [the Bureau of Alcohol, Tobacco and Firearms](#) (ATF) regulations [concerning the handling of explosives.](#) This individual will also have a full understanding of the diving equipment in use, and of the tasks assigned. The diver is assigned by the Diving Supervisor/[Lead Diver](#) to perform specific tasks underwater and topside. He must be qualified for the diving technique, particular equipment selected, and the task assigned. In addition, each diver will maintain certification in cardiopulmonary resuscitation (CPR) (American Red Cross or equivalent), [First Aid, AED and O<sub>2</sub> administration.](#) Each diver in the accomplishment of his duties will:

Know the use of tools, equipment and systems relevant to assigned tasks.

Techniques of the assigned diving mode.

For scientific research operations, the use of snorkeling equipment is authorized by a qualified diver in place of scuba tanks for shallow water observations with no encumbered obstacles in the vicinity of the snorkeler. [See ACOE 385-1-1 for additional requirements.](#)

Accomplish all tasks assigned by the Diving Supervisor/[Lead Diver](#). In the event that he is assigned a task for which he does not consider himself qualified either by training and/or experience, he will immediately inform the Diving Supervisor/[Lead Diver](#).

Read, understand and comply with all [TtEC](#) policies and with applicable governmental regulations as they relate to his qualifications or performance while engaged in diving.

Maintain a high level of physical fitness.

Immediately obey all commands or instructions from the Diving Supervisor/[Lead Diver](#) to return to the surface, [or](#) first decompression stop as appropriate.

Keep topside personnel advised of conditions on the bottom.

Be responsible for the diving gear worn and ensure that it is complete, in good repair, and ready for use at any time in accordance with regulations or instructions concerning its use, maintenance, repair and testing.

Report to the Diving Supervisor/[Lead Diver](#) any defect or malfunction of the diving equipment provided for the diving operation.

Ensure the deepest depth of his dive has been established before his ascent.

Report to the Diving Supervisor/[Lead Diver](#) any recent medical treatment or illness so that the proper determination can be made concerning the divers fitness to dive.

Immediately report all symptoms or suspected symptoms of decompression sickness as early and accurately as possible.

Follow safe diving practices at all times during the diving operation whether topside or in the water. The diver will bring to the attention of the Diving Supervisor/[Lead Diver](#) any questionable items and will be alert for the safety of all.

Remain awake and in the vicinity of the decompression chamber for at least one hour following treatment or a hyperbaric exposure beyond no decompression limits.

Know and observe the rules for ascending to altitude, including flying after diving.

Ensure that his diving equipment has been properly maintained, prepared and tested before each dive. This requirement should never be delegated to others.

Maintain a divers' logbook, which details all dives, medical examinations, courses taken, and personal equipment maintenance.

Ensure their medical certificates are up to date and recorded in their diving logbooks. Divers will present their logbooks to the Diving Supervisor/[Lead Diver](#) at every job.

A diver will not be exposed to hyperbaric conditions against his will, except when necessary to complete decompression or treatment procedures.

Maintain certification in CPR, First Aid, AED [and O<sub>2</sub>](#).

[A diver may refuse to dive, without fear of penalty, whenever they feel it is unsafe for them to make the dive since the ultimate responsibility for safety rests with the diver. It is the diver's responsibility and duty to refuse to dive if, in their judgment, conditions are unsafe or unfavorable, or if they would be violating the precepts of their training or the regulations in this manual.](#)

### **3.2.8 Standby Diver**

The standby diver is a fully qualified diver, assigned for back up to provide emergency assistance, and is ready to enter the water when conducting diving operations with a single tended diver. When assigned during buddy diving, where two divers are conducting the dive together, he will be ready to enter the water prior to commencing the dive and then may remove tank, mask and fins, at the Diving Supervisor/[Lead Diver's](#) discretion. Under no circumstances will he leave the dive site. The standby diver receives the same briefings and instructions as the working diver/s, [wears the same diving equipment](#), monitors the progress of the dive and is fully prepared to respond if called upon for assistance.

While acting as a standby diver, in addition to the requirements of a regular diver, he will:

Be rested and fully capable of performing emergency rescue assistance.

Be sufficiently free of residual nitrogen to allow for sufficient bottom time for the prescribed task at the working depth without exceeding the no-decompression limits for that depth.

Be dressed appropriately to allow prompt entry into the water as directed by the Diving Supervisor/[Lead Diver](#).

Remain at his station throughout the entire dive.

Not be assigned any tasks that might interfere with his duties as a standby diver while there is a diver in the water.

Maintain certification in CPR, First Aid AED [and O<sub>2</sub>](#).

### **3.2.9 Diver Tender**

The tender is the surface member of the diving team who works most closely with the diver on the bottom. Though it is preferred that the tender be a qualified diver it is not mandatory. If the tender is not a qualified diver he must be familiar with line pull signals and emergency procedures. The tender is assigned by the Diving Supervisor/[Lead Diver](#) to continuously tend (monitor) the diver. He will devote his full attention to tending the diver he is assigned to, from preparation of the dive through its completion. He will not be assigned any other task while the diver is in the water.

The tender should further:

Assist the diver in dressing and undressing and confirm that the diver's equipment is functioning properly.

Tend the diver's safety line and be aware of the diver's depth and location at all times.

Set up and operate all equipment as directed by the Dive Supervisor/[Lead Diver](#).

Immediately inform the Diving Supervisor/[Lead Diver](#) in the event that he is assigned a task for which he does not consider himself qualified either by training and/or experience. Be alert and immediately report any conditions that may be hazardous or unsafe.

Assist in topside work as required or directed.

Maintain certification in CPR, First Aid AED [and O<sub>2</sub>](#).

### **3.2.10 Reciprocity and Visiting Scientific Diver**

Two or more AAUS Organizational Members engaged jointly in diving activities, or engaged jointly in the use of diving resources, shall designate one of the participating Diving Review (Control) Boards to govern the joint dive report.

A Scientific Diver from one Organizational Member shall apply for permission to dive under the auspices of another Organizational member by submitting to the DSO of the host Organizational Member a document containing all information described in AAUS Standards Appendix 6 - AAUS Request for Diving Reciprocity Form Verification of Diver Training and Experience. This form shall be signed by the DSO or Chairman of the Scientific Diving Control Board.

A visiting Scientific Diver may be asked to demonstrate their knowledge and skills for the planned dive.

If a host Organizational Member denies a visiting Scientific Diver permission to dive, the host Scientific Diving Control Board shall notify the visiting Scientific Diver and their Diving Control Board with an explanation of all reasons for the denial.

### **3.2.11 Waiver of Requirements**

The Diving Review Board may grant a waiver for specific requirements of training, examinations, and minimum activity to maintain certification.

## **3.3 General Requirements for Diving or Snorkeling**

### **3.3.1 The requirements presented in this section will be used in conjunction with procedures and requirements for individual dive techniques presented in following sections of the dive manual.**

- All dives will be executed in accordance with 29 CFR 1910 Subpart "T", for commercial diving. The 29 CFR 1910 Subpart "T" will accompany this DSPM on the diving location. Scientific diving has an exemption in OSHA 29 CFR 1920 Subpart "T" for strictly scientific diving purposes. Scientific diving will be in accordance with this manual and the American Academy of Underwater Sciences Standards for Scientific Diving. The Association of Diving Contractors (ADC) Consensus and Technical Standards provides an accepted interpretation of these regulations. All ascents, descent and decompression procedures will be in accordance with the US Navy Dive Manual. A link to the U.S. Navy Diving Unlimited/No-Decompression limits is located in Section 5 References.
- The qualifications of personnel and equipment requirements for snorkeling are the same as diving with the exception of the required air supply for diving.
- A ladder extending below the surface of the water [and handrails three feet minimum above the diving platform](#) will be provided to assist the diver on entry and exit from the water (inflatable boats are exempt from this requirement).
- A means will be provided to assist an injured diver from the water.
- [When diving from vessels, the international code alpha and recreational dive flag with a minimum dimension of 23 inches will be displayed whenever diving operations are being conducted and will not be removed until diving operations have been completed and all divers are safely out of the water. TtEC divers will comply with all site-specific local, state, federal and international regulations regarding marking of diving activities.](#)
- [For enclosed areas, i.e. intracoastal waterway or marinas, individual buoys with recreational diver flags will mark the outline of the diving area and the divers may have a "follow me" buoy with the recreational dive flag to determine their exact location. A rigid replica of the International Code Alpha flag at least one](#)

[meter in height shall be displayed at the dive location visible all-round.](#)

- A diver will be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
- Positive communications to the recompression facility, the designated medical facility and any required transportation to these facilities (medivac, ambulance, etc.) will be checked daily. This communication will include cellular telephone or radio communications with a constantly manned location with telephone access at the dive site. Diving operations will not be conducted without established communications.
- The Diving Supervisor/[Lead Diver](#) is not permitted to dive unless another qualified supervisor is present and has assumed the Dive Supervisor responsibility.

**3.3.2 Employees engaged in SCUBA diving will comply with the general requirements for diving and the following additional requirements, unless otherwise specified:**

- Audio communications are preferred in all diving situations. However, this type of communication is not required for a diver who is accompanied by another diver (buddy), or who can communicate with the tender on the surface via a safety line using line pull signals.
- The planned time of such a diving operation will not exceed the no decompression limits according to the US Navy Dive Manual, or the air supply duration of the cylinders in use exclusive of the reserve supply. The cylinder pressure will be determined immediately before each dive.
- Each diver will be equipped with a knife, a diving wristwatch, a depth gauge [or dive computer](#), a facemask, a submersible cylinder pressure gauge, and a life jacket or buoyancy compensator.
- A weight belt [or integrated weight system](#) with a quick release that is appropriate for the suit and the depth of the dive will be worn.
- A cylinder harness with a quick release will be worn to secure the SCUBA cylinders to the diver.
- The weight belt and cylinder harness, will be independently attached to permit release of either one without interference by the other.
- A personal flotation [or buoyancy compensation](#) device will be worn. An exception will be considered during approval of the Dive Plan for diving in enclosed spaces or under the ice.
- SCUBA diving will not be conducted [at depths deeper than 130 feet. For depths from 100 feet to 130 feet, a recompression chamber must be within 5 minutes of reaching the surface.](#)
- During all SCUBA dives, a standby diver will be available while a diver is in the water.
- A SCUBA diver will be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations. If the SCUBA diver is tended, he will wear a harness (ACOE requirement).
- A diver-carried reserve breathing gas supply will be provided for each diver consisting of:

A manual reserve (J valve); or

An independent reserve cylinder that either has a separate regulator or is connected to the underwater breathing apparatus. [If connected to the underwater breathing apparatus the valve will be closed until required. For ACOE diving a 30 CuFt reserve cylinder is required with separate regulator.](#)

The [air pressure](#) of the reserve breathing gas supply [will be gauged and the valve left](#) in the

closed position prior to the dive.

**3.3.3 Employees engaged in Surface Supplied diving will comply with the general requirements for diving and the following additional requirements, unless otherwise specified.**

- The approximate depth of each dive will be determined prior to the start of operations.
- A weight belt appropriate for the suit and depth of the dive will be worn, except when conditions dictate otherwise for the safety of the diver.
- A 5-point safety harness, with a positive buckling device, shall be worn, under all other types of equipment (except in heavy gear). This harness will have an attachment point for the umbilical to distribute the weight of the diver's body and prevent any strain from being placed on the divers mask or helmet if/when the umbilical is pulled on. The safety harness will also have a lifting point to distribute the pull force of the line over the diver's body. The safety harness may be equipped with a backpack for a bailout bottle.
- Surface supplied dives will not exceed 190 FSW, and will not enter into exceptional exposure dives as set forth in the U. S. Navy standard air decompression tables.
- A decompression chamber will be ready for use on site for any dive outside the no-decompression limits or deeper than 100 FSW.
- A diving bell will be used for all dives requiring an in-water decompression time greater than 120 minutes.
- Each diver will be continuously tended by another dive team member while in the water.
- A diver will be stationed at the underwater entry point when diving is conducted in enclosed or physically confining spaces.
- A standby diver will be available while a diver is in the water.
- Each dive will have a primary air supply capable of supplying the diver(s) with the specified air volume, pressure and flow rate IAW manufacturer's specifications of the diving apparatus worn, throughout the planned [depth of the](#) dive, including decompression.
- Each dive location will have a reserve breathing air supply, in line, capable of supporting the dive operation.
- A diver carried reserve breathing gas supply will be provided for each diver on dives deeper than 60 FSW or outside no-decompression limits, or when the diver does not have direct access to the surface (on all ACOE surface supplied dives). This does not apply to heavy gear.
- On all dives deeper than 100 FSW or outside the no-decompression limits, an extra breathing gas hose capable of supplying gas to the diver in the water will be available to the stand by diver.
- On all dives deeper than 100 FSW or outside the no-decompression limits, an in water stage will be provided.

**3.4 Diver Training and Qualifications**

The following section describes the minimum requirements for TtEC divers. Additional training may be needed for site specific conditions or required under state, federal or local regulations.

- The level of experience or training required by the standard depends upon the job the employees are required to do. All dive-team members must have either experience or training in the use of tools,

equipment, systems, techniques, operations, operational procedures and emergency procedures that are pertinent to, and necessary for, the assigned tasks for the diving mode. It is essential that those dive-team members who are exposed to hyperbaric conditions, or those members who control the exposure of others have knowledge of the physiological effects of diving and the related effects of pressure. Accordingly, this standard also requires that employees be trained in diving-related physics and physiology. Employee qualifications achieved through field experience and classroom training may be used to meet the requirements of the standard.

- Federal service qualification certificates, (such as from the Army Corps of Engineers, NOAA, or Military Diving School).
- Civilian diving school certificates of completion for the appropriate training level issued by schools associated with the Association of Diving Contractors International.
- Each dive-team member must be trained in CPR (American Red Cross or equivalent), First Aid, AED and O<sub>2</sub> treatment. Employees completing this training are issued a card certifying that they have successfully completed the course.
- Each member of the TtEC diving team will be qualified to conduct the work assigned by completion of training and/or experience. This qualification will be documented by completion of a certified course of instruction, either a certified commercial course (ASSOCIATION OF COMMERCIAL DIVING EDUCATORS (A.C.D.E.) accredited), civilian certification with experience for the profile of the dive or documented military diver training and experience are acceptable.
- All divers will maintain a personal dive log that will document all hyperbaric exposures. The following minimum information should be included in the log. Additionally, dates of diving physicals and a record of relevant training will accompany the log.

Location of Exposure

Maximum depth

Time left surface, total bottom time and time reached surface

Type of breathing apparatus and mixture used

Task performed

Decompression table and schedule used

Any Decompression sickness symptoms or injury

Signed by the Diving Supervisor/Lead Diver

Comments

### **3.4.1 Entry Level Training**

All TtEC non-divers who have the required skills and training to participate in diving related activities shall be certified by an internationally recognized agency.

### **3.4.2 SCUBA Training**

All TtEC divers shall provide a copy of their diver certification to the Chairman of the Diving Review Board, and to the DSO for scientific divers that represent successful completion of a swimming evaluation, practical diver training, written examination and open water evaluation. The certificate from the training activity will be used to document the location and date of training. The dive log will document the depth and number of diving qualification dives.

### **3.4.3 Scientific Diver Training**

TtEC divers engaged in scientific diving shall comply with the policies and guidelines set forth in this manual; as well as demonstrated proficiency in diving and in meeting the project objectives and goals. Only a person diving under the auspices of TtEC that subscribes to the practices of AAUS is eligible for scientific diver certification. The diving log will be used to document the number of dives and depth qualifications of scientific divers.

#### **3.4.4 Surface Supplied Diver Training**

The training certificate will be provided to document previous training and dive log to document number of dives and depth of diving qualifications. The conduct of training dives will be required to ensure all divers are current in the type of equipment and the depth expected of the diving project.

#### **3.4.5 Requirements for Scientific Diver Certification**

TtEC divers participating in scientific diving must be approved by the DSO or designee and the Diving Control Board. Any applicant who does not possess the necessary skills and training may be denied Organizational Member scientific diving privileges.

#### **3.4.6 Theoretical and Practical Training**

A TtEC professional considered for scientific diving must complete theoretical aspects and practical training for a minimum cumulative time of 100 hours.

Theoretical aspects shall include principles and activities appropriate to the intended area of scientific study, and shall include the following:

- Diving Emergency Care Training
- Dive Rescue
- Dive Physics
- Dive Physiology
- Dive Environments
- Decompression Theory and Application
- Scientific Diving Regulations and History
- Scientific Method
- Data Gathering Techniques (specific to the area of study)
- Common Biota
- Site Selection, Location, and Re-Location
- Specialized Equipment for Data Gathering

Practical training must include a checkout dive, with evaluation of open water skills with the DSO or qualified delegate followed by at least 5 ocean or open water dives in a variety of dive sites and conditions for a cumulative bottom line of 3 hours. This qualifies the person to the initial qualification depth of 30 feet.

An additional 12 dives under supervision from 31 feet to 60 feet for a dive time of 4 hours will certify the diver to the 60 foot depth. This method will continue to advance the dive depth to deeper certification levels as outlined in paragraph 5.40 in the AAUS manual.

#### **3.4.7 Continuation of Certificate and Re-Certification**

During any 12-month period, each certified scientific diver must log a minimum of 12 dives. At least one dive must be logged near the maximum depth of the divers certification during each 6 month period. A diving certificate may be revoked or restricted for cause by the DSO or Diving Review Board. A TtEC diver may be re-certified upon review of the diver's skills by the DSO and Diving Review Board.

### **3.5 Personnel Requirements**

### **3.5.1 Self Contained Underwater Breathing Apparatus (SCUBA)**

- a. Option one, Tended Diver – 1, Stand-by Diver – 1, Diving Supervisor/[Lead Diver](#) – 1
- b. Option two, Divers – 2, Stand-by Diver – 1, Diving Supervisor/[Lead Diver](#) – 1
- c. Option two modified, (Science diving only in shallow waters), Divers – 2, Diving Supervisor/[Lead Diver](#)/Standby – 1

Note: “Scientific diving is defined (29CFR 1910.401) as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks.”

### **3.5.2 Surface Supplied Diving (0-100 FSW with no decompression diving)**

- a. Tended Diver – 1
- b. Diver Tender – 1 ([Can be the Stand-by Diver](#))
- c. Stand-by Diver – 1 ([May not be required for all dives](#))
- d. Air supply Operator – 1 ([Can be a non-diver](#))
- e. Diving Supervisor/[Lead Diver](#) – 1

Note: In establishing the number of dive-team members required for a dive, proper consideration must be given to 29CFR1910.421 (d) Planning and assessment, 29CFR1910.421 (e) Hazardous activities. This latter provision required employers to provide a means to assist an injured diver from the water, such as a small boat or stokes basket, this may necessitate additional dive-team members.

### **3.5.3 Surface Supplied Diving (Deeper than 100 FSW or decompression diving)**

- a. Tended Diver – 1
- b. Stand-by Diver – 1
- c. Diver Tender – 2
- d. Air supply Operator – 1 ([Can be a non-diver](#))
- [b0](#). e. Diving Supervisor/[Lead Diver](#) – 1

### **3.5.4 An additional dive crew member may be required when any diving operations which has an increased likelihood of diver entrapment or potential for rendering the diver unconscious or incapacitated from chemical, physical, electrical or topside hazards. These operations include but are not limited to:**

- Diving on ordnance and/or explosives.
- Diving from a small boat.
- Diving in remote areas where assistance from non-diving crew personnel is not **immediately** available, i.e. within communication range.
- Penetration diving, both horizontal and vertical.
- Any crane operations associated with the diving program.

- Diving in any situation where the diver utilizes surface tended equipment.
- Diving from a platform greater than 8' above the water surface.

### 3.6 Medical Requirements

#### 3.6.1 Physical Examination

Each diver will receive a diving physical examination initially when assigned diving duties and yearly thereafter. In addition, a medical examination will be conducted whenever a diver has been hospitalized for more than 24 hours due to an injury or illness. A determination as to his fitness to continue to dive will be prepared by the examining physician. The physician will prepare a written report containing the following statement: a physician based on the following certifies the diver as "Fit to Dive":

- Medical requirements of this standard and a summary of the nature and extent of hyperbaric exposure to which the diver will be exposed, including diving modes and types of work to be assigned. [TtEC](#) will provide the dive information.
- The divers medical history, Attachment 7 will be filled out completely and will be provided to the examining physician.
- A basic diving physical examination will be conducted initially and annually for all TtEC divers which will include Chest X-ray, vision testing, audiogram, Pulmonary Function Test (PFT), blood chemistry panel, CBC with differential, urinalysis and Micro (US) and any additional tests required by the examining physician. An electrocardiogram (EKG) will occur during the first annual physical and every three years after. An exercise stress test may be indicated based on risk factor assessment by the doctor.
- The results of the medical examination.
- The examining physician's opinion of the employee's fitness to be exposed to hyperbaric conditions, including any recommendations or limitations to such exposure. [TtEC](#) will provide the employee with a copy of the physician's written report.

Determination of the employee's fitness to dive will be based on the physician's written report and review by the Diving Review Board. If the physician has recommended a restriction or limitation on the employees' exposure to hyperbaric conditions, and the employee does not agree with the physician's findings, then the employee has the right to obtain his own diving certified physician to perform a diving physical. If the second physician does not agree with the findings of the first physician, then a third physician will be consulted for resolution.

### 3.7 Equipment Considerations

The Diving Supervisor/[Lead Diver](#) in conjunction with the Diving Review Board will establish the equipment requirements for individual projects. This list will be included in the approved Dive Plan and will include required dive gear, boat equipment and any required task-specific equipment. This list should be submitted to the Project Manager when the Dive Plan has been approved.

Each equipment modification, repair, test, calibration or maintenance service that is required will be recorded by means of a tagging or logging system. This system will include the date, serial number of the item and nature of the work performed and the initials of the person who conducted the work.

#### 3.7.1 Regulators

TtEC divers will be responsible for inspecting and scheduling maintenance on their regulators prior to first use and every 12 months thereafter. Documentation of the inspections and maintenance will be maintained in the TtEC diving files.

### **3.7.2 Air Supply Requirements**

Diver air will be procured from a facility where the compressors meet [the requirements established by the Compressed Gas Association \(CGA pamphlet G-7.1\) or more stringent standards](#). The tanks will be filled with compressed air from a source which complies with, at a minimum, 29 CFR, Subpart T, section 1910.430 (equipment). The breathable air supplied to the diver will be tested every 6 months and will not contain:

- A level of carbon monoxide (CO) greater than 10 parts per million (ppm).
- A level of carbon dioxide (CO<sub>2</sub>) greater than 1,000 ppm.
- A level of oil mist greater than 5 milligrams per cubic meter.
- A level of hydrocarbons other than methane greater than 25 ppm.
- No noxious or pronounced odor.

A copy of the latest air test results will be [reviewed and/or](#) obtained and filed with the dive plan. [When using local established vendors providing divers air, a check of current certification is required every 6 months](#). If air test results are not available [TtEC](#) will draw an air sample from the compressor for appropriate analyses.

### **3.7.3 Compressed Air Cylinders**

Compressed breathing air cylinders will:

- Be constructed with seamless steel or aluminum, which meet DOT 3AA and DOT 3AL specifications.
- Have identification symbols stamped into the shoulder of the cylinder.
- Be inspected internally and externally for corrosion and pitting on an annual basis. If a defect is found that may impair the safety of the pressure vessel, then a hydrostatic test must be performed.
- Be hydrostatically tested every 5th year in accordance with DOT regulations. The test dates will be stamped into the shoulder of each cylinder.
- [Documentation of each cylinder inspection will be maintained in the TtEC diving files.](#)
- Be stored in a ventilated area and protected from excessive heat.
- Be secured from falling.
- Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or when installed with a manifold, or when used for SCUBA diving.

### **3.7.4 Air Compressor Systems**

Air Compressors used to supply air to the diver will:

- Be equipped with a volume tank that has a check valve on the inlet side, a pressure gauge, a relief valve and a drain valve.
- Have intakes located away from areas where exhaust fumes or other air contaminants may be present.
- Be tested every six months by means of samples taken at the connection to the distribution system to ensure that the air supplied meets all applicable standards (See Section 3.7.1, above). Non-oil lubricated compressors do not have to be tested for oil mist.

- Be equipped with a moisture separator and filtration system
- [A log shall be maintained showing all tests, repairs, maintenance and run time on all air compressors systems.](#)

### **3.7.5 Divers Air Supply**

The diver's surface supplied air supply may originate from an air compressor, a bank of high-pressure air flasks, or a combination of both. Regardless of the source, the air must:

- Meet the purity standards stated above.
- Be supplied in an adequate volume for breathing.
- Have a rate of flow that properly ventilates the helmet or mask.
- Be provided at sufficient pressure to overcome the bottom water pressure and the pressure losses due to flow through the diving hose, fittings, and valves.

The air supply requirements depend upon specific factors for each dive such as depth, duration, level of work, number of divers being supported, and type of diving system being used.

The capacity of the primary air supply must meet the consumption rate for the designated number of divers for the full duration of the dive (bottom time plus decompression time). The maximum depth of the dive, the number of divers, and the equipment to be used must be taken into account when sizing the supply.

The secondary air supply must be sized to support recovery of all divers using the equipment and dive profile of the primary supply, if the primary supply malfunctions or fails at the worst-case time (i.e., immediately prior to completion of planned bottom time of maximum dive depth, when decompression obligation is greatest).

### **3.7.6 Breathing Gas Supply Hoses (High Pressure)**

Breathing gas supply hoses will:

- Have a working pressure at least equal to the pressure of the total breathing gas system.
- Have a rated bursting pressure at least 4 times the working pressure.
- Be tested annually (at a minimum) to 1.5 times their working pressure.
- Have their ends taped, capped or plugged when not in use.
- Have connections made of corrosion resistant material, and be resistant to accidental disengagement.
- Have connectors with a working pressure at least equal to the hose they are attached to.

### **3.7.7 Divers Air Supply Hoses (Umbilical)**

Umbilical's will:

- Be marked (starting from the divers end) at 10' increments for the first 100; and 50' increments thereafter.
- Be made of kink resistant material
- Have a working pressure greater than the pressure equivalent of the maximum depth of the dive plus 100-psi.

### **3.7.8 Gauges and Time Keeping Devices**

- Each depth gauge will be deadweight tested or calibrated against a master reference gauge every six months, and when there is a discrepancy greater than two percent of full scale between any two equivalent gauges.
- A cylinder pressure gauge that is capable of being monitored by the diver during the dive will be worn by each SCUBA diver and surface supplied diver when equipped with a bailout bottle.
- Each SCUBA diver will wear a diving watch capable of displaying elapsed time.
- A timekeeping device will be available at each dive location.
- [Dive computers are approved for use after their review and approval of the Diving Review/Control Board. See paragraph 3.7.12 below.](#)

### **3.7.9 Buoyancy Control**

- A dry suit or buoyancy compensator not directly connected to the helmet or mask will be equipped with an exhaust valve. For more information on dry suits and cold-water equipment considerations see Appendix 14.
- Helmets or masks directly connected to a dry suit or other buoyancy-changing device will be equipped with an exhaust valve.
- When used for SCUBA diving, a buoyancy compensator will have an inflation source separate from the breathing gas supply and a manual inflator hose.
- An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manual activated inflation source independent of the breathing gas supply, an oral inflation device, and an exhaust valve is required for SCUBA diving, except when diving in enclosed spaces or under the ice.

### **3.7.10 Masks and Helmets**

- Surface-supplied masks/helmets will have a non-return valve at the attachment point between helmet or mask and hose, which will close readily and positively. Masks/helmets will also have an exhaust valve.
- Surface-supplied air masks and helmets will have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated, or they will have the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

### **3.7.11 Hand-held Power Tools**

Hand-held power tools are not normally used during SCUBA diving operations, but if used they will be used in accordance with the following safeguards:

- Hand-held power tools and equipment will be de-energized before being placed into or out of the water.
- Hand-held power tools will not be supplied with power from the dive location until requested from the diver.
- 2-way Voice communications between divers and topside must be used.

### **3.7.12 Dive Computers**

Diver carried computers that calculate decompression time based on time and depth must be checked for

accuracy prior to use. [AAUS recommendations on dive computers are located in the AAUS Standards, Appendix 8.](#)

### **3.7.13 Dive Tables**

[Dive tables must be made available to divers at all diving locations.](#)

### **3.7.14 Backpacks**

[Backpacks worn during diving operations without integrated flotation devices and weight systems need to be equipped with a quick release device.](#)

### **3.7.15 Welding/Cutting/Burning**

These procedures are not addressed in this manual. When a diving project requires welding, cutting or burning operations, those specific procedures will be addressed in the Project Specific Dive Plan (PSDP) for that project.

### **3.7.16 First Aid/CPR/AED/Oxygen**

A first aid kit, appropriate for diving operations and approved by a physician will be available at the dive site. This kit will contain an American Red Cross standard first aid handbook or equivalent, a bag-type resuscitator with transparent mask and tubing, and a stokes litter or backboard w/flotation. Additionally, a portable source of oxygen will be available [at](#) the dive site for transport of a diving related casualty to the hyperbaric treatment facility. One additional first aid kit will be the Automatic External Defibrillator (AED). It has been proved [that](#) in the case of cardiac arrest, the AED if used within the first 3 minutes would save an additional 74% of patients.

## **3.8 Record Keeping Requirements**

The following records are required by 29 CFR 1910, Subpart T, [and AAUS Standards for Scientific Diving](#) and will be maintained as indicated. The [TtEC](#) Chairman, Diving Review Board will maintain all historical records. Records and documents are as required by 29 CFR 1910, Subpart T, and will be provided upon request to employees, designated representatives, and other as determined by [TtEC](#). [The Scientific Diving Safety Officer or designee shall maintain permanent records for each Scientific Diver certified. The file shall include evidence of certification level, log sheets, results of current physical examination, reports of disciplinary actions by the organizational member Diving Control Board, and other pertinent information deemed necessary.](#)

### **3.8.1 Dive Profile Log (Depth-Time Profile)**

Attachment 6 will be forwarded to the Chairman, Diving Review Board and maintained for 1 year. If there has been a diving related illness or injury on the project, the records will be maintained for a period of 5 years. After the 5 year time limit, the records will be forwarded to the National Institute for Occupational Safety and Health (NIOSH). [The Scientific Diving Safety Officer will also maintain copies for all scientific divers.](#)

### **3.8.2 Diving Related Injury Records**

Any diving related injury or illness, which requires any dive team member to be transported to a hospital for treatment of any diving incident will be reported to the Project Environmental Safety Manager (PESM) and documented by specifying the circumstances of the incident and extent of the injuries in the section provided in the Dive Profile Log, Attachment 6. The PESH will subsequently report this accident/incident to the [TtEC](#) organization in accordance with [Event](#) Reporting EHS 1-7 and to OSHA/[AAUS](#) as required. The Dive Profile Log and written accident/incident report will then be forwarded to the PESH, who will forward it to the Chairman, Diving Review Board who will include the Dive Profile Log sheet into the [TtEC](#) Dive Log.

### **3.8.3 Recording of Dive**

As stated above a Dive Profile Log sheet will be completed for each dive, and upon completion of the dive will be forwarded to the Chairman, Diving Review Board. The Chairman, Diving Review Board will include the Dive Profile Log into the [TtEC](#) Dive Log, which will document all dives conducted by [TtEC](#) personnel. Ensure that Attachment 7, Divers History & Supplemental Questionnaire is completed for each diver before they commence diving.

#### **3.8.4 Decompression Procedure Assessment Evaluation**

In the event of a diving related incident, which requires treatment by recompression, the section of the Dive Profile Log for Decompression Procedure Assessment Evaluation will be completed and forwarded to the Chairman, Diving Review Board who will include the log into the [TtEC](#) Dive Log. The Dive Log will be maintained for a period of 5 years. The Chairman, Diving Review Board or designee will conduct the accident investigation.

#### **3.8.5 Equipment Inspections and Testing Records**

Maintain current log entry or tag for required equipment until equipment is removed from service.

#### **3.8.6 Records of Hospitalization**

Ensure all medical records generated by a hospitalization are forwarded to the TtEC Medical Provider.

#### **3.8.7 Diver Medical Records**

Maintain diver qualification medical records that are signed by the TtEC Medical Provider on site for the project duration or 5 years, which ever is longer.

#### **3.8.8 Dive Safe Practices Manual**

Only the current document is required to be maintained.

#### **3.8.9 Forwarding of Records**

After the expiration of the retention period of any record required to be kept for five (5) years, the Chairman, Diving Review Board will forward such records to the National Institute for Occupational Safety and Health (NIOSH). [See OSHA Subpart T for address.](#)

#### **3.8.10 Termination of Diving Operations**

In the event that [TtEC](#) ceases to do business the successor employer will receive and retain all dive and employee medical records required by 29 CFR 1910, Subpart T. If there is not a successor employer then all dive and employee medical records will be sent to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare.

#### **3.8.11 Training Records**

Copies of each diver's successful completion of Navy Dive School or civilian certification and any other certificates of any specialized training (relevant to the job) will be forwarded to the Chairman, Diving Review Board and kept on the project site. Additionally, any training conducted in preparation for the job will be documented and retained on site and copies forwarded to the Chairman, Diving Review Board.

### **3.9 Operations Planning**

This section provides guidance on effective dive planning for any size operation. The success of any diving operation is a direct outcome of careful, thorough planning. The site-specific circumstances of each operation determine the scope of the planning effort, but certain considerations apply to every operation. The "Dive Plan" provides a basic outline of minimum required information to successfully plan the diving operation. A

project-specific Dive Safety Plan will be developed and implemented by the designated [TtEC](#) Diving Supervisor/[Lead Diver](#) for each separate diving project.

### 3.9.1 Termination of Dive Operations

The working interval of a dive will be terminated when:

- [The activities are completed as planned](#)
- A diver requests termination.
- A diver fails to respond correctly to communications.
- Communications are lost and cannot be quickly re-established between the diver and a dive team member at the dive location, or between the designated person-in-charge and the person controlling the vessel in live boating operations.
- A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas.
- When the Diving Supervisor/[Lead Diver](#) determines that any unsafe condition exists.

### 3.9.2 Hazardous Environmental Conditions

Effective dive planning must provide for extremes in environmental conditions. Diving will be discontinued if sudden squalls, electric storms, heavy seas, unusual tide, or any other condition exists that, in the opinion of the Diving Supervisor/[Lead Diver](#), jeopardizes the safety of the divers.

### 3.9.3 Communications

Adequate communications for the dive site will be provided as follows:

**Diver to diver** – Wireless electronic communications is preferred for SCUBA operations, but diver-to-diver hand signals or line pull signals, in accordance with the U.S. Navy Diving Manual are acceptable, Attachment 8. Surface supplied diving requires an operating two-way audio communication system between the diver and topside.

**Surface to Diver/Diver to Surface** – Wireless electronic communications is preferred for SCUBA operations, but line pull signals in accordance with the U.S. Navy Diving Manual are acceptable, Attachment 8 Surface supplied diving requires an operating two-way audio communication system between the diver and topside.

**Emergency Assistance** – Telephone communications will be maintained on site via landline, cell phone or two-way radio communications with a constantly manned location to activate emergency services if required.

### 3.9.4 Cold Water Diving

Cold water diving is defined as diving in water at or below a temperature of 37 degrees Fahrenheit. Cold water diving requires the use of special equipment and techniques. All dives conducted in cold water will be in accordance with Attachment 9. Hypothermia demands immediate treatment and prompt evacuation to a medical facility. The Diving Supervisor/[Lead Diver](#) will also take into consideration hypothermia for the surface support personnel. The local/responding medical facility must be notified of the possibility of hypothermia PRIOR to the commencement of diving operations. Emergency re-warming and evacuation plans should be established with their (the medical facility's) recommendations. See Attachment 9 for Cold Water Considerations and Safety Precautions. Diving under the ice requires extremely specialized training and equipment and will not be performed by [TtEC](#) employees.

### 3.9.5 Diving at Altitude

Diving operations may be required in bodies of water at higher altitudes. Because of the reduced atmospheric pressure, dives conducted at altitude require more decompression than identical dives conducted at sea level. Standard air decompression tables, therefore, cannot be used as written. Planning must address the effects of the atmospheric pressures that may be lower than those at sea level. No correction is required for dives conducted at altitudes between sea level and 300 ft. The additional risk associated with these dives is minimal. At altitudes between 300 and 1000 feet, correction is required for dives deeper than 145 FSW (actual depth). At altitudes above 1000 ft., correction is required for all dives. High altitude diving requires special equipment and techniques and will be conducted in accordance with the provisions of the U.S. Navy Diving Manual. Additionally, standard operating procedures addressing the special requirements and support will be developed prior to commencing any high altitude diving [and included in the project specific, Health and Safety Diving Plan.](#)

### 3.9.6 Diving on UXO

Diving in the vicinity of explosive ordnance combines the inherent risk of diving and the explosive hazards of ordnance. Diving to investigate, recover or dispose of explosive ordnance found underwater, regardless of the type or fuzing, will only be accomplished by qualified UXO divers.

Generally, it is safer for divers to work in pairs rather than singly. However, when diving on explosive ordnance the use of two divers doubles the exposure to the ordnance and the amount of bottom time expended, and increases the risk to life from an unplanned detonation. Consequently, the Diving Supervisor/SUXOS should employ a single tended or marked diver when any manipulation of the ordnance is anticipated. Use of two divers for ordnance search operations is authorized and preferred. The development and use of standard operating procedures to address the hazards associated with the explosive ordnance is required when conducting UXO Diving.

### 3.9.7 Diving in Contaminated Water

Divers may encounter dangerous or unpleasant forms of pollution that can cause severe problems, such as: effluent from a sewer or industrial outfall, oil leaking from a wellhead or damaged fuel tank, toxic materials or volatile fuels leaking from barges or tanks, and ordnance or chemical warfare material. The dive team should not conduct the dive until the contaminate has been identified, the safety factors evaluated, and the process for decontamination set up. When diving in a known or suspected radiological environment, proper radiological procedures must be followed. When diving in contaminated waters the appropriate dress should be a fully contained dry suit with gloves and hood, with a positive pressure full-face mask or the new "Dirty Harry" SSDS. Technical advice for contaminated water diving is available from the National Oceanic and Atmospheric Administration (NOAA), HAZMAT Department, (206) 526-6317.

### 3.9.8 Diving Hazards

In addition to environmental hazards, and the hazards directly attributable to diving, a diver may occasionally be exposed to operational hazards that are not unique to the diving environment.

- **Underwater Obstacles** – Various underwater hazards such as: broken pilings, rocks, wrecks, dumping grounds, and discarded munitions offer serious hazards to diving.
- **Electrical Shock** – Electrical shock is rare underwater but may occur when using power equipment underwater or topside. A ground fault interrupter (GFI) must be used with electrical equipment employed on the dive site, both on the surface and underwater.
- **Explosions** – Explosions may occur during demolition tasks or during ordnance clearance operations, intentionally or accidentally. When using explosives, or as identified during UXO diving, separate standard operating procedures and work plans will be developed to cover all aspects of the use or possibility of encountering explosives/ordnance underwater. All divers will be out of the water prior to any planned detonation of explosives or ordnance.

- **Explosives** – All diving related explosives use will be pre-approved by the Manager of UXO Operations. The procedures for explosives handling, use, storage and underwater procedures will be detailed in the specific Dive Plan for the project.
- **Sonar** – Additional precautions are required when diving in the vicinity of vessels, which employ active sonar. Ships use low frequency sonar for object location and depth finding. It is a dense, high-energy pulse of sound that can cause damage to divers' ears. Avoid diving in the vicinity of low frequency sonar and approach no closer than 600 yards. The optimal separation distance is 3,000 yards. Additionally, the US Navy Diving Manual has a worksheet to compute actual time and distance restrictions for various types of Sonar. This worksheet takes into account such variables as depth, time, diving apparatus and wetsuit hoods. High frequency (greater than 100 kHz), short duration sonar, such as used with side scan and hand-held sonar, poses little danger to the diver. The diver will abort the dive if active low frequency sonar is energized while he is in the water.
- **Marine Life** – Certain marine life, because of its aggressive or venomous nature, may be dangerous to man. Some species of marine life are extremely dangerous while some are merely an uncomfortable annoyance. Most marine life poses little threat, as they tend to leave man alone. The diver's best defense against injury is knowledge. All divers should be able to identify the dangerous species which are likely to be found in the area of operations, and should be able to deal with each appropriately. The U.S. Navy Diving Manual provides specific information about dangerous marine life.
- **Ascent to Altitude including Flying after Diving** - Leaving the dive site may require temporary ascent to a higher altitude. For example, divers may drive over a mountain pass at higher altitude or leave the dive site by air. Ascent to altitude after diving increases the risk of decompression sickness because of the additional reduction in atmospheric pressure. The higher the altitude, the greater the risk. The cabin pressure in commercial aircraft is maintained at a constant value regardless of the actual altitude of the flight. Though cabin pressure varies somewhat with aircraft type, the nominal value is 8,000 feet. For [all diving](#) projects divers will wait at least 12 hours before flying after any dive, or 24 hours following multiple days of repetitive dives. The ascent to altitude table located in the Navy Diving Manual gives the surface interval (hours; minutes) required before making a further ascent to altitude. The surface interval depends on the planned increase in altitude and the highest repetitive group designator obtained in the previous 24-hour period. Enter the table with the highest repetitive group designator obtained in the previous 24-hour period and read the required surface interval from the column for the planned change in altitude. [Diving at altitude considerations will be outlined in the Safety and Health Dive Plan and approved by the Chairman of the Diving Review Board or the Diving Safety Officer for scientific diving.](#)

### 3.9.9 Boating

All boating activities will be conducted according to applicable State, Coast Guard and [TtEC](#) regulations, including Boating EHS 6-6.

- Diving Operations involving live boating will not be conducted [unless](#) using surface-supplied air at depths [that are restricted for TtEC to no](#) deeper than [100](#) FSW, in rough seas, which significantly impede diver mobility or work function; or, in non-daylight hours.
- The propeller of the vessel will be stopped before the diver enters or exits the water.
- A device will be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.
- Two-way voice communication between the designated person-in-charge (Dive Supervisor) and the person controlling the vessel will be available while the diver is in the water.
- Each diver engaged in live boating operations will carry a diver-carried reserve breathing gas supply.

### 3.9.10 Other Hazards

- Noise – Some operations may require the use of generators, pumps, compressors, engines, and other equipment that can generate high levels of noise. Short term exposure to extremely loud noise and/or long exposure to low level noise can cause hearing loss. Personnel assigned to a high noise area shall wear proper hearing protection and be enrolled in a hearing conservation program.
- Lifting Hazards – During some operations, there may be several instances when personnel would be called on to lift and/or carry a heavy load, sometime over rough or unstable terrain. When doing so, personnel should be instructed to observe the following rules.
  - Test the load to ensure it can be moved safely
  - Plan the move to ensure the travel path is clear
  - Keep the back in its normal arched position while lifting, bend at the knees to lift
  - Lift with the legs and stand up in one smooth motion
  - Move the feet to change direction, do not twist at the waist

## 4.1 Definitions

**Arterial Gas Embolism (AGE)** – AGE is caused by entry of gas bubbles into the arterial circulation system then act as blood vessel obstructions called emboli.

**ASME Code or Equivalent** – American Society of Mechanical Engineers – Boiler and Pressure Vessel Code. Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

**ATA** – Atmosphere absolute - [Total pressure exerted on an object, by a gas or mixture of gases at a specific depth or elevation, including normal atmospheric pressure.](#)

**Bottom Time** - The total elapsed time from when the divers leave the surface to the time (rounded up to the next whole minute) they begin their ascent from the bottom or from the deepest depth attained. This time is measured in minutes.

**Breath-Holding Diving** - [A diving mode in which the diver uses no self-contained or surface-supplied air or oxygen supply](#)

**Buddy Breathing** - [Sharing of a single air source between divers](#)

**Buddy Diver** - [Second member of the dive team](#)

**Buddy System** - [Two comparably equipped scuba divers in the water in constant communications](#)

**Buoyant Ascent** - [An ascent made using some form of positive buoyancy](#)

**Bursting Pressure** - The pressure under which a pressure containment device would fail structurally.

**Certified Diver** - [A diver who holds a recognized valid certification from an organizational member, internationally recognized certifying agency, or through military training.](#)

**Controlled Ascent** - Any one of several kinds of ascents including normal, swimming, and air sharing ascents where the diver(s) maintain control so a pause or stop can be made during the ascent.

**Cylinder** - A pressure vessel for the storage of gases.

**Decompression Chamber** - A pressure vessel for human occupancy. Also called a hyperbaric chamber.

**Decompression Schedule** - A specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table. It is normally indicated as feet/minutes.

**5 Decompression Sickness** – A condition with a variety of symptoms, which may result from gas, and bubbles in the tissues of divers after pressure reduction.

**Decompression Table** – A profile or set of profiles of depth-time relationship for ascent rates and breathing mixtures to be followed by divers after a specific depth-time exposure or exposures.

**Decompression Time** – Elapsed time from when the divers leave the bottom to the time when they reach the surface.

**Descent Time** – Descent time is the total elapsed time from when the divers leave the surface to the time they reach the bottom. Descent time is rounded up to the next whole minute

**Dive Computer** - A microprocessor based device which computes a diver's theoretical decompression status, in real time, by using pressure (depth) and time as input to a decompression model, or set of decompression tables, programmed into the device.

**Dive Location** - A surface of vessel from which a diving operations is conducted. The surface location from which diving operations are conducted such as a vessel, barge, wharf, pier, riverbank or offshore rig.

**Dive Location Reserve Breathing Gas** - A supply system of air at the dive location which is independent of the primary system and sufficient to support divers during the planned decompression.

**Dive Team** - Divers and support employees involved in a diving operation, including the Diving Supervisor/Lead Diver

**Diver** – An employee working in water using underwater apparatus, including snorkel, that supplies breathing gas at the ambient pressure.

**Diver Carried Reserve Breathing Gas** - A diver carried independent supply of air sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by another driver.

**Diving Control Board (DCB)** - The Diving Control Board shall consist of a majority of active scientific divers. Voting members shall include the Scientific Diving Safety Officer, the responsible administrative officer, or designee, and should include other representative of the diving program such as qualified divers and members selected by procedures established by each organizational member. A chair person and a secretary may be chosen from the membership of the board according to local procedure.

**Diving Mode** – A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

**Diving Review Board (DRB)** – The TtEC Review Board has oversight for all diving operations within the company. Board members will review the diving procedures and qualification of divers before authorization is given to conduct diving operations. The board is made up of qualified divers from the UXO Group, the Science Department and the ESQ Department.

**Equivalent Single Dive Time** - The time, in minutes, for which the schedule of a single repetitive dive is

selected.

**FSW** - Feet of Sea Water

**Heavy Gear** – Diver worn deep sea dress including helmet, breast plate, dry suit, and weighted shoes. [Advances in diving equipment and technology have lead to heavy gear that does not include a breastplate. Surface-supplied diving gear, including helmet, dry suit, and weighted shoes \(i.e. with the helmet directly connected to the dry suit, forming a self-contained pressure envelope for the diver\) constitutes heavy gear as well.](#)

**Hyperbaric Conditions** – Pressure conditions in excess of surface pressure.

[Lead Diver - Certified scientific diver with experience and training to conduct the diving operations.](#)

**Live Boating** - The practice of supporting a surface-supplied air diver from a vessel which is underway

[Mixed-Gas-Diving - A diving mode in which the diver is supplied in the water with a breathing gas other than air.](#)

**No Decompression (No "D") Limits** – The maximum time that can be spent at a given depth that safe ascent can be made directly to the surface at a prescribed travel rate with no decompression stops.

[Organizational Member - An organization which is a current member of the AAUS, and which has a program, which adheres to the standards of the AAUS as set forth in the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs.](#)

**Penetration Diving** – Passing through a barrier where the divers lifeline/umbilical requires tending by another diver or swimmer.

**PESM** – Project Environmental Safety Manager, Responsible for all safety aspects of the diving evolution. The on site ESS qualified person reports to the PESM on all safety related matters.

[Pressure Related Injury - An injury resulting from pressure disequilibrium within the body as the result of hyperbaric exposure. Examples include: decompression sickness, pneumothorax, mediastinal emphysema, air embolism, subcutaneous emphysema, or ruptured eardum.](#)

**PSI (g)** – Pounds per square inch (gauge).

**Pulmonary Over Inflation Syndromes** – Disorders that are caused by gas expanding in the lungs, and include arterial gas embolism, pneumothorax, mediastinal and subcutaneous emphysema.

**Recompression/Decompression Chamber** – A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

**Repetitive Dive** - Any dives conducted within 12 hours of a previous dive.

**Repetitive Group Designation** - A letter, which is used to relate directly to the amount of residual nitrogen remaining in a diver's body.

**Residual Nitrogen** - Nitrogen gas that is still dissolved in a diver's tissues after surfacing.

**Residual Nitrogen Time** - Time, in minutes, which must be added to the bottom time of a repetitive dive to compensate for the nitrogen still in solution in a diver's tissues from a previous dive.

[Scientific Diving - Scientific diving is defined \(29CFR1910.402\) as diving performed solely as a necessary part of a scientific research or educational activity by employees whose sole purpose for diving is to perform](#)

scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as but not limited to: placing or removing heavy objects underwater; inspection of pipelines and similar objects, construction; demolition; cutting or welding; or the use of explosives.

**Scientific Diving Safety Officer (DSO)** - The Scientific Diving Safety Officer serves as a member of the Diving Control Board (DCB) and is responsible through the DCB for the conduct of the scientific diving program of the membership organization. A permanent member of the TtEC Diving Review Board.

**SCUBA Diving** - A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

**Single Dive** - Any dives conducted more than 12 hours after a previous dive.

**Standby Diver** – A diver at the dive location properly equipped and available to assist a diver in the water.

**Surface Interval** - The time a diver has spent on the surface following a dive. It begins as soon as the diver surfaces and ends as soon as he starts his next descent.

**Surface-Supplied Diving** - Dives where the breathing gas is supplied from the surface by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full face mask. The diver may rely on the tender at the surface to keep up with the diver's depth, time and diving profile.

**Tended/Marked Diver** - When a diver has a buoy line to the surface or is tended by another diver located in the diving boat or on the surface platform.

**Treatment Table** – A depth-time and breathing gas profile designed to treat decompression sickness or pulmonary over-inflation syndromes.

**Umbilical** – The composite hose bundle between a dive location and the diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions. This includes a safety line between the diver and the dive location or dive bell.

**Volume Tank** – A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

**Working Pressure** – The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

### Please Describe your Reference Here

1. U.S. Navy Diving Manual
2. 29 CFR 1910, Subpart "T" – Commercial Diving Operations
3. WAC 296-37 – Standards for Commercial Diving Operations
4. U.S. Army Corps of Engineers, Safety & Health Requirements Manual, EM 385-1-1
5. The American Academy of Underwater Sciences, Standards for Scientific Diving
- 6.
- 7.

### Place your Link in this Column

- [http://www.supsalv.org/pdf/DiveMan\\_rev6.pdf](http://www.supsalv.org/pdf/DiveMan_rev6.pdf)
- [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=DIRECTIVES&p\\_id=3449](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=3449)
- <http://apps.leg.wa.gov/WAC/default.aspx?cite=296-37>
- [http://140.194.76.129/publications/eng-manuals/em385-1-1/2008\\_English/toc.html](http://140.194.76.129/publications/eng-manuals/em385-1-1/2008_English/toc.html)
- <http://www.aaus.org/mc/page.do?sitePagelId=29798&origId=aaus>

## Please Provide a Description of the Attachment

1. Dive Supervisor Dive Plan Briefs
2. Diving Supervisor Pre-Dive Check List
3. Diving Supervisor Post-Dive Check List
4. Emergency Procedures
5. Emergency Phone Number Check List
6. Dive Profile Log
7. Divers Medical History & Supplemental Diving Questionnaire
8. U.S. Navy Standard Pull Line Signals
9. Cold Water Considerations & Safety Precautions
- 10a. Navy No Decompression Table
- 10b. Navy Residual Nitrogen Table
- 10c. Navy Shallow No Decompression Table

## Place your Attachments Here



EHS 2-2, Attachment 1, Supervisor Dive Plan.doc



EHS 2-2, Attachment 2, Supervisor Pre-dive Checklist.doc



EHS 2-2, Attachment 3, Supervisor Post-dive Checklist.doc



EHS 2-2, Attachment 4, Emergency Procedures.doc



EHS 2-2, Attachment 5, Emergency Phone Numbers.doc



EHS 2-2, Attachment 6, Dive Profile Log.doc



EHS 2-2, Attachment 7, Divers History & Supplemental Questionnaire.doc



EHS 2-2, Attachment 8, Line Pull Signals.doc



EHS 2-2, Attachment 9, Cold Water Safety.doc



EHS 2-2, Attachment 10a, Navy No Decompression Table Rev.1.pdf



EHS 2-2, Attachment 10b, Navy Residual Nitrogen Table Rev1.pdf



EHS 2-2, Attachment 10c, Navy Shallow No Decompression Table.Rev1.pdf

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**ATTACHMENT 1  
DIVE SUPERVISOR DIVE PLAN BRIEF**

PROJECT NAME/NUMBER: \_\_\_\_\_

1. **NOTIFICATIONS** - The following list of notifications is not to be considered all-inclusive and should be modified to fit the intended task. Place a "X" in the box of those called, include the phone number

- |  |  |
|--|--|
| a. Harbor Master: <input type="checkbox"/> _____         | b. Pipeline Manager: <input type="checkbox"/> _____        |
| c. Boat Pilots: <input type="checkbox"/> _____           | d. Port Services: <input type="checkbox"/> _____           |
| e. Cognizant Authority: <input type="checkbox"/> _____   | f. Ambulance/Air Evac: <input type="checkbox"/> _____      |
| g. Recompression Chamber: <input type="checkbox"/> _____ | h. Medical Facility: <input type="checkbox"/> _____        |
| i. Coast Guard: <input type="checkbox"/> _____           | j. Army COE Representative: <input type="checkbox"/> _____ |
| k. Navy Representative: <input type="checkbox"/> _____   | l. Support Personnel: <input type="checkbox"/> _____       |

2. **PERSONNEL ASSIGNMENTS**

- |                             |                          |
|-----------------------------|--------------------------|
| a. Diving Supervisor: _____ | e. Senior UXO Sup: _____ |
| b. Standby Diver: _____     | f. Boat Operator: _____  |
| c. Diver: _____             | g. Assistance: _____     |
| d. Diver: _____             | h. Tenders: _____        |

- |  | YES   | NO    |
|--|-------|-------|
| • Has any diver dove in the last 12 hours?                     | _____ | _____ |
| • Is any diver taking any type of medication?                  | _____ | _____ |
| • Does any diver have any aches or pains?                      | _____ | _____ |
| • Can divers clear on the surface?                             | _____ | _____ |
| • Does any diver have a hangover?                              | _____ | _____ |
| • Is any diver wearing contact lenses?                         | _____ | _____ |
| • Do divers feel well or have any problem making the dive?     | _____ | _____ |
| • Do divers know the emergency procedures for the diving mode? | _____ | _____ |
| • Do all divers have current dive physicals (1 year)?          | _____ | _____ |

3. **ENVIRONMENTAL DATA:**

- a. Temperature: Water: \_\_\_\_\_ Air: \_\_\_\_\_
- b. Tide: High: \_\_\_\_\_ / \_\_\_\_\_ Low: \_\_\_\_\_ / \_\_\_\_\_
- c. Visibility expected: \_\_\_\_\_ Bottom type: \_\_\_\_\_
- d. Current speed/direction: \_\_\_\_\_
- e. Wind Direction/Speed: \_\_\_\_\_ / \_\_\_\_\_
- f. Landmarks: \_\_\_\_\_
- g. Sunrise/Sunset: \_\_\_\_\_ / \_\_\_\_\_
- h. Wave action: Height \_\_\_\_\_ Direction: \_\_\_\_\_
- i. Dive platform: \_\_\_\_\_

**ATTACHMENT 1  
DIVE SUPERVISOR DIVE PLAN BRIEF**

PROJECT NAME/NUMBER: \_\_\_\_\_

**4. OBJECTIVES:**

- a. Purpose of the dive (TASK): \_\_\_\_\_
- b. Location: \_\_\_\_\_
- c. General comments: \_\_\_\_\_
- d. Dive schedule: \_\_\_\_\_/\_\_\_\_\_ Depth:\_\_\_\_\_ Max depth:\_\_\_\_\_
- e. Dive mode to be used \_\_\_\_\_

**5. ANTICIPATED HAZARDS:**

- a. Boating: \_\_\_\_\_
- b. Ensure the "Code ALPHA" flag is flying from the vessel, or a 1-meter rigid "Code ALPHA" flag is prominently displayed from the non-vessel dive platform (pier, shore, etc.).
- c. Ensure the "Divers down" flag is also displayed.
- d. If you hear boat engines overhead and still within NO "D" limits, remain on the bottom.
- e. If remaining on bottom will put you into SUR "D" come up on buoy line, Chase boat will clear the area of other boats.
- f. Climate: \_\_\_\_\_
- g. Sea Life: \_\_\_\_\_
- h. Expected Ordnance: \_\_\_\_\_
- i. Current: \_\_\_\_\_
- j. Pollution: \_\_\_\_\_
- k. Other: \_\_\_\_\_

**6. EQUIPMENT REQUIREMENTS:**

- a. Diving Mode:\_\_\_\_\_
- b. Search Equipment:\_\_\_\_\_
- c. Recovery Equipment:\_\_\_\_\_
- d. Explosive Disposal Equipment:\_\_\_\_\_
- e. Special Task Equipment:\_\_\_\_\_

**ATTACHMENT 1  
DIVE SUPERVISOR DIVE PLAN BRIEF**

PROJECT NAME/NUMBER: \_\_\_\_\_

**7. GENERAL DIVING SAFETY PRECAUTIONS**

- Ensure divers are physically and mentally ready to perform the assigned dive task.
- Determine the exact depth of the dive site through use of lead line or Fathometer.
- Gauge diving and emergency air cylinders prior to diving.
- All dives will be no-decompression dives.
- Ensure the dive platform is in a position for rapid and safe recovery of the divers.
- Each diver is responsible for the condition of his/her own diving equipment.
- Ensure the standby diver is well briefed and ready to enter the water.
- The buddy system will be used whenever possible. If the buddy system is not used or inappropriate for the Dive, the diver will be tended.
- Ensure the international code "alpha" is and "divers down" prominently displayed. If diving is not conducted from a vessel then a 1-meter square rigid replica of the "alpha" flag will be displayed.
- Ensure divers are briefed and protected against local harmful marine life.
- The Diving Supervisor must be aware of local ship and small boat traffic in the vicinity of the diving operation.
- Ensure the appropriate diving mode and dress; have been selected for the task at hand.
- All dives conducted where there is not free access to the surface must be tended dives.
- Do not inflate life jacket or BCD where ascent to the surface is restricted.
- The Diving Supervisor will use the Pre-dive and Post-dive check-off sheets, Attachment 6 and 7 respectively.
- Devise and use a method of diver recall.
- The dive will be aborted in the event of any equipment malfunction.
- Inflate your life vest if surfacing with injuries or excessive fatigue.
- Do not force the dive.
- Use the proper ascent and descent rates of 75 feet per minute for descent and 30 feet per minute for ascent.
- Divers will not position themselves between any objects (camels, pier, boat, etc.).
- Brief task specific safety precautions (UXO diving, Altitude diving, ordnance/explosive safety, etc.).
- Brief special line-pull signals Attachment 8.
- Brief appropriate ordnance safety precautions.
- For cold water see Attachment 9.

**8. COMMUNICATIONS:**

- a. Radio frequency: \_\_\_\_\_
- b. Radio call signs:
  - i Primary: \_\_\_\_\_
  - ii Secondary: \_\_\_\_\_
- c. Telephone location: \_\_\_\_\_
- d. Site cell phone number: \_\_\_\_\_
- e. Other cell phones: \_\_\_\_\_

**ATTACHMENT 1  
DIVE SUPERVISOR DIVE PLAN BRIEF**

PROJECT NAME/NUMBER: \_\_\_\_\_

**9. SPECIAL CONSIDERATIONS:**

Meals: \_\_\_\_\_ Water: \_\_\_\_\_ Heat source: \_\_\_\_\_

Clothing change: \_\_\_\_\_

**10. EMERGENCY PROCEDURES:** See Attachment 4

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

**1. DIVING SUPERVISORS PRE-DIVE CHECKLIST FOR SCUBA DIVING**

**Note: Ensure divers are not sick or recently treated for an injury or illness**

**a. All divers shall have the following minimum equipment:**

\_\_\_\_\_ SCUBA w/regulator

\_\_\_\_\_ Life Jacket/Buoyancy Compensator (BC)

\_\_\_\_\_ Submersible cylinder pressure gauge

\_\_\_\_\_ Weight belt

\_\_\_\_\_ Mask

\_\_\_\_\_ Knife

\_\_\_\_\_ Depth Gauge

\_\_\_\_\_ Diving Watch or Diving Computer

\_\_\_\_\_ Fins

\_\_\_\_\_ Safety Harness (mandatory for COE projects if tended)

\_\_\_\_\_ Cylinder pressure is adequate for both the emergency air and SCUBA

\_\_\_\_\_ All quick-release buckles and fastenings can be reached by either hand and are properly rigged for quick release.

\_\_\_\_\_ Weight belt is outside of all other belts, straps and equipment, and is not likely to become pinched under the bottom edge of the cylinders.

\_\_\_\_\_ Life preserver/BC is not constrained, is free to expand, CO2 carts are installed and all air has been evacuated.

\_\_\_\_\_ Check position of the knife to ensure that it will remain with the diver no matter what equipment he may jettison.

\_\_\_\_\_ Conduct time check and synchronize watches.

\_\_\_\_\_ Cylinder valve open and then back off 1/4 to 1/2 turn.

\_\_\_\_\_ Have diver breathe for 30 seconds. While doing this, he should be alert for any impurities in the air or for any unusual physiological reactions.

\_\_\_\_\_ Have divers check their reserve air/mechanisms and ensure it is left in the closed/up position.

\_\_\_\_\_ Conduct final review of the dive plan.

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

\_\_\_\_\_ Brief the divers on the following reasons for terminating the dive:

- The diver requests termination.
- The diver fails to respond correctly to communications or signals.
- Communications are lost and cannot be quickly reestablished.
- The diver begins to use his/her reserve breathing air.
- Puncture/tear of a dry suit.

\_\_\_\_\_ Divers physically and mentally ready to enter the water.

\_\_\_\_\_ Ladder is in place to retrieve divers from water

\_\_\_\_\_ Divers know the maximum depth and bottom time.

\_\_\_\_\_ Review proper/special line pull signals.

\_\_\_\_\_ Code Alpha and Divers Down flags are displayed.

\_\_\_\_\_ Standby diver has tending line with bowline tied around waist.

\_\_\_\_\_ Ensure standby diver knows searching signals

\_\_\_\_\_ Verify that personnel and equipment are ready to give proper visual, sound or radio signals to warn off other vessels.

\_\_\_\_\_ The diver or divers are now ready to enter the water.

**b. Pre-Descent Surface Check**

\_\_\_\_\_ Conduct a breathing check of the SCUBA. Breathing should be easy, without resistance, and with no evidence of water leaks.

\_\_\_\_\_ Visually check dive partner's equipment for leaks, especially at all connection points (cylinder valves hoses at regulator and mouthpiece).

\_\_\_\_\_ Check face mask seal.

\_\_\_\_\_ Check partner for loose or entangled straps.

\_\_\_\_\_ Check buoyancy. SCUBA divers should strive for neutral buoyancy.

\_\_\_\_\_ If wearing a dry suit, check for leaks.

\_\_\_\_\_ Orient yourself with your surroundings, note any obstructions that you may encounter upon surfacing.

**NOTE: SURFACE TIME SHOULD BE KEPT TO A MINIMUM DURING COLD WEATHER DIVING. PRECAUTIONS SHOULD BE TAKEN DURING COLD WEATHER DIVING TO AVOID HYPOTHERMIA DURING SURFACE INTERVALS. CONSIDERATION SHOULD ALSO BE TAKEN FOR THE SURFACE SUPPORT PERSONNEL.**

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

**2. DIVING SUPERVISOR'S PRE-DIVE CHECKLIST FOR SURFACE-SUPPLIED DIVING**

**CAUTION - This checklist is an overview intended for use with the detailed Operating Procedures (OP's) from the appropriate equipment O&M technical manual.**

**a. Basic Preparation:**

- \_\_\_ Verify that a recompression chamber is present on the diving station for dives deeper than 100 FSW or dives requiring decompression.
- \_\_\_ Verify that proper signals indicating underwater operations being conducted are displayed correctly.
- \_\_\_ Ensure that all personnel concerned, or in the vicinity, are informed of diving operations.
- \_\_\_ Determine that all valves, switches, controls, and equipment components affecting diving operations are tagged-out to prevent accidental shut-down or activation.

**b. Equipment Protection:**

- \_\_\_ Assemble all members of the diving team and support personnel (winch operators, boat crew, etc.) for a pre-dive briefing.
- \_\_\_ Assemble and lay out all dive equipment, both primary equipment and standby spares for diver (or standby diver), including all accessory equipment and tools.
- \_\_\_ Check all equipment for superficial wear, tears, dents, distortion, or other discrepancies.
- \_\_\_ Check all masks, helmets, view ports, faceplates, seals, and visors for damage.
- \_\_\_ Check all harnesses, laces, strain relief, and lanyards for wear; replace as needed.

**c. Helmets and Masks:**

- \_\_\_ Ensure that all Set up and Operating Procedures have been completed in accordance with the appropriate Technical Manual and Operating Procedures.

**d. General Equipment:**

- \_\_\_ Check that all accessory equipment – tools, lights, special systems, spares, etc., are on site and in working order. In testing lights, tests should be conducted with lights submerged in water and extinguished before removal, to prevent overheating and failure.
- \_\_\_ Erect diving stage or attach diving ladder. In the case of the stage, ensure that the screw pin shackle connecting the stage line is securely fastened with the shackle pin seized with wire or a safety shackle is used to help prevent opening.
- \_\_\_ Ensure first aid kits, portable O2 and AED's are available and working.

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

**e. Preparing the Diving System:**

- \_\_\_ Check that a primary and suitable back-up air supply is available with a capacity in terms of purity, volume, and supply pressure to completely service all divers and standby diver, including decompression, recompressions and accessory equipment throughout all phases of the planned operation.
- \_\_\_ Verify that all diving system operating procedures have been conducted to properly align the dive system.
- \_\_\_ Ensure that qualified personnel are available to operate and stand watch on the dive system.

**f. Compressors:**

- \_\_\_ Determine that sufficient fuel, coolant, lubricants, and antifreeze are available to service all components throughout the operation. All compressors should be fully fueled, lubricated, and serviced (with all spillage cleaned up completely).
- \_\_\_ Check maintenance and repair logs to ensure the suitability of the compressor (both primary and back-up) to support the operation.
- \_\_\_ Verify that all compressor controls are properly marked and any remote valving is tagged with "**Divers Air Supply - Do Not Touch**" signs.
- \_\_\_ Ensure that the compressor is secure in the diving craft and will not be subject to operating angles, caused by roll or pitch that will exceed 15 degrees from the horizontal.
- \_\_\_ Verify that oil in the compressor is an approved type. Check that the compressor oil does not overflow the FULL mark; contamination of air supply could result from fumes or oil mist.
- \_\_\_ Check that compressor exhaust is vented away from work areas and, specifically, does not foul the compressor intake.
- \_\_\_ Check that compressor intake is obtaining a free and pure suction without contamination. Use pipe to lead intake to a clear suction location if necessary.
- \_\_\_ Check all filters, cleaners and oil separators for cleanliness.
- \_\_\_ Bleed off all condensed moisture from filters and from the bottom of volume tanks. Check all manifold drain plugs, and that all petcocks are closed.
- \_\_\_ Check that all belt-guards are properly in place on drive units.
- \_\_\_ Check all pressure-release valves, check valves and automatic unloaders.
- \_\_\_ Verify that all supply hoses running to and from compressor have proper leads, do not pass near high-heat areas such as steam lines, are free of kinks and bends, and are not exposed in such a way that they could be rolled over, damaged, or severed by machinery or other means.

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

\_\_\_ Verify that all pressure supply hoses have safety lines and strain relief's properly attached.

**g. Activate the Air Supply in accordance with approved OPs.**

**a. Compressors:**

\_\_\_ Ensure that all warm-up procedures are completely followed.

\_\_\_ Check all petcocks, filler valves, filler caps, overflow points, bleed valves, and drain plugs for leakage or malfunction of any kind.

\_\_\_ Verify that there is a properly functioning pressure gauge on the air receiver and that the compressor is meeting its delivery requirements.

**b. Cylinders:**

\_\_\_ Gauge all cylinders for proper pressure.

\_\_\_ Verify availability and suitability of reserve cylinders.

\_\_\_ Check all manifolds and valves for operation.

\_\_\_ Activate and check delivery.

**For all supply systems, double check "Do Not Touch" tags (tag out).**

**h. Diving Hoses:**

\_\_\_ Ensure all hoses have a clear lead and are protected from excessive heating and damage.

\_\_\_ Ensure that the hose (or any length) has not been used in a burst test program. No hose length involved in such a program will be part of an operational diving hose.

\_\_\_ Check that hoses are free of moisture, packing material, or chalk.

\_\_\_ Soap test hose connections after connection to air supply and pressurization.

\_\_\_ Ensure umbilical boots are in good condition.

**i. Test Equipment with Activated Air Supply:**

\_\_\_ Hook up all air hoses to helmets, masks and chamber; make connections between back-up supply and primary supply manifold.

\_\_\_ Verify flow to helmets and masks from primary and secondary air supply.

\_\_\_ Check all exhaust and non-return valves.

\_\_\_ Hook up and test all communications.

**ATTACHMENT 2**  
**DIVING SUPERVISORS PRE-DIVE CHECKLISTS**

PROJECT NAME/NUMBER: \_\_\_\_\_

\_\_\_ Check air flow from both primary and back-up supplies to chamber.

**j. Recompression Chamber Checkout (Pre-dive only):**

\_\_\_ Check that chamber is completely free and clear of all combustible materials.

\_\_\_ Check primary and back-up air supply to chamber and all pressure gauges.

\_\_\_ Check that chamber is free of all odors or other "contaminants."

\_\_\_ Hook up and test all communications.

\_\_\_ Check air flow from both primary and back-up supplies to chamber.

**k. Final Preparations:**

\_\_\_ Verify that all necessary records, logs, and timesheets are on the diving station.

\_\_\_ Check that appropriate decompression tables are readily at hand.

\_\_\_ Place the dressing bench in position, reasonably close to the diving ladder or stage, to minimize diver travel.

**ATTACHMENT 3**  
**DIVING SUPERVISOR POST-DIVE CHECKLIST**

PROJECT NAME/NUMBER: \_\_\_\_\_

- \_\_\_\_\_ Check the physical condition of the diver.
- \_\_\_\_\_ Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness.
- \_\_\_\_\_ Advise the diver of the location of the closest recompression chamber that is ready for use.
- \_\_\_\_\_ Alert the diver to the potential hazards of ascending to altitude, including flying after diving (SEE DSPM Paragraph 3.9.5)
- \_\_\_\_\_ Assemble diving equipment and return to site support facility (trailer).
- \_\_\_\_\_ Have divers shower and consume warm liquids, avoid beverages with caffeine.
- \_\_\_\_\_ Observe the divers on the surface for symptoms of diving disorders for a minimum of 10 minutes before allowing the divers to leave the dive site.
- \_\_\_\_\_ Wash all diving equipment in fresh water and hang to dry.
- \_\_\_\_\_ Reorder/replace equipment as necessary.
- \_\_\_\_\_ Complete dive profile log for all divers and submit the log to the Chairman Diving Review Board for input into TtEC's master dive log.

**ATTACHMENT 4**  
**EMERGENCY PROCEDURES**

**1. Decompression Sickness or Gas Embolism:**

- a. Recall all divers.
- b. Begin transport to chamber on oxygen.
- c. Administer first aid/CPR and O<sub>2</sub> as required.
- d. Notify Recompression Chamber.

**2. Fire in Equipment:**

- a. Evaluate effect of fire on diver AND topside crew.
- b. Terminate dive if necessary.
- c. Inform crew and diver of action planned.
- d. Activate plan.

**3. Explosive detonation with divers in the water:**

- a. Try to establish communications with the divers using standard line pull signals. If contact is established with the divers, recall, recover, and administer first aid as required. Transport to medical assistance as required.
- b. If communications cannot be established, activate the standby diver and recover the divers via the tending line, and administer first aid as required. Request medical assistance and remember that unconscious divers should be treated for possible A.G.E.
- c. Discontinue diving operations until the cause of the explosion is determined.

**4. Boat Breakdown:**

This situation is considered to constitute an emergency due to the loss of control of the divers.

- a. Recall and recover the divers.
- b. Discontinue diving operations.
- c. Deploy the anchor
- d. Request assistance via radio, phone, or signals.

**5. Variations in ascent rate.**

- a. Always ascend at a rate of 30 fpm (20 seconds per 10 FSW). Minor variations in the rate of travel between 20 and 40 FSW/minute are acceptable. Any variation in the rate of ascent must be corrected in accordance with the following procedures however; a delay of up to one minute in reaching the first decompression stop can be ignored.
- b. **Travel Rate Exceeded.** On a Standard Air Dive, if the rate of ascent is greater than 30 feet per minute (fpm), STOP THE ASCENT, allow the watches to catch up, and then continue ascent. If the decompression stop is arrived at early, start the stop time after the watches catch up.
- c. **Delay greater than 1 minute, deeper than 50 FSW.** Add the total delay time (rounded up to the next whole minute) to the bottom time, re-compute a new decompression schedule, and decompress accordingly.
- d. **Delay greater than 1 minute, shallower than 50 FSW.** If the rate of ascent is less than 30 fpm, add the delay time to the diver's first decompression stop. If the delay is between stops, disregard the delay. The delay time is rounded up to the next whole minute.

**ATTACHMENT 4**  
**EMERGENCY PROCEDURES**

**6. Unplanned Ascent (Blowup)**

- a. **Ascent from 20 Feet or Shallower with No Decompression Stops Required.** No recompression is required if the diver surfaces from 20 feet or shallower but was within no-decompression limits. The diver should be observed on the surface for 1 hour. Consider administering O<sub>2</sub>.
- b. **Ascent from 20 Feet or Shallower (Willow Surfacing) with Decompression Stops Required.** If decompression is required and the diver surfaces from 20 FSW or shallower (missed the 20 and/or 10 ft stop) and feels well, the diver is returned to that decompression stop.
  - 1) If the time from the surface back to the stop was less than 1 minute, add 1 minute to the stop.
  - 2) If the time from the surface back to the stop was more than 1-minute and the diver remains asymptomatic, multiply the 20 and/or 10 ft stops by 1.5.
  - 3) Observe diver for 1 hour. Consider administering O<sub>2</sub>.
- c. **Ascent from Deeper than 20 Feet (Uncontrolled Ascent).** Any unexpected surfacing of the diver from depths in excess of 20 feet is considered an uncontrolled ascent. If the diver is within no-decompression limits and asymptomatic, he should be observed for at least 1 hour on the surface. Recompression is not necessary unless symptoms develop. Consider administering O<sub>2</sub>.
- d. **Asymptomatic Uncontrolled Ascent.** Asymptomatic divers who experience an uncontrolled ascent and who have missed decompression stops are treated by recompression based on the amount of decompression missed as follows:
- e. **Oxygen Available.** Immediately compress the diver to 60 feet in the recompression chamber. If less than 30 minutes of decompression (total ascent time from the tables) were missed, decompress from 60 feet on Treatment Table 5. If more than 30 minutes of decompression were missed, decompress from 60 feet on Treatment Table 6.
- f. **Oxygen Not Available.** Compress the diver to 100 feet in the recompression chamber and treat on Table 1A if less than 30 minutes of decompression were missed; compress to 165 feet and treat on Table 2A if more than 30 minutes were missed.
- g. **Symptomatic Uncontrolled Ascent.** If a diver has had an uncontrolled ascent and has any symptoms, he should be recompressed immediately in a recompression chamber to 60 FWS.
  - 1) If the diver surfaced from 60 FWS or shallower, compress to 60 FSW and begin Treatment Table 6.
  - 2) If the diver surfaced from a greater depth, compress to 60 FSW or depth where the symptoms are significantly improved, not to exceed 165 FSW, and begin Treatment Table 6A.

**7. Emergency Evacuation**

- a. Notify diver and dive team of emergency and abort dive.
- b. Evacuate all unnecessary personnel.
- c. Decompress the diver (if required) and recover. If decompression is not possible, follow omitted decompression procedures.

**ATTACHMENT 4**  
**EMERGENCY PROCEDURES**  
**SCUBA EMERGENCY PROCEDURES**

1. **Buddy Separation** – Make a 360-degree check, above and below, if your buddy is not found, surface immediately. Check the surface for bubbles and notify the Diving Supervisor immediately.
2. **Lost Diver** – The first stage of a lost diver is when communications have been lost and emergency recall has failed.
  - a. Initiate diver recall.
  - b. Wait 1 minute for response.
  - c. Deploy lost diver buoy.
  - d. Deploy standby diver (Dive Supervisor's discretion) chase bubbles or conduct expanding circle line search from last known position.
  - e. Notify ships/boats in the area to look out for lost diver and request assistance from the Coast Guard Rescue Center, if necessary.
3. **Loss of Air/Equipment Malfunction (SCUBA)**
  - a. Signal buddy/surface and abort dive.
  - b. Buddy breath/activate reserve/breath from emergency air supply.
  - c. Exhale to the surface.
4. **Mechanical Injury:**
  - a. Signal buddy/surface and abort dive.
  - b. Inform Dive Supervisor.
  - c. Rule out possible decompression sickness.
  - d. If immediate treatment required, recall all divers & transport to hospital.
5. **Fouled/Trapped Diver:**
  - a. Don't panic, stop and think!
  - b. Notify your buddy diver or topside, if possible (2-2-2 fouled and need assistance, or 3-3-3 fouled and can clear myself).
  - c. Carefully and calmly try to work yourself free of the entanglement.
  - d. If required, ditch your equipment and make a buoyant ascent to the surface.
  - e. If the diver is trapped, the buddy diver should mark the position of the trapped diver with a circle line, his tending line or any available method of marking the trapped diver's position, and then surface and report to the Diving Supervisor.
  - f. The Diving Supervisor will formulate a rescue plan, while the diver delivers additional air to the trapped diver.
  - g. Dive supervisor will then brief the rescue plan to the dive team and execute the rescue.

After rescue, observe the divers on the surface for signs of A.G.E., asphyxia, physical injury, omitted decompression, and hypothermia.

**ATTACHMENT 4**  
**EMERGENCY PROCEDURES**  
**SURFACE SUPPLIED EMERGENCY PROCEDURES**

**1. Loss of Breathing Media**

- a. Re-establish breathing media supply by:
  - 1) Activate topside secondary breathing media supply, or
  - 2) Diver go on bailout bottle, or
  - 3) Put breathing media to diver's pneumofathometer hose and have the diver insert the hose into his helmet or mask.
- b. Alert stand by diver
- c. Have stricken diver go to bell, stage or ladder.
- d. If required, send stand by diver to assist.
- e. Terminate dive

**2. Loss of Communications**

- a. Attempt to establish communications with line pull signals.
- b. Put constant air to the divers pneumofathometer.
- c. Alert stand by diver
- d. If communications are established using line pull signals, abort dive and decompress if required.
- e. If communications are not established, send stand by diver to divers assistance, abort dive and decompress if required.

**3. Fouled or Trapped diver**

- a. Avoid panic and ensure diver does NOT ditch equipment.
- b. Diver informs topside – give a good report.
- c. Alert stand by diver.
- d. Diver determines the extent of entrapment.
- e. Diver attempts to free himself.
- f. If required, deploy stand by for assistance.
- g. Abort dive and decompress if required

**4. Injury in the Water**

- a. Diver informs topside of injury and extent, give detailed report.
- b. Alert stand by diver
- c. If required, deploy stand by diver to assist stricken diver.
- d. Abort dive and follow decompression protocol, unless injury indicates a greater risk than omitted decompression. Check surface decompression tables for alternate protocol.
- e. Request required medical assistance.

**ATTACHMENT 4**  
**EMERGENCY PROCEDURES**

**5. Severance of Divers Air Supply**

- a. Put constant air to diver's pneumofathometer.
- b. Diver goes on emergency air or inserts pneumofathometer into mask or helmet.
- c. Alert stand by diver.
- d. Abort dive and decompress.
- e. Deploy stand by diver with more air and/or to assist stricken diver if required.

**6. Severance of Complete Umbilical**

- a. Diver goes on emergency air.
- b. Topside alert stand by diver
- c. Deploy stand by diver down stage line, divers umbilical (if visible), or descent line with additional air supply (his pneumofathometer if necessary) to assist stricken diver and inform topside of conditions.
- d. Abort dive and decompress. Check surface decompression tables for shorter water time.

**ATTACHMENT 5**  
**EMERGENCY PHONE NUMBERS CHECKLIST**

PROJECT NAME/NUMBER: \_\_\_\_\_

**RECOMPRESSION CHAMBER:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**HOSPITAL:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**AIR TRANSPORTATION:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**SEA TRANSPORTATION:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**AMBULANCE:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**PHYSICIAN:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**COMMUNICATIONS:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**USCG RESCUE COORD. CENTER:**

ADDRESS/LAT-LONG \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

POC: \_\_\_\_\_

RESPONSE TIME: \_\_\_\_\_

**NOTE – THIS CHECKLIST WILL BE PROMINENTLY POSTED AT THE DIVE SITE AND BE PLACED IN ALL BOATS AND RESPONSE VEHICLES.**

**ATTACHMENT 6**  
**TETRA TECH EC DIVE PROFILE LOG**

PROJECT NAME/NUMBER: \_\_\_\_\_

1. Date of Dive: \_\_\_\_\_ 2. Time of Dive: \_\_\_\_\_

3. Location of Dive (Address or Lat/Long): \_\_\_\_\_

4. Dive Team:  
Dive Supervisor: \_\_\_\_\_  
Standby Diver: \_\_\_\_\_  
Diver: \_\_\_\_\_  
Diver: \_\_\_\_\_  
Tender: \_\_\_\_\_  
Tender: \_\_\_\_\_

5. Environmental Data:  
Current: \_\_\_\_\_  
Visibility: \_\_\_\_\_  
Water/Air Temperature: \_\_\_\_\_ / \_\_\_\_\_

6. Diving Mode used: \_\_\_\_\_

7. Brief Statement of Work  
Performed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Diving Related Injury/Illness (describe circumstances of injury/illness, extent of the injury/illness, and actions taken, if hospitalized, attach hospital report, include name and address of attending physician):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Decompression Procedure Assessment Evaluation (to be completed if treatment by recompression was required as a result of this Dive, provide details on, depth and time of on-set of symptoms, treatment table selected and results of treatment):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Diving Supervisor

\_\_\_\_\_  
Date

**ATTACHMENT 6**  
**TETRA TECH EC DIVE PROFILE LOG**

PROJECT NAME/NUMBER: \_\_\_\_\_

1. All Tetra Tech ECI dives will be recorded on this attachment.
2. Upon completion of the project or weekly, all Dive Logs will be collected by the Dive Supervisor/Field Lead forwarded to the Chairman Diving Review Board and for science divers a copy to the Science DSO. The Chairman Diving Review Board will retain this log for 1 year, except 5 years where there has been an injury or incident of decompression sickness.
3. Definitions:
  - a. Old Group - Repetitive group designation from previous dive. Leave blank if this is the first dive.
  - b. Surface Interval - The time, which a diver has spent on the surface following a dive. It begins as soon as the diver surfaces and ends as soon as he starts his next descent. Not required for first dive.
  - c. RNT - RESIDUAL NITROGEN TIME - Time, in minutes, which must be added to the bottom time of a repetitive dive to compensate for the nitrogen still in solution in a diver's tissues from a previous dive.
  - d. Depth - Depth of current dive.
  - a. Bottom Time - The total elapsed time from when the divers leave the surface to the time (rounded up to the next whole minute) they begin their ascent from the bottom.
  - f. Decompression time – Decompression Schedule/Decompression time
  - f. Equivalent Single Dive Time - RNT plus actual bottom time.
  - g. New Group - REPETITIVE GROUP DESIGNATION - A letter, which is used to relate directly to the Amount of residual nitrogen remaining in a diver's body.
4. RNT Exception Rule - If performing a repetitive dive to the same depth or deeper, and the RNT is greater than the bottom time of the previous dive, use the bottom time of the previous dive as the RNT.
5. See Attachment 10a, 10b, and 10C for the Navy Diving Tables.



## Attachment 8 Line Pull Signals

From Tender to Diver		Searching Signals (Without Circling Line)	
1 Pull	"Are you all right?" When diver is descending, one pull means "Stop."	7 Pulls	"Go on (or off) searching signals."
2 Pulls	"Going Down." During ascent, two pulls mean "You have come up too far; go back down until we stop you."	1 Pull	"Stop and search where you are."
3 Pulls	"Stand by to come up."	2 Pulls	"Move directly away from the tender if given slack; move toward the tender if strain is taken on the life line."
4 Pulls	"Come up."	3 Pulls	"Face your umbilical, take a strain, move right."
2-1 Pulls	"I understand" or "Talk to me."	4 Pulls	"Face your umbilical, take a strain, move left."
3-2 Pulls	"Ventilate."		
4-3 Pulls	"Circulate."		
From Diver to Tender		Searching Signals (With Circling Line)	
1 Pull	"I am all right." When descending, one pull means "Stop" or "I am on the bottom."	7 Pulls	"Go on (or off) searching signals."
2 Pulls	"Lower" or "Give me slack."	1 Pull	"Stop and search where you are."
3 Pulls	"Take up my slack."	2 Pulls	"Move away from the weight."
4 Pulls	"Haul me up."	3 Pulls	"Face the weight and go right."
2-1 Pulls	"I understand" or "Talk to me."	4 Pulls	"Face the weight and go left."
3-2 Pulls	"More air."		
4-3 Pulls	"Less air."		
Special Signals From the Diver		Emergency Signals From the Diver	
1-2-3 Pulls	"Send me a square mark."	2-2-2 Pulls	"I am fouled and need the assistance of another diver."
5 Pulls	"Send me a line."	3-3-3 Pulls	"I am fouled but can clear myself."
2-1-2 Pulls	"Send me a slate."	4-4-4 Pulls	"Haul me up immediately."
			<b>ALL EMERGENCY SIGNALS SHALL BE ANSWERED AS GIVEN EXCEPT 4-4-4</b>

A special group of searching signals is used by the tender to direct a diver in moving along the bottom. These signals are duplicates of standard line-pull signals, but their use is indicated by an initial seven-pull signal to the diver that instructs the diver to interpret succeeding signals as searching signals. When the tender wants to revert to standard signals, another seven-pull signal is sent to the diver which means searching signals are no longer in use. Only the tender uses searching signals; all signals initiated by the diver are standard signals. To be properly oriented for using searching signals, the diver must face the line (either the lifeline or the descent line, if a circling line is being employed).

## ATTACHMENT 9

### COLD WATER CONSIDERATIONS AND SAFETY PRECAUTIONS

#### 1. UNDER ICE DIVING

Diving under the ice requires extremely specialized training and equipment and will not be performed by Tetra Tech ECI employees unless approved by the Diving Review Board.

#### 2. COLD WATER DIVING

In addition to decompression, thermal problems arising from exposure to cold water pose the major consideration when planning operational dives and selecting equipment. The working diver commonly experiences heat loss during immersion and often expects to be uncomfortably chilled at the end of a dive. Bottom time limits may be determined by the diver's cold tolerance rather than by decompression considerations.

An individual thoroughly conditioned physically can be transported from warm climates into cold climates and immediately begin diving without harmful effects. However, individuals differ in how well suited they are for cold weather operations. At least half of the diving team should have previous experience in ice or cold water diving operations and should be well qualified to train the less experienced.

Personnel scheduled to go to Polar Regions should be instructed in cold weather physiology and the prevention of cold injuries. To prevent injury, any techniques that aid heat balance, protection, and basic metabolism should be used.

Cold water immersion may also cause excessive urination, severely dehydrating the diver. This in turn reduces performance and may increase the risk of developing decompression sickness. A diver who is dehydrated may appear normal in the water. However, exiting the water combined with warming of the skin may cause pooling of the blood in the extremities leading to fainting. This means that divers who have been in cold water for any period of time and who appear cold should be assisted from the water and sit or lie down and take fluids until they are sure they can stand without problems.

Vertigo is caused by cold water stimulating the balance mechanism of the inner ear.

In repetitive diving with cold exposure, the operation should be planned so that the diver is re-warmed to the point of sweating before diving again. If cold water exposures are severe and if more than a 30 -minute duration, then consideration should be given to requiring an overnight rest between exposures. The diver must also have sufficient non-caffeine beverages to replace the excessive body fluid loss from cold water induced urination.

The support equipment required for ice and cold water diving must be carefully evaluated for effectiveness and suitability

Maintaining proper body temperature is particularly difficult for a diver working underwater. The principal temperature control problem encountered by divers involves keeping the body warm. The high thermal conductivity of water, coupled with the normally cool-to-cold waters in which divers operate, can result in rapid and excessive heat loss. At extremely low temperatures or with prolonged immersion, body heat loss will reach a point at which death will occur. Appropriate dress can greatly reduce the effects of heat loss, and a diver with proper dress can work in very cold water for reasonable periods of time

In very cold water, the wet suit is only a marginally effective thermal protective measure and its use exposes the diver to hypothermia and restricts available bottom time. The use of alternative thermal protective equipment should be considered in these circumstances

## ATTACHMENT 9

### COLD WATER CONSIDERATIONS AND SAFETY PRECAUTIONS

The variable volume dry suit and hot water suit are effective means of thermal protection for cold water diving. Wet suits made of incompressible material are now available. Such suits offer more protection at depth than standard wet suits of the same thickness. Prior to the use of variable volume dry suits and hot water suits in cold and ice-covered waters, divers must be trained in their use and be thoroughly familiar with the operation of these suits.

More weight must be used with a variable volume dry suit than with a wet suit due to the great positive buoyancy of a dry suit. Manufacturer's recommendations should be followed to select starting weight. The additional weight makes use of a weight vest or harness desirable. A shoulder harness is one method of preventing the heavy, awkward belts from slipping down during a dive. A few heavy hip hugger weights are better than several smaller weights.

Both single- and double-hose regulators are used for ice and cold water diving. The single-hose regulator is preferred for buddy breathing, is less bulky, and is easier to maintain than the double-hose; however, it is more subject to freeze-up than the double-hose regulator. Due to the serious nature of the freeze-up problems in single-hose regulators, they should not be allowed to free-flow or be purged for over five seconds at a time. Only regulators having a cold water conversion will be used for ice/cold water diving.

The single-hose regulator should be kept in a warm place before diving. It is important that the divers test the regulator in a warm place, then refrain from breathing it until submerging. When returning to the surface, the regulator should remain submerged and the diver should refrain from breathing from the regulator until re-submerging. The diver's time on the surface should be kept to a minimum. Once under the water, chances of a freeze-up are reduced. However, if a regulator is allowed to free-flow at depth for as little as five seconds, freeze-up may occur. The diver should therefore avoid purging the second stage of the regulator when diving in cold water. If water needs to be purged from the mouthpiece, the diver should do so by exhaling into it.

Where water temperature is at or below 37°F, a redundant SCUBA system (twin SCUBA bottles, each having a "K" valve and an approved cold water regulator) or twin SCUBA bottles with one common manifold and an approved cold water regulator (with octopus) may be used. When selecting the redundant SCUBA system, maximum depth and bottom time is greatly reduced because the extra SCUBA will be used for emergencies only.

Using surface supplied diving in cold water requires detailed operations planning and extensive logistical support. This includes thermal protection for an elaborate dive station and recompression chamber and hot water heating equipment. In addition, dive equipment may require cold climate modification. Because of logistical considerations, scuba is used in most ice diving situations. However, surface supplied diving may be required because of prolonged bottom times, depth requirements, and complex communications between topside and diver. When diving in cold water that is not ice covered, logistic and equipment support requirements are reduced; however, very cold water poses many of the same dangers to the surface-supplied diver as ice diving.

The diver's mask may show an increased tendency to fog in cold water. An anti-fog solution should be used to prevent this from occurring. Saliva will not prevent this fogging.

**3. Hypothermia.** When diving in cold water, hypothermia may predispose the diver to decompression sickness. Hypothermia is easily diagnosed. The hypothermic diver loses muscle strength, the ability to concentrate, and may become irrational or confused. The victim may shiver violently, or, with severe hypothermia, shivering may be replaced by muscle rigidity. Profound hypothermia may so depress the heartbeat and respiration that the victim appears dead. However, a diver should not be considered dead until the diver has been re-warmed and all resuscitation attempts have been proven to be unsuccessful.

## **ATTACHMENT 9**

### **COLD WATER CONSIDERATIONS AND SAFETY PRECAUTIONS**

Hypothermia demands immediate treatment and prompt evacuation to a medical facility. A hypothermic diver must not be allowed to walk; i.e., the diver should be transported in a horizontal position. Improper handling of the diver can cause dangerous rhythms of the heart and a drop in the body core temperature, known as after drop. The local/responding medical facility must be notified of the possibility of hypothermia PRIOR to the commencement of diving operations. Emergency re-warming and evacuation plans should be established with their recommendations.

Some of the signs and symptoms of hypothermia are shivering, mental confusion, loss of memory, speech/sensory impairment, and hallucinations. At app. 88 degrees F, all shivering stops, the victim will not recognize familiar people, followed by muscle rigidity and loss of consciousness.

**Table 9-7. No-Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives.**

Depth (fsw)	No-Stop Limit	Repetitive Group Designation															
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Z
10	Unlimited	57	101	158	245	426	*										
15	Unlimited	36	60	88	121	163	217	297	449	*							
20	Unlimited	26	43	61	82	106	133	165	205	256	330	461	*				
25	595	20	33	47	62	78	97	117	140	166	198	236	285	354	469	595	
30	371	17	27	38	50	62	76	91	107	125	145	167	193	223	260	307	371
35	232	14	23	32	42	52	63	74	87	100	115	131	148	168	190	215	232
40	163	12	20	27	36	44	53	63	73	84	95	108	121	135	151	163	
45	125	11	17	24	31	39	46	55	63	72	82	92	102	114	125		
50	92	9	15	21	28	34	41	48	56	63	71	80	89	92			
55	74	8	14	19	25	31	37	43	50	56	63	71	74				
60	60	7	12	17	22	28	33	39	45	51	57	60					
70	48	6	10	14	19	23	28	32	37	42	47	48					
80	39	5	9	12	16	20	24	28	32	36	39						
90	30	4	7	11	14	17	21	24	28	30							
100	25	4	6	9	12	15	18	21	25								
110	20	3	6	8	11	14	16	19	20								
120	15	3	5	7	10	12	15										
130	10	2	4	6	9	10											
140	10	2	4	6	8	10											
150	5	2	3	5													
160	5		3	5													
170	5			4	5												
180	5			4	5												
190	5			3	5												

\* Highest repetitive group that can be achieved at this depth regardless of bottom time.

**Table 9-8. Residual Nitrogen Time Table for Repetitive Air Dives.**

Locate the diver's repetitive group designation from his previous dive along the diagonal line above the table. Read horizontally to the interval in which the diver's surface interval lies.

Next, read vertically downward to the new repetitive group designation. Continue downward in this same column to the row that represents the depth of the repetitive dive. The time given at the intersection is residual nitrogen time, in minutes, to be applied to the repetitive dive.

\* Dives following surface intervals longer than this are not repetitive dives. Use actual bottom times in the Air Decompression Tables to compute decompression for such dives.

Dive Depth	Repetitive Group at Beginning of Surface Interval																
	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	
10	**	**	**	**	**	**	**	**	**	**	**	427	246	159	101	58	
15	**	**	**	**	**	**	**	**	450	298	218	164	122	89	61	37	
20	**	**	**	**	**	**	462	331	257	206	166	134	106	83	62	44	27
25	†	†	470	354	286	237	198	167	141	118	98	79	63	48	34	21	
30	372	308	261	224	194	168	146	126	108	92	77	63	51	39	28	18	
35	245	216	191	169	149	132	116	101	88	75	64	53	43	33	24	15	
40	188	169	152	136	122	109	97	85	74	64	55	45	37	29	21	13	
45	154	140	127	115	104	93	83	73	64	56	48	40	32	25	18	12	
50	131	120	109	99	90	81	73	65	57	49	42	35	29	23	17	11	
55	114	105	96	88	80	72	65	58	51	44	38	32	26	20	15	10	
60	101	93	86	79	72	65	58	52	46	40	35	29	24	19	14	9	
70	83	77	71	65	59	54	49	44	39	34	29	25	20	16	12	8	
80	70	65	60	55	51	46	42	38	33	29	25	22	18	14	10	7	
90	61	57	52	48	44	41	37	33	29	26	22	19	16	12	9	6	
100	54	50	47	43	40	36	33	30	26	23	20	17	14	11	8	5	
110	48	45	42	39	36	33	30	27	24	21	18	16	13	10	8	5	
120	44	41	38	35	32	30	27	24	22	19	17	14	12	9	7	5	
130	40	37	35	32	30	27	25	22	20	18	15	13	11	9	6	4	
140	37	34	32	30	27	25	23	21	19	16	14	12	10	8	6	4	
150	34	32	30	28	26	23	21	19	17	15	13	11	9	8	6	4	
160	32	30	28	26	24	22	20	18	16	14	13	11	9	7	5	4	
170	30	28	26	24	22	21	19	17	15	14	12	10	8	7	5	3	
180	28	26	25	23	21	19	18	16	14	13	11	10	8	6	5	3	
190	26	25	23	22	20	18	17	15	14	12	11	9	8	6	5	3	

**Residual Nitrogen Times (Minutes)**

\*\* Residual Nitrogen Time cannot be determined using this table (see paragraph 9-9.1 subparagraph 8 for instructions).

† Read vertically downward to the 30 fsw repetitive dive depth. Use the corresponding residual nitrogen times to compute the equivalent single dive time. Decompress using the 30 fsw air decompression table.

**Table 9-8. Residual Nitrogen Time Table for Repetitive Air Dives.**

Locate the diver's repetitive group designation from his previous dive along the diagonal line above the table. Read horizontally to the interval in which the diver's surface interval lies.

Next, read vertically downward to the new repetitive group designation. Continue downward in this same column to the row that represents the depth of the repetitive dive. The time given at the intersection is residual nitrogen time, in minutes, to be applied to the repetitive dive.

\* Dives following surface intervals longer than this are not repetitive dives. Use actual bottom times in the Air Decompression Tables to compute decompression for such dives.

Dive Depth	Repetitive Group at Beginning of Surface Interval																
	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	
10	**	**	**	**	**	**	**	**	**	**	**	427	246	159	101	58	
15	**	**	**	**	**	**	**	**	450	298	218	164	122	89	61	37	
20	**	**	**	**	**	**	462	331	257	206	166	134	106	83	62	44	27
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30	372	308	261	224	194	168	146	126	108	92	77	63	51	39	28	18	
35	245	216	191	169	149	132	116	101	88	75	64	53	43	33	24	15	
40	188	169	152	136	122	109	97	85	74	64	55	45	37	29	21	13	
45	154	140	127	115	104	93	83	73	64	56	48	40	32	25	18	12	
50	131	120	109	99	90	81	73	65	57	49	42	35	29	23	17	11	
55	114	105	96	88	80	72	65	58	51	44	38	32	26	20	15	10	
60	101	93	86	79	72	65	58	52	46	40	35	29	24	19	14	9	
70	83	77	71	65	59	54	49	44	39	34	29	25	20	16	12	8	
80	70	65	60	55	51	46	42	38	33	29	25	22	18	14	10	7	
90	61	57	52	48	44	41	37	33	29	26	22	19	16	12	9	6	
100	54	50	47	43	40	36	33	30	26	23	20	17	14	11	8	5	
110	48	45	42	39	36	33	30	27	24	21	18	16	13	10	8	5	
120	44	41	38	35	32	30	27	24	22	19	17	14	12	9	7	5	
130	40	37	35	32	30	27	25	22	20	18	15	13	11	9	6	4	
140	37	34	32	30	27	25	23	21	19	16	14	12	10	8	6	4	
150	34	32	30	28	26	23	21	19	17	15	13	11	9	8	6	4	
160	32	30	28	26	24	22	20	18	16	14	13	11	9	7	5	4	
170	30	28	26	24	22	21	19	17	15	14	12	10	8	7	5	3	
180	28	26	25	23	21	19	18	16	14	13	11	10	8	6	5	3	
190	26	25	23	22	20	18	17	15	14	12	11	9	8	6	5	3	

**Residual Nitrogen Times (Minutes)**

\*\* Residual Nitrogen Time cannot be determined using this table (see paragraph 9-9.1 subparagraph 8 for instructions).

† Read vertically downward to the 30 fsw repetitive dive depth. Use the corresponding residual nitrogen times to compute the equivalent single dive time. Decompress using the 30 fsw air decompression table.

**APPENDIX B**  
**ACTIVITY HAZARD ANALYSIS**

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# Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	<b>DIVING OPERATIONS, INCLUDING CRANE SUPPORT FOR DIVING OPERATIONS</b>	Overall Risk Assessment Code (RAC) (Use highest code)				<b>H</b>																																			
	SIGNATURES	Activity #	<b>A1220</b>	AHA #	<b>12</b>																																				
PWD/OICC/ROICC OFFICE		<b>Risk Assessment Code (RAC) Matrix</b>																																							
NAME & DATE ACCEPTED BY GDA:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="10" style="text-align: center; vertical-align: middle;"><b>Severity</b></td> <td colspan="5" style="text-align: center;"><b>Probability</b></td> </tr> <tr> <td style="text-align: center;">Frequent</td> <td style="text-align: center;">Likely</td> <td style="text-align: center;">Occasional</td> <td style="text-align: center;">Seldom</td> <td style="text-align: center;">Unlikely</td> </tr> <tr> <td style="text-align: center;">Catastrophic</td> <td style="text-align: center;">E</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> </tr> <tr> <td style="text-align: center;">Critical</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Marginal</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;">Negligible</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> </table>					<b>Severity</b>	<b>Probability</b>					Frequent	Likely	Occasional	Seldom	Unlikely	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L
<b>Severity</b>	<b>Probability</b>																																								
	Frequent							Likely	Occasional	Seldom	Unlikely																														
	Catastrophic							E	E	H	H	M																													
	Critical							E	H	H	M	L																													
	Marginal							H	M	M	L	L																													
	Negligible							M	L	L	L	L																													
	CONTRACT NUMBER:							<b>N62470-13-D-8007</b>																																	
	TASK ORDER/DELIVERY #:							<b>WE01</b>																																	
	LOCATION:							<b>SWMU 3, JEB LITTLE CREEK</b>																																	
	DATE PREPARED:	<b>August 2013, Revised November 2013</b>																																							
PREPARED BY:	<b>Jennifer Peters, Sr. EHS Specialist</b>																																								
REVIEWED BY:	<b>Roger Margotto, CIH, CSP, CHMM</b>																																								
PRIME CONTRACTOR:	<b>Tetra Tech EC</b>																																								
SUBCONTRACTOR:	<b>N/A</b>																																								
DATE OF PREPARATORY MEETING:		Catastrophic	E	E	H	H	M																																		
DATE OF INITIAL INSPECTION:		Critical	E	H	H	M	L																																		
CONTRACTOR COMPETENT PERSON:		Marginal	H	M	M	L	L																																		
SITE SAFETY and HEALTH OFFICER		Negligible	M	L	L	L	L																																		
<b>ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)</b>		Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine (RAC)																																							
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard". Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity																																							
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place																																							
M = MODERATE RISK (CM or ET or PAR)																																									
L = LOW RISK (ET or PAR)		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.																																							

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
1. Boating Operations (General).	Failure to meet EM 385-1-1 Section 19F requirements. Use of boats could cause injury or death.	Refer to AHA 7, Boating Operations, and go over this AHA with all personnel prior to boating activities.	H
2. Diving Operations (General).	Failure to meet EM 385-1-1 Section 30 and Appendix O and OSHA Subpart T for commercial diving requirements could lead to injury or death.	Follow the requirements of the EM 385-1-1 Part 30 and Appendix O, OSHA Subpart T, the TtEC Safe Diving Practices Manual, and the site-Specific Dive Operations Plan. All divers will be experienced commercial divers as stated in the APP and the Dive Operations Plan. The requirements in the Diving Operations Plan, including team configuration and duties, diving hazards, decompression sickness signs and symptoms, bottom times, and other procedures will be reviewed with the team prior by the Dive Supervisor. The SSHO will give all divers orientation training to the APP. Dive Plans, diver qualifications, and medical clearance (as specified in the Dive Operations Plan) will be approved by the TtEC Diving Safety Manager, Steve Neill.	H
3. Crane Operations (General)	Failure to meet EM 385 1-1 Section 16 requirements for crane operations	The crane operations in support of diver assisted placement of AquaBlok™ agent are considered to be critical lifts. As such the Lift Plan for this activity will be a Critical Lift Plan as per Section 16.H of EM 385 1-1.	H
4. Barge and crane preparedness for diver support	Lack of coordination and planning could lead to injury to barge staff, divers, support staff or other accidents could occur	Barge and crane use AHA #8 will be reviewed and followed and includes general tug and barge operations that addresses travel and moorage/spudding of barge, hazards in loading of AquaBlok™ agent onboard, and general barge deck operational hazards. Critical Lift Plan prepared for this task will be reviewed by all members of the team.  Entire team – dive team, barge team (including tug captain, deckhand, crane operator, rigger and TtEC SS and SSHO) will participate in emergency preparedness and procedures to follow for coordinating the AquaBlok™ agent placement for divers use and retrieving the skid and for divers who use diver-held suction dredge equipment. Roles and responsibilities, clear means of coordination and communication and signals will be reviewed so that all team members understand the tasks and procedures to follow and their roles.	H
	Failure to test the operation of the crane as configured for diver support and agent transport	Operational testing of the crane will be conducted to test the crane, rigging, and load throughout the full range of operation. This will be documented. The Navy may be present for this testing.	H
	Improper rigging or loading of skid could lead to failure of rigging or unstable loads	Qualified and experienced rigger (competent person, TBD) qualified and experienced crane operator (competent person, TBD) will be in charge of the crane operations. Rigger will configure and hook up the rigging to the skid as per the Critical Lift Plan. Rigging and gear	H

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Barge and crane preparedness for diver support (continued)		will be inspected daily by the competent person before use and periodically to ensure it remains secure when in use. Skid load will be placed in stable manner in the skid	
	Poor visibility for crane operator, barge rigger in where to place skid – could injure personnel including divers and dive site personnel or damage dock	Never position under any load. Never raise a load over personnel. When required, a qualified person who knows hand and verbal signals and how to direct a crane operator, will be shore side or on dock to help crane operator place the skids in the correct area and ensure skid does not strike boats, dock, or other hazard. Divers will be at surface and away from placement area when skid is placed or removed. Divers may place a buoy to help guide where the next load should be placed.	H
5. Evaluate weather conditions.	Severe weather can cause hazardous diving, boating, and crane operation conditions.	Monitor the local and national weather service broadcasts prior to boating and diving operations and during the day. Pay attention to weather advisories and storm warnings. Monitor actual water conditions for dangerous wave action. Follow provisions in the APP for severe weather. Follow the Dive Operations Plan and Critical Lift Plan and do not dive in hazardous conditions such as currents exceeding 1 knot (not anticipated in Little Creek Harbor) or in marginal visibility conditions, do not operate crane in winds that could make the load swing or be unstable. Do not conduct operations if lightning is present or severe storms are forecast for the area.	L
6. Stage and set up equipment and supplies at the dive site  (location is anticipated to be on a dock at marina; however it may be necessary to use a dive boat in some instances)	Lack of emergency preparedness	Ensure the required emergency response equipment as stated in the Dive Operations Plan such as first aid kit, emergency oxygen kit, stokes litter with floating backboard, copy of emergency response plan and routes to hospital, and emergency contact numbers are present at the site along with Dive Operations Plan and APP. Review and sign all applicable AHAs with the dive team and support staff (e.g., barge, crane, breathing air tender, boat captains, etc.). Inspect the emergency equipment. Conduct an emergency drill. Daily review of emergency procedures. Review MSDS for AquaBlok™ agent with crew.	H
	Materials and equipment can be heavy and cumbersome and lead to strains and sprains or back injuries	Use mechanical lifting equipment or team lift when possible rather than by hand and tool methods. Do not bend at the waist, bend at the knees. Do not twist and turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds (may be lesser for some folks) alone. Rotate tasks and take breaks when performing repetitive tasks and try to find the best position possible to perform the task.	M
	Lack of proper breathing air supply for divers	Ensure certified breathing air providing equipment is onsite. Copy of recent breathing air testing and certification must be on-hand and submitted to the TtEC Dive Safety Manager in advance. Inspect the system, including compressor, hoses, fittings, primary and reserve air system. Store and maintain this gear as required by the manufacturer.	H
	Poor condition and	Dive gear must be inspected before use. Dive gear must be inspected and maintained per a	M

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Stage and set up equipment and supplies at the dive site (location is anticipated to be on a dock at marina; however it may be necessary to use a dive boat in some instances) (continue)	maintenance of diver gear and equipment	maintenance and servicing schedule and program. Dive gear that is not in good working order, must be taken out of service and repaired (by qualified person, typically manufacturer) before further use.	
	Improper operation and use of boats used in dive support operations	Boats will be inspected before use daily following the boater's checklist in the APP. Boat captain will do the inspection and ensure emergency equipment is in place per USCG and EM 385 1-1 requirements. Boats, if used for diver entry and egress will have a proper swim step and ladder as well as a sling to use for diver retrieval if necessary. If used as the dive platform, it will be configured to allow the full dive team, tenders/standby divers and Dive Supervisor as well as air compressor onboard as well as the equipment, including air compressor and air compressor attendant. Boat will be anchored for diving, if used and will required display diver down and code alpha flags and the area around the dive site will be controlled to keep other boats out of the area. A system of buoys or lines may be used to cordon off the dive site and the barge activities. Boat will have a horn and will have emergency communications such as marine radio channel 16 and working cell phones. Work will be coordinated with the Marina and Port through the NTR.  Also see and review Boating AHA #7.	H
	Potential falls into the water by dock or boat personnel	Staff on docks and boat/barge decks will wear a Type II or better PFD when there are inadequate or no rails in place. Standby diver in full gear is exempt from wearing a PFD.	M
7. Prepare for diver entry into water.	Improper pre-dive preparation could lead to accidents, water entry into suits, or malfunctioning air supply.	Teams will follow pre-dive safety requirements and inspections per the Dive Operations Plan. The diver will check gear and verify breathing air before use, and the Dive Supervisor will verify equipment on diver prior to entry, including communications. The pre-dive checklist in the Dive Operations Plan will be followed.  The Dive Supervisor will verify that all appropriate diver-down flags and demarcations are displayed for diving operations and monitor for other boats in the area.  The Dive Supervisor will verify that all appropriate emergency equipment is staged in the support zone and is accessible for a response.	M
8. Entry into water.	Injury could occur if diver hangs up on equipment or deploys improperly; propeller injuries.	Ensure no gear is entangled in equipment. Ensure outboard or inboard motor of boat is in neutral or off position so divers do not contact a propeller (if boats are used). Once the okay to proceed is given, diver will deploy by the safest method for the means of entry (either by dock or boat). Other equipment (as required) will be given to the diver after entry into the water.	L
	Potential for disruption of equipment during entry	Perform tests of breathing air and communication devices when in the water. Ensure hoses, tender lines, and equipment is secured and not tangled.	M
9. Placing and	Diver hazards with being	For placement of the skid and removal of the skid, divers will surface and move away from the	H

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
removing skids underwater	struck by moving skid	skid to a safe distance when it is placed or removed.  All working dives require communications between the divers and topside to direct crane load movements. The crane operator will take direction from the tender or Dive Supervisor directly in communication with the diver to ensure divers are away and the load is ready to be placed or removed.	
	Skid movement or rigging movement when placed – potential to strike diver or entrap diver	Divers will not remove rigging. Diver will confirm that skid is placed firmly on the bottom and is stable. Crane operator will ensure that slight slack is on the cable but only slight so rigging does not move while divers are in the water. Divers will confirm rigging placement and lack of movement. Barge will be firmly spudded when lifts are being done so that there is no motion of the crane from the water.	H
	Potential transient turbidity at skid location	Divers will ensure sufficient visibility conditions in water before placement of dredge equipment and beginning operations. Control fin kicks and buoyancy.	M
10. Setup and testing of dredge and operation of dredge	Large and bulky equipment may be cumbersome for diver to move around	As required, boats and lines may be needed to move and position dredge from place to place or dredge will be moved in and with the skid (to be determined)  Items are heavier to a person in air than in water and could injure backs or cause strains when brought into boat or onto dock. An item's weight can be misjudged underwater.  An appropriate means of transport of items to the surface will be developed. Divers will only hand carry items to the surface that are small and likely to be able to be handed up to surface support persons without strain. Other heavier or bulkier items may be attached by a rope and sling by the diver and pulled to the surface, although size and weight are not to exceed what is likely to be readily handled by two surface support persons or about 50 pounds maximum.	M
	Improper use and operation could result in injury	Ensure that the equipment manufacturer's instruction on use and operation and limitations are followed and not deviated from. Have the operation manual onsite.	M
	Divers on suction end of dredge could have equipment or body part sucked into or against tube	Tube will have a large mesh screen over it to prevent sucking of tools, diver gear, or diver body part into it. Tube will have dual handles on it to facilitate handling and positioning by diver. Diver will be instructed and trained or have prior experience in operation of this equipment and the procedures to follow if tube forms a vacuum on diver's body. Diver will have ability to stop or direct the stop of the equipment in an emergency. Always direct tube away from body.	M
	Divers on both ends of the tube could be injured by bucking and jerking of the tube	Keep tube oriented away from face and body. Always maintain positive control of the tube when in operation. Be prepared for jerky movements with inconsistent suction application	M

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Setup and testing of dredge and operation of dredge (continued)	Noise of dredge topside could cause hearing loss if noisy or hinder effective communication	Hearing protection is required when sound levels exceed 84 dBA continuously. This rule applies to personnel working near or on heavy equipment and any other sources of loud noise. Shield loud sources of noise so that communications are not hindered. Test communications effectiveness with background noise levels.	M
	Dredge lines and diver lines and hoses could become entangled	Conduct checks to verify that lines are not crossed. Do not reposition onto other side of dredge hose by crossing lines and hoses. Exit and enter area from the same side of lines.	M
	Increased turbidity due to spread of agent or other in water activity	Monitor visibility and known when to suspend operations if visibility could lead to safety issues or could hinder ability to verify even spread of agent at the discharge site.	M
11. Conduct placement of AquaBlok™ agent	Communications could be lost in water.	Routine radio checks to surface will be performed.	M
	Entanglement, entrapment, or sharps hazards could occur if debris is present on bottom.	Use caution around debris in and around docks and boats moored in marina. Be mindful of equipment and regulator hoses dangling that could get caught or severed. Control buoyancy at all times. Do not stick body parts under heavy objects or try to remove heavy or large objects from the bottom. Do not run hands along sharp edges. Report debris hazards or obstacles to placement of the agent to the Dive Supervisor.	M
	Diving illnesses such as the bends or arterial gas embolism could cause death; drowning.	All dives will be no-decompression dives. The maximum dive depth anticipated is 12 feet. The Dive Supervisor will ensure briefing for all personnel pre-dive and ensure standby divers and tenders are prepared and aware of emergency response situations. The Dive Operations Plan identifies emergency responses for diver illnesses and other emergency dive-related situations. The Dive Operations Plan includes telephone number of recompression facilities and Diver Alert Network. Dive Supervisor to verify availability of recompression chamber in event of an emergency. Emergency oxygen will be available at the dive site. Diver supplied air will be tended at the surface and will include reserve and backup system.	M
	Cold water temperatures could lead to hypothermia or loss of dexterity and confusion. Warm water and exertion could cause heat stress and fatigue	Dress in appropriate thermal garments under dry suit. Notify Dive Supervisor if a break is needed for warm up. Have dry blankets present at the dive site. Warm showers are also available for divers as required. Rotate standby diver as needed to give persons a break.  In warm water, wear lighter dive suit if necessary. Ensure to drink plenty of fluids and electrolytes and to take breaks as required. Notify Dive Supervisor if you need a break. Dive Supervisor and tenders to monitor for signs and symptoms of heat or cold stress of divers.	M

<b>AHA – 12 Diving operations, including crane support for diving operations</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Conduct placement of AquaBlok™ agent (continued)	Cold or heat stress to divers or topside team. Sunburn.	Properly dress for the weather. SSHO will implement heat stress and cold stress controls as specified in the APP. Provide breaks for personnel to get either into cool or warm environment. Encourage a steady work pace. Ensure adequate drinking water is available. Know the signs and symptoms of exposure and keep an eye on your partner. Wear broad-spectrum sunblock at surface and a hat.	M
	Fatigue could cause diver to lose situational awareness or cause him/her to rush activities or omit steps.	Monitor each other for fatigue. Notify Dive Supervisor if fatigue is interfering with work activities and take breaks as required and between loading and positioning of skids. All divers will be advised of the need for plenty of rest at night and not to drink alcohol excessively before diving work days. Rotate standby diver as needed to give persons a break. The Dive Operations Plan contains more information about rotation of divers and dive times.	M
	Items on dock or boats could fall and land on diver.	Secure or move any items on deck or on dock that could fall onto divers.	M
	Surface team could get cuts and scrapes or trip on debris.	Wear leather or neoprene work gloves when handling tools or materials. Practice good housekeeping on the dock.	
12. Boarding dock or boats from water	Divers could fall while boarding onto or deploying from boat; injury by propeller.	The boat or dock exit and entry point will be equipped with a ladder and handrail assembly to facilitate safe entry and egress to and from water and a platform to step onto. Topside personnel will take and stow equipment to facilitate ease of entry as necessary. Ensure outboard or inboard motor (for boat entry) is in neutral or off position so divers do not contact a propeller.	M

<b>AHA 12 – Diving operations, including crane support for diving operations</b>		
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel Name(s)</b>	<b>Inspection Requirements</b>
Boats	Qualified operators will have U.S. Coast Guard approved boater safety qualifications identified in the APP and experience in use of the boats on the project.	Inspect daily and before use. Use the boating checklist form.
Diving equipment (e.g., mask, fins, dry suit, mask, tanks, buoyancy compensator, octopus)	Qualified divers will inspect their equipment each day before use. Dive supervisor will ensure equipment is serviced and maintained as required. Divers check each other's equipment using buddy system.	Inspect daily and before use. Clean and stage after use.
Hand tools	User will inspect hand tools before use and be trained in proper use and limitations.	Inspect daily and before use.
Reacquisition and positioning equipment on support boat	Qualified and experienced geophysical technician.	Daily positioning verification per QAPP by operator.
PFDs	Training in proper use and limitations of PFDs. Autoinflatable PFDs take additional awareness. SSHO or boat captain will brief workers on the use and limitations of PFDs and the location stowed on boats (when stowed vs. worn). Training in how to inspect and what to inspect for different types of PFDs.	Daily inspection by users.
Fire extinguishers	Fire extinguisher training including use/limitations.	At least monthly by SSHO or designee.
First aid kits and other emergency equipment	Use of emergency equipment/first aid kits must be done by personnel familiar with this plan; use and inspection criteria of the equipment, and what the equipment is used for, by or under direction of the SSHO.  All divers are CPR/First Aid/AED/DAN Oxygen administration trained.	Initially and at least weekly thereafter or after use for restocking. (29 CFR 1926.50[d][2])

**NOTES:**

In addition to the information listed in this AHA, all field personnel must review and be familiar with all provisions of the approved safety plan. TtEC Corporate Safety Programs will also be available on-site for review of specific materials and mitigation measures.

***Abbreviations and Acronyms:***

AED – automatic external defibrillator

AHA – Activity Hazard Analysis

APP – Accident Prevention Plan

CFR – *Code of Federal Regulations*

CHMM – Certified Hazardous Materials Manager

CIH – Certified Industrial Hygienist

CPR – cardiopulmonary resuscitation

CSP – Certified Safety Professional

DAN – Diver Alert Network

EHS – Environmental Health and Safety

EM – Engineer Manual

OSHA – Occupational Safety and Health Administration

PFD – personal flotation device

RAC – Risk Assessment Code

SHM – Safety and Health Manager

**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.

NAME	SIGNATURE	TITLE	DATE
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

**APPENDIX C**  
**DIVE INSPECTION CHECKLISTS**

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PROJECT NAME/NUMBER: \_\_\_\_\_ Date: \_\_\_\_\_

## **DIVING SUPERVISOR'S PRE-DIVE CHECKLIST FOR SURFACE-SUPPLIED DIVING**

**CAUTION - This checklist is an overview intended for use with the detailed Operating Procedures (OP's) from the appropriate equipment O&M technical manual.**

### **a. Basic Preparation:**

- \_\_\_ Verify that a recompression chamber is present on the diving station for dives deeper than 100 FSW or dives requiring decompression.
- \_\_\_ Verify that proper signals indicating underwater operations being conducted are displayed correctly.
- \_\_\_ Ensure that all personnel concerned, or in the vicinity, are informed of diving operations.
- \_\_\_ Determine that all valves, switches, controls, and equipment components affecting diving operations are tagged-out to prevent accidental shut-down or activation.

### **b. Equipment Protection:**

- \_\_\_ Assemble all members of the diving team and support personnel (winch operators, boat crew, etc.) for a pre-dive briefing.
- \_\_\_ Assemble and lay out all dive equipment, both primary equipment and standby spares for diver (or standby diver), including all accessory equipment and tools.
- \_\_\_ Check all equipment for superficial wear, tears, dents, distortion, or other discrepancies.
- \_\_\_ Check all masks, helmets, view ports, faceplates, seals, and visors for damage.
- \_\_\_ Check all harnesses, laces, strain relief, and lanyards for wear; replace as needed.

### **c. Helmets and Masks:**

- \_\_\_ Ensure that all Set up and Operating Procedures have been completed in accordance with the appropriate Technical Manual and Operating Procedures.

### **d. General Equipment:**

- \_\_\_ Check that all accessory equipment – tools, lights, special systems, spares, etc., are on site and in working order. In testing lights, tests should be conducted with lights submerged in water and extinguished before removal, to prevent overheating and failure.
- \_\_\_ Erect diving stage or attach diving ladder. In the case of the stage, ensure that the screw pin shackle connecting the stage line is securely fastened with the shackle pin seized with wire or a safety shackle is used to help prevent opening.
- \_\_\_ Ensure first aid kits, portable O2 and AED's are available and working.

**e. Preparing the Diving System:**

- \_\_\_ Check that a primary and suitable back-up air supply is available with a capacity in terms of purity, volume, and supply pressure to completely service all divers and standby diver, including decompression, recompressions and accessory equipment throughout all phases of the planned operation.
- \_\_\_ Verify that all diving system operating procedures have been conducted to properly align the dive system.
- \_\_\_ Ensure that qualified personnel are available to operate and stand watch on the dive system.

**f. Compressors:**

- \_\_\_ Determine that sufficient fuel, coolant, lubricants, and antifreeze are available to service all components throughout the operation. All compressors should be fully fueled, lubricated, and serviced (with all spillage cleaned up completely).
- \_\_\_ Check maintenance and repair logs to ensure the suitability of the compressor (both primary and back-up) to support the operation.
- \_\_\_ Verify that all compressor controls are properly marked and any remote valving is tagged with "**Divers Air Supply - Do Not Touch**" signs.
- \_\_\_ Ensure that the compressor is secure in the diving craft and will not be subject to operating angles, caused by roll or pitch that will exceed 15 degrees from the horizontal.
- \_\_\_ Verify that oil in the compressor is an approved type. Check that the compressor oil does not overflow the FULL mark; contamination of air supply could result from fumes or oil mist.
- \_\_\_ Check that compressor exhaust is vented away from work areas and, specifically, does not foul the compressor intake.
- \_\_\_ Check that compressor intake is obtaining a free and pure suction without contamination. Use pipe to lead intake to a clear suction location if necessary.
- \_\_\_ Check all filters, cleaners and oil separators for cleanliness.
- \_\_\_ Bleed off all condensed moisture from filters and from the bottom of volume tanks. Check all manifold drain plugs, and that all petcocks are closed.
- \_\_\_ Check that all belt-guards are properly in place on drive units.
- \_\_\_ Check all pressure-release valves, check valves and automatic unloaders.
- \_\_\_ Verify that all supply hoses running to and from compressor have proper leads, do not pass near high-heat areas such as steam lines, are free of kinks and bends, and are not exposed in such a way that they could be rolled over, damaged, or severed by machinery or other means.

\_\_\_ Verify that all pressure supply hoses have safety lines and strain relief's properly attached.

**g. Activate the Air Supply in accordance with approved OPs.**

**a. Compressors:**

\_\_\_ Ensure that all warm-up procedures are completely followed.

\_\_\_ Check all petcocks, filler valves, filler caps, overflow points, bleed valves, and drain plugs for leakage or malfunction of any kind.

\_\_\_ Verify that there is a properly functioning pressure gauge on the air receiver and that the compressor is meeting its delivery requirements.

**b. Cylinders:**

\_\_\_ Gauge all cylinders for proper pressure.

\_\_\_ Verify availability and suitability of reserve cylinders.

\_\_\_ Check all manifolds and valves for operation.

\_\_\_ Activate and check delivery.

**For all supply systems, double check "Do Not Touch" tags (tag out).**

**h. Diving Hoses:**

\_\_\_ Ensure all hoses have a clear lead and are protected from excessive heating and damage.

\_\_\_ Ensure that the hose (or any length) has not been used in a burst test program. No hose length involved in such a program will be part of an operational diving hose.

\_\_\_ Check that hoses are free of moisture, packing material, or chalk.

\_\_\_ Soap test hose connections after connection to air supply and pressurization.

\_\_\_ Ensure umbilical boots are in good condition.

**i. Test Equipment with Activated Air Supply:**

\_\_\_ Hook up all air hoses to helmets, masks and chamber; make connections between back-up supply and primary supply manifold.

\_\_\_ Verify flow to helmets and masks from primary and secondary air supply.

\_\_\_ Check all exhaust and non-return valves.

\_\_\_ Hook up and test all communications.

\_\_\_ Check air flow from both primary and back-up supplies to chamber.

**j. Recompression Chamber Checkout (Pre-dive only):**

- \_\_\_ Check that chamber is completely free and clear of all combustible materials.
- \_\_\_ Check primary and back-up air supply to chamber and all pressure gauges.
- \_\_\_ Check that chamber is free of all odors or other “contaminants.”
- \_\_\_ Hook up and test all communications.
- \_\_\_ Check air flow from both primary and back-up supplies to chamber.

**k. Final Preparations:**

- \_\_\_ Verify that all necessary records, logs, and timesheets are on the diving station.
- \_\_\_ Check that appropriate decompression tables are readily at hand.
- \_\_\_ Place the dressing bench in position, reasonably close to the diving ladder or stage, to minimize diver travel.

PROJECT NAME/NUMBER: \_\_\_\_\_ Date: \_\_\_\_\_

### **DIVING SUPERVISORS POST-DIVE CHECKLIST FOR SCUBA DIVING**

- \_\_\_\_\_ Check the physical condition of the diver.
- \_\_\_\_\_ Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness.
- \_\_\_\_\_ Advise the diver of the location of the closest recompression chamber that is ready for use.
- \_\_\_\_\_ Alert the diver to the potential hazards of ascending to altitude, including flying after diving (SEE Dive Safe Practices Manual Paragraph 3.9.5)
- \_\_\_\_\_ Assemble diving equipment and return to site support facility (trailer).
- \_\_\_\_\_ Have divers shower and consume warm liquids, avoid beverages with caffeine.
- \_\_\_\_\_ Observe the divers on the surface for symptoms of diving disorders for a minimum of 10 minutes before allowing the divers to leave the dive site.
- \_\_\_\_\_ Wash all diving equipment in fresh water and hang to dry.
- \_\_\_\_\_ Reorder/replace equipment as necessary.
- \_\_\_\_\_ Complete dive profile log for all divers and submit the log to the Chairman Diving Review Board for input into TtEC's master dive log.

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**APPENDIX D**  
**DIVER CERTIFICATIONS**

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**Diver, Personnel Qualifications**

# DIVERS INSTITUTE OF TECHNOLOGY INC.



The DIVERS INSTITUTE OF TECHNOLOGY INC.

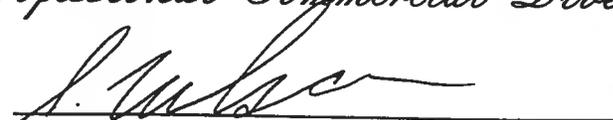
Presents this Diploma to

Martin S. Smith

This 26th day of January 1996

Who has demonstrated the skill and proficiency with Surface Supplied Air and Helium Diving Equipment to be eligible for graduation as a Professional Commercial Diver.

  
PRESIDENT

  
DIRECTOR OF TRAINING



*"Protecting the Health of Your Business"*

**Fit For Diving**  
Commercial Diver's Medical Fitness Certification

Employee Name: Martin Smith Date of Birth: 5-1-1969  
Company: Precon Marine Examination Date: 1-24-13

**Reason for Examination:**

- Initial Examination
- Renewal Examination
- Re-Examination following a Serious Diving Injury or Illness
- Other \_\_\_\_\_

The Commercial Diver identified above has been examined this day in accordance with the Association of Diving Contractors, International Medical History and Physical Examination Form(s). As the examining physician, I have determined and certify this person to be-

- Fit for Diving
- Cleared for Topside Operations only
- Cleared with the following restrictions \_\_\_\_\_
- Unfit for Diving \_\_\_\_\_

This certification shall expire 12 months from the above date or sooner in the event of a serious diving injury or illness.

Medical Provider (Print): Timothy Lee, MD  
Signature: Tim Lee MD  
Date: 1-24-13

*"Protecting the Health of Your Business"*

## OSHA MEDICAL RECOMMENDATION FOR RESPIRATOR USE

### Section 1: Employee Complete

Protecting  
Health  
of  
Your  
Business

COMPANY: Precon Marine

EMPLOYEE: Martin Smith

SSN: XXX-XX-3836

DATE OF  
QUESTIONNAIRE: 1-24-13

---

### Section 2: Medical Provider Complete

29 CFR 1910.134(e)(6)(i)(A)

Based on the answers presented to questions on the OSHA "Respirator Medical Evaluation Questionnaire" – (Appendix C to Section 1910.134) – the above employee is:

Not restricted on use of respirators identified by the company for clearance.

Restricted to use only the types of respirator(s) indicated:

Open Circuit SCBA (e.g. Scott Airpack)

Supplied Air Respirator (air-line)

Air-Purifying (non-powered, cartridge)

Closed Circuit SCBA (rebreather)

Combination Air-Line and SCBA

Air-Purifying (powered, cartridge)

Subject to other restrictions for respirator use as follows:

Not permitted to use a respirator, unless cleared through Primary Care Provider

Not permitted to use a respirator.

29 CFR 1910.134(e)(6)(i)(B)

Recertification exam is required in One year(s). Employee/Company understands if any medical condition arises, immediate reevaluation is required by Taylor Made Diagnostics.

29 CFR 1910.134(e)(6)(i)(C)

The employee (  has ) or (  has not ) been provided a copy of this certificate or a wallet size certificate.

Physician's Signature:

Timothy Lee MD  
Timothy Lee, MD

Date:

1-24-13

Taylor Made Diagnostics is SWaM certified (small, woman-owned business)

801 Poindexter Street, Suite 218, Chesapeake, VA 23324

Office: 757-494-1688 Fax: 757-494-1973

www.tmdocmed.com



# Emergency Oxygen First Aid for Scuba Diving Injuries



Martin S. Smith

Has fulfilled all of the academic and skill evaluations for providing emergency oxygen first aid in the event of a diving emergency and is recognized as a DAN Emergency Oxygen Provider.

We, the undersigned, on the 5 day of Jan, 2013  
endorse this certificate to be valid for 24 months.



Dive Services Inc.

DAN Training Center

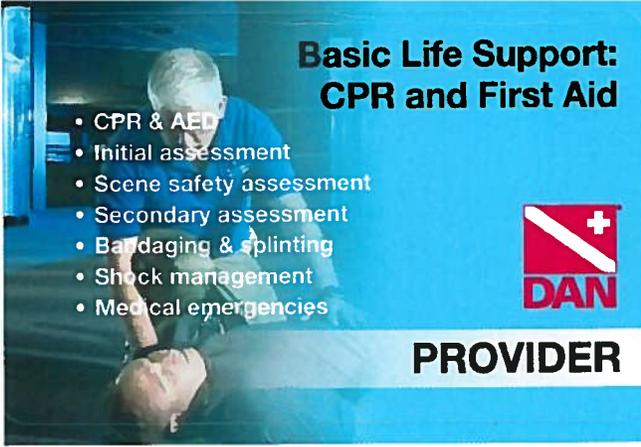
ProCon Marine

Course Location

Joel D. Mihok  
Signature of Authorized Instructor

1-5-13

Date of Completion



# Basic Life Support: CPR and First Aid

- CPR & AED
- Initial assessment
- Scene safety assessment
- Secondary assessment
- Bandaging & splinting
- Shock management
- Medical emergencies



**PROVIDER**

## Meets ILCOR/AHA 2010 Guidelines

Name: Martin Smith 2253463

Certification Date: 1/5/2013

Instructor: 14021 Joel Michello

2251855 Dive Services Inc.

(Card expires two years after certification date.)



This person has met or exceeded the standards for this certification as set forth by: Divers Alert Network, 6 West Colony Place, Durham, NC 27705  
phone 800-446-2871 or 919-684-2948 • fax 919-490-6630 • www.DAN.org

*"Protecting the Health of Your Business"*

## Fit For Diving

### Commercial Diver's Medical Fitness Certification

Employee Name: LEONARD BRIGHTMAN Date of Birth: 9-8-1960

Company: PRECOR MARINE Examination Date: 12-10-12

#### Reason for Examination:

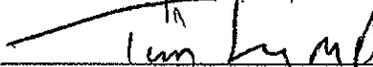
- Initial Examination  
 Renewal Examination  
 Re-Examination following a Serious Diving Injury or Illness  
 Other \_\_\_\_\_

The Commercial Diver identified above has been examined this day in accordance with the Association of Diving Contractors, International Medical History and Physical Examination Form(s). As the examining physician, I have determined and certify this person to be-

- Fit for Diving  
 Cleared for Topside Operations only  
 Cleared with the following restrictions \_\_\_\_\_  
\_\_\_\_\_  
 Unfit for Diving \_\_\_\_\_

This certification shall expire 12 months from the above date or sooner in the event of a serious diving injury or illness.

Medical Provider (Print): Timothy Lee, MD

Signature: 

Date: 12-10-12

### OSHA MEDICAL RECOMMENDATION FOR RESPIRATOR USE

#### Section 1: Employee Complete

Protecting  
Health  
of  
Your  
Business

COMPANY: Recon Marine

EMPLOYEE: Leonard J. Brightman

SSN: XXX-XX-3278

DATE OF QUESTIONNAIRE: 12-10-12

---

#### Section 2: Medical Provider Complete

29 CFR 1910.134(e)(6)(i)(A)

Based on the answers presented to questions on the OSHA "Respirator Medical Evaluation Questionnaire" - (Appendix C to Section 1910.134) -- the above employee is:

Not restricted on use of respirators identified by the company for clearance.

Restricted to use only the types of respirator(s) indicated:

Open Circuit SCBA (e.g. Scott Airpack)

Supplied Air Respirator (air-line)

Air-Purifying (non-powered, cartridge)

Closed Circuit SCBA (rebreather)

Combination Air-Line and SCBA

Air-Purifying (powered, cartridge)

Subject to other restrictions for respirator use as follows:

Not permitted to use a respirator, unless cleared through Primary Care Provider

Not permitted to use a respirator.

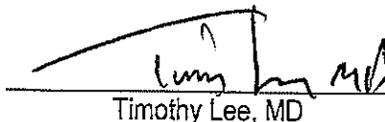
29 CFR 1910.134(e)(6)(i)(B)

Recertification exam is required in one year(s). Employee/Company understands if any medical condition arises, immediate reevaluation is required by Taylor Made Diagnostics.

29 CFR 1910.134(e)(6)(i)(C)

The employee ( has) or ( has not) been provided a copy of this certificate or a wallet size certificate.

Physician's Signature:

  
Timothy Lee, MD

Date: 12-10-12

Taylor Made Diagnostics is SWaM certified (small, woman-owned business)

801 Poindexter Street, Suite 218, Chesapeake, VA 23324

Office: 757-494-1688 Fax: 757-494-1973

www.tmdocmed.com



# Emergency Oxygen First Aid for Scuba Diving Injuries



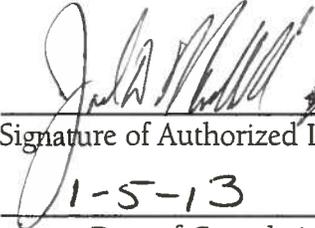
LEONARD BRIGHTMAN

Has fulfilled all of the academic and skill evaluations for providing emergency oxygen first aid in the event of a diving emergency and is recognized as a DAN Emergency Oxygen Provider.

We, the undersigned, on the 5 day of JANUARY 2013  
endorse this certificate to be valid for 24 months.



DIVE SERVICES INC  
DAN Training Center  
VA. BEACH VA.  
Course Location

  
Signature of Authorized Instructor  
1-5-13  
Date of Completion



## Basic Life Support: CPR and First Aid

- CPR & AED
- Initial assessment
- Scene safety assessment
- Secondary assessment
- Bandaging & splinting
- Shock management
- Medical emergencies



**PROVIDER**

**Meets ILCOR/AHA 2010 Guidelines**

**Name:** Leonard Brightman 1824908

**Certification Date:** 1/5/2013

**Instructor:** 14021 Joel Michello

2251855 Dive Services Inc.

*(Card expires two years after certification date.)*



This person has met or exceeded the standards for this certification as set forth by: Divers Alert Network, 6 West Colony Place, Durham, NC 27705  
phone 800-440-2671 or 919-684-2948 • fax 919-490-6630 • [www.DAN.org](http://www.DAN.org)

# Professional Diving School of New York

Certificate of Completion

This certifies that:

*Leonard J. Brightman*

has satisfactorily completed a 615 hour course of study and is qualified as a

**PROFESSIONAL DEEP SEA DIVER**

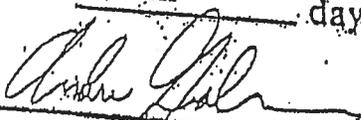
approved by the New York State Education Department.

He is therefore awarded this Certificate in testimony whereof the  
signatures of the President and Director are herewith subscribed this

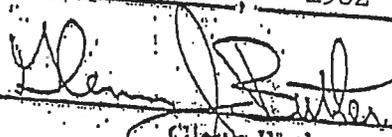
15th

day of May

1982



Andre Galerne  
President



Glenn Butler  
Director

*"Protecting the Health of Your Business"*

**Fit For Diving**  
**Commercial Diver's Medical Fitness Certification**

Employee Name: Austin Lester Date of Birth: 12-12-1987

Company: Precon Marine Examination Date: 9-16-13

**Reason for Examination:**

- Initial Examination
- Renewal Examination
- Re-Examination following a Serious Diving Injury or Illness
- Other \_\_\_\_\_

The Commercial Diver identified above has been examined this day in accordance with the Association of Diving Contractors, International Medical History and Physical Examination Form(s). As the examining physician, I have determined and certify this person to be-

- Fit for Diving
- Cleared for Topside Operations only
- Cleared with the following restrictions \_\_\_\_\_
- Unfit for Diving \_\_\_\_\_

This certification shall expire 12 months from the above date or sooner in the event of a serious diving injury or illness.

Medical Provider (Print): Timothy Lee, MD

Signature: [Signature] MD

Date: 9-24-13



**Virginia**  
DRIVER'S LICENSE

LESTER, AUSTIN BARRETT  
529 ROYAL GRANT DR  
CHESAPEAKE, VA 23030

CUSTOMER NO. T62-14-2642  
DOB 05-12-1987  
SEX M  
EYES BRN  
HAIR BRN  
CLASS NONE  
ENDORSEMENT NONE  
COURT CODE

ORGAN DONOR

UNDER 21 UNTIL 12-12-2006  
UNDER 18 UNTIL 12-12-2006

*Austin Lester*

**HeartSaver®**  
First Aid CPR AED

American Heart Association

Child CPR AED  
Infant CPR  
Written test

October 2011  
October 2013

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA HeartSaver First Aid CPR AED Program. Optional completed modules are those NOT marked out:

Underwater Construction Academy

Austin Lester

Issue Date: 1/09/2012

Cert # 11-01

Commercial Driver Certification Card

Sharon Holloway  
Head of Academics

Issued by

Austin Lester has completed all requirements of a Commercial Driver, as set forth by ANSI/ACDE, given by the Underwater Construction Academy, licensed to operate by the State Council of Higher Education for Virginia. This training meets or exceeds the guideline of 625 clock hours of theory and practical training set forth by the ANSI/ACDE 01-2009 Commercial Driver Training Minimum Standards.

*Austin Lester*  
Signature of Card Holder

For certification or questions contact:  
Underwater Construction Academy at (757) 312-0055  
Great Bridge Blvd. Suite E Chesapeake, VA 23320



**HEARTSAVER FIRST AID CPR AED**

Training Center Name: TCC VA Beach, VA TC ID #: 5015599

TC Info: City, State ZIP Phone  
cprdude757@yahoo.com (757)-650-4485

Course Location: Virginia Beach, VA

Instructor Name: Harvey Raffensperger Inst. ID #: 9060163403

Holder's Signature: \_\_\_\_\_

DEFINITIONS: \_\_\_\_\_

NOTICE: \_\_\_\_\_

Restrictions for restriction, class, and endorsement codes, contained on the back of this document are visible on the back of this card.

RESTRICTIONS: \_\_\_\_\_

© 2011 American Heart Association. Tampering with this card will alter its appearance. 90-1815



# CPR CERT4U, LLC

## Certificate of Training Oxygen First Aid (American Heart Association)

Austin Lester

STUDENT

HAS COMPLETED THE NECESSARY TRAINING GIVEN BY A CERTIFIED AMERICAN HEART ASSOCIATION INSTRUCTOR TO ADMINISTER OXGEN TO A PAITENT IN NEED OF FIRST AID.

AWARDED BY:

  
\_\_\_\_\_  
Teresa Ashcraft

02-09-12

DATE



# DIPLOMA FOR COMPLETION OF ACADEMICS

## UNDERWATER CONSTRUCTION ACADEMY

Austin B. Lester

STUDENT

STUDENT #	CLASS#	START DATE	GRADUATION DATE
11-01	1	09-11	01-12

HAS COMPLETED THE MINIMUM OF 625 CLOCK HOURS SET FORTH BY ANSI COMMERCIAL DIVER;  
TRAINING - 01-2009 MINIMUM STANDARD . THIS DIPLOMA GUARANTEES THAT THIS STUDENT  
HAS THE KNOWLEDGE AND BASIC SKILLS TO ACHIEVE WORK AS A COMMERCIAL DIVER.

AWARDED BY:

  
SHANNON HOLLOWAY

1/13/12  
DATE



Oxygen First Aid for Scuba Diving Injuries

Jeffrey Huff

Provider name

6-22-13

Date (card expires after 24 months)

Jeff Huff

Provider Signature



Basic Life Support and First Aid Program

Jeffrey Huff

Provider name

6-22-13

Date (Certification expires after 24 months)

Jeff Huff

Provider Signature

DAN Instructor Signature

This individual has successfully completed DAN's Basic Life Support and First Aid program and is prepared to recognize the warning signs of decompression illness and provide basic life support including the use of emergency oxygen first aid. This course includes training in CPR, AED use, choking, bandaging, splinting and first aid.

DAN Instructor Signature

This individual has successfully completed DAN's Oxygen First Aid for Scuba Diving Injuries course and is prepared to recognize the warning signs of decompression illness and provide basic life support including the use of emergency oxygen first aid. This course includes training in CPR, AED use, choking, bandaging, splinting and first aid.

18. My Personal Physician is:

Name \_\_\_\_\_  
Address N/A  
City, State \_\_\_\_\_  
Phone Number \_\_\_\_\_

19. DIVING HISTORY How long have you been commercial diving? 2 years

Surface Air Diving History  
Maximum Depth Surface Air 165 ft  
Maximum Depth Surface Mixed Gas Nitrox - 60 ft  
Longest Bottom Time Air 3 hours 56 mins  
Longest Bottom Time Mixed Gas Nitrox - 32 mins

Saturation Diving History  
Maximum Depth \_\_\_\_\_  
Maximum Duration (Days) \_\_\_\_\_  
Heliox Yes  No   
Trimix Yes  No   
Nitrox Yes  No

20. DIVING EXPERIENCE (Number of years experience):  
Air 2 Have you passed an oxygen tolerance test?  
Mixed Gases 2 Yes  No   
Saturation - Name of Diving School  
Commercial Diving Academy

21. INDICATE THE NUMBER OF DECOMPRESSION INCIDENTS  
List any residuals  
Bends, pain only \_\_\_\_\_  
Bends, neurological \_\_\_\_\_  
Chokes \_\_\_\_\_  
Inner ear \_\_\_\_\_

22. IN DIVING HAVE YOU HAD A HISTORY OF: (Provide details of dates and severity)

Yes No Details  
Gas Embolism   \_\_\_\_\_  
Oxygen Toxicity   \_\_\_\_\_  
CO<sub>2</sub> Toxicity   \_\_\_\_\_  
CO Toxicity   \_\_\_\_\_  
Ear/Sinus Squeeze   \_\_\_\_\_  
Ear Drum Rupture   \_\_\_\_\_  
Deafness   \_\_\_\_\_

Yes No Details  
Lung Squeeze   \_\_\_\_\_  
Near Drowning   \_\_\_\_\_  
Asphyxiation   \_\_\_\_\_  
Vertigo (Dizziness)   \_\_\_\_\_  
Pneumothorax   \_\_\_\_\_  
Nitrogen Narcosis   \_\_\_\_\_  
Loss of Consciousness   \_\_\_\_\_

23. Have you been involved in a diving accident (decompression sickness or others) since your last physical examination?  Yes  No  
Date of last physical examination: \_\_\_\_\_ Name of Physician who performed your last exam \_\_\_\_\_  
For what company or organization were you last examined? \_\_\_\_\_ Address of Physician \_\_\_\_\_  
City, State \_\_\_\_\_

24. Have you ever had any of the following? If so, give approximate date:

Yes No Give Date  
  Chest X-Ray \_\_\_\_\_  
  Longbone Series \_\_\_\_\_  
  Back (Spine) X-Ray \_\_\_\_\_  
  ENG \_\_\_\_\_  
  EEG \_\_\_\_\_  
  EMG \_\_\_\_\_

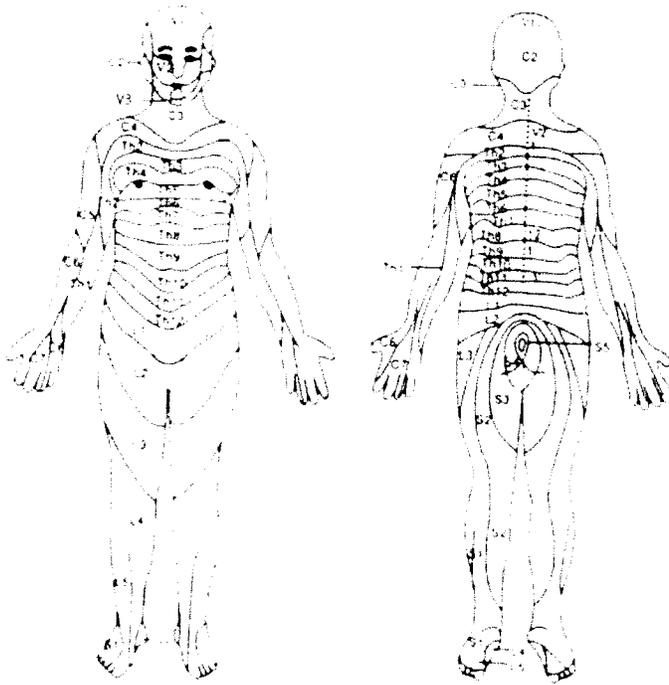
Yes No Give Date  
  Nerve Condition Studies \_\_\_\_\_  
  Pulmonary Function Studies \_\_\_\_\_  
  Audiogram \_\_\_\_\_  
  EKG \_\_\_\_\_  
  Exercise (Stress) EKG \_\_\_\_\_  
  MRI \_\_\_\_\_

25. Physician Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I CERTIFY THAT I HAVE REVIEWED THE FOREGOING INFORMATION SUPPLIED BY ME AND THAT IT IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT LEAVING OUT OR MISREPRESENTING FACTS CALLED FOR ABOVE MAY BE CAUSE FOR REFUSAL OF EMPLOYMENT OR SEPARATION FROM THE COMPANY. I AUTHORIZE ANY OF THE DOCTORS, HOSPITALS, OR CLINICS MENTIONED ABOVE TO FURNISH THE COMPANY MEDICAL EXAMINER WITH A COMPLETE TRANSCRIPT OF MY MEDICAL RECORD FOR PURPOSES OF PROCESSING MY PHYSICAL EXAM.

Date 4/4/17 Signature \_\_\_\_\_

Well exam



**LABORATORY FINDINGS**

<b>53. Urinalysis</b> Color _____ Appearance <u>WNL</u> Sp. Gravity _____ Ph _____	Sugar _____ Blood _____ Ketones _____ Bilirubin _____ Protein _____	<table border="1"> <tr> <th>0</th> <th>1+</th> <th>2+</th> <th>3+</th> <th>4+</th> </tr> <tr> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	0	1+	2+	3+	4+	✓					<b>54. Blood Tests</b> <u>NA</u> CBC <u>NA</u> Normal <input type="checkbox"/> Abnormal <input type="checkbox"/> Sickle Cell <input type="checkbox"/> Pos <input type="checkbox"/> Neg	Attach Reports RPR <input type="checkbox"/> Pos <input type="checkbox"/> Neg HIV <input type="checkbox"/> Pos <input type="checkbox"/> Neg													
		0	1+	2+	3+	4+																					
✓																											
<b>55. Pulmonary Function</b> <u>NA</u> FVC _____ FEV1 _____ FEV1/FVC _____	<b>56. X-rays</b> <u>NA</u> Chest <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Lumbar Spine <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Long Bone Series <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Other _____	(Describe) _____ _____ _____																									
<b>57. Electrocardiogram</b> <u>NA</u> Static _____ Exercise Stress _____	<b>58. Audiogram</b> <table border="1"> <tr> <th>Hz</th> <th>500</th> <th>1000</th> <th>2000</th> <th>3000</th> <th>4000</th> <th>6000</th> <th>8000</th> </tr> <tr> <td>Left</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Right</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Hz	500	1000	2000	3000	4000	6000	8000	Left								Right									
Hz	500	1000	2000	3000	4000	6000	8000																				
Left																											
Right																											
<b>59. Comprehensive Metabolic Panel</b> Attach Report <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <input type="checkbox"/>	<b>Lipid Panel</b> (if done) Normal <input type="checkbox"/> Abnormal <input type="checkbox"/>	Comments: _____ _____																									
		<b>60. Drug Screen</b> <input type="checkbox"/> Not collected <input type="checkbox"/> Collected, results sent to employer																									

**Work Status:**

- Fit for diving
  - Cleared for supervisor
  - Cleared for topside work only
  - Cleared with restrictions: \_\_\_\_\_
  - Further evaluation needed: \_\_\_\_\_
  - Unfit for diving: \_\_\_\_\_
  - Unfit \_\_\_\_\_
- Comments: \_\_\_\_\_

Examinee Signature [Signature] / HUFF, JEFFREY

Examinee Name [Signature]

Physician Signature G. Alexis Shosenko, D.O.

Physician Name 995 Senator Keating Blvd.

Address Building E, Suite 3100  
Rochester, NY 14618  
(585) 473-1750

Phone Number \_\_\_\_\_

AVIATION MEDICAL EXAMINER

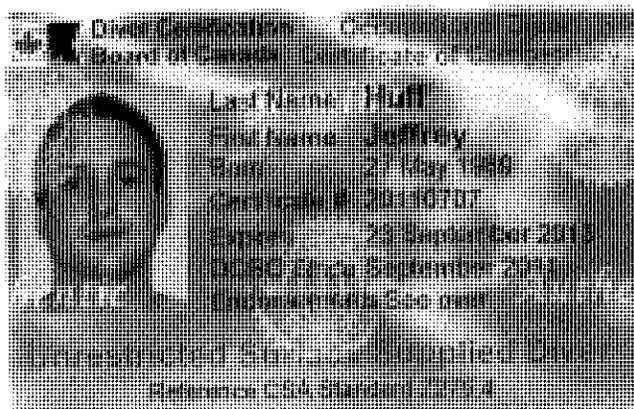
#25127-4

Date of Examination

4-4-13



**Association of  
Commercial  
Diving  
Educators**



**COMMERCIAL DIVER**

ACDE Accredited School	Date	Cert. No.
COMMERCIAL DIVING ACADEMY	9/23/11	10697

**JEFFREY HUFF**

**Certifications for  
First Aid / CPR / AED / O<sub>2</sub>**

Jeff Huff 5/24/11  
Provider's Name **NASE** Issue Date  
(valid for 24 months from issue date)

Provider's Signature

[www.naseworldwide.org](http://www.naseworldwide.org)

## Medical Notes

Blood Group: \_\_\_\_\_

Allergies: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Any other informatin which would be of assistance in an emergency.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Medical Certificate

Full Name of Diver/Supervisor: Cody Shires

Date of Medical Exam (dd/month/yyyy): 04/03/2013

Date of X-Ray Exam: 04/03/2013

Result of Medical Exam: **FIT**/~~UNFIT~~

\_\_\_\_\_  
\_\_\_\_\_

Medical Restriction on Diving or Compression (if applicable):

None  
\_\_\_\_\_  
\_\_\_\_\_

Duration of Validity of Certificate: 2yrs

Date of Commencement (dd/month/yyyy): 04/03/2013

Date of Expiry (dd/month/yyyy): 04/03/2015

Name of Physician: Daniel Matricia, D.O.

Address of Physician: Certified UHMS

Amelia Urgent Care

510 Airport Center Dr

Jacksonville, FL 32218

904-696-0055

Telephone number of Physician: \_\_\_\_\_

Signature of Physician: 



**Association of  
Commercial  
Diving  
Educators**



<b>ACDE Accredited School</b>	<b>Date</b>	<b>Cert. No.</b>
CDA TECHNICAL INSTITUTE (COMMERCIAL DIVING ACADEMY)	7/26/13	12141
<b>CODY SHIRES</b>		

**Diver Certification Board of Canada**    **Occupational Diver Certificate of Competency**



Last Name **Shires**  
 First Name **Cody T.**  
 Born **06 January 1992**  
 Certificate # **20130684**  
 Expires **26 July 2015**  
 DCBC Since **June 2013**  
 Endorsements **See over**

**Unrestricted Surface Supplied Diver**  
 Reference CSA Standard Z275.4

**Certifications for  
First Aid / CPR / AED / O<sub>2</sub>**

*C. Shires*      **NASE**      *3/11/13*  
 Provider's Name      Issue Date  
(valid for 24 months from issue date)

\_\_\_\_\_  
 Provider's Signature

**www.naseworldwide.org**

NASE Instructor Signature

---

*[Signature]*

This individual has successfully completed NASE Worldwide's First Aid, CPR, AED and Oxygen Provider programs and is prepared to respond to workplace diving emergency. This course includes training in Oxygen First Aid, AED use, First Aid for Hazardous Marine Life, CPR First Aid and Blood-Bone Pathogens.

*"Protecting the Health of Your Business"*

## Fit For Diving

### Commercial Diver's Medical Fitness Certification

Employee Name: Jordan James Johnston Date of Birth: 6/5/1983

Company: Precon Marine Examination Date: 6/21/2013

#### Reason for Examination:

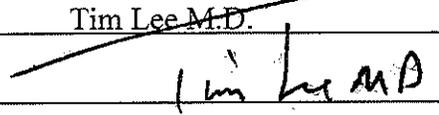
- Initial Examination  
 Renewal Examination  
 Re-Examination following a Serious Diving Injury or Illness  
 Other \_\_\_\_\_

The Commercial Diver identified above has been examined this day in accordance with the Association of Diving Contractors, International Medical History and Physical Examination Form(s). As the examining physician, I have determined and certify this person to be-

- Fit for Diving  
 Cleared for Topside Operations only  
 Cleared with the following restrictions \_\_\_\_\_  
\_\_\_\_\_  
 Unfit for Diving \_\_\_\_\_

This certification shall expire 12 months from the above date or sooner in the event of a serious diving injury or illness.

Medical Provider (Print): Tim Lee M.D.

Signature: 

Date: 6/21/13



**Association of Diving Contractors**

**International**

**Cert. # 40361**

**Expires 08/16/2013**



**ENTRY LEVEL TENDER/DIVER**

**Jordan J. Johnston I.D. 3009**

**Commercial Diver Certification Card**



**T  
W  
I  
C™**

**JOHNSTON,  
JORDAN J**

**Expires  
04AUG2016**



**Transportation Worker Identification Credential**



## Oxygen First Aid for Scuba Diving Injuries

Jordan Johnston

Has fulfilled all of the educational and practical requirements for providing emergency oxygen first aid in the event of a diving emergency and is recognized as a DAN Oxygen Provider.

We, the undersigned, on the 06 day of 23, 2013 endorse this certificate to be valid for 24 months.

Douglas  
Director of Education  
Alert Network

DAN Instructor  
Instructor Number 14021



## Basic Life Support and First Aid

JORDAN J. JOHNSTON

Has fulfilled all of the educational and practical requirements for providing basic life support and first aid and is recognized as a Basic Life Support and First Aid Provider.

We, the undersigned, on the 06 day of 22, 2013 endorse this certificate to be current valid. Certification expires after 24 months.

Douglas  
Director of Education  
Alert Network

DAN Instructor  
Instructor Number 14021

*"Protecting the Health of Your Business"*

## Fit For Diving

### Commercial Diver's Medical Fitness Certification

Employee Name: Jessica Fuller Date of Birth: 1-14-1987

Company: Recon Marine Examination Date: 1-28-13

#### Reason for Examination:

- Initial Examination
- Renewal Examination
- Re-Examination following a Serious Diving Injury or Illness
- Other \_\_\_\_\_

The Commercial Diver identified above has been examined this day in accordance with the Association of Diving Contractors, International Medical History and Physical Examination Form(s). As the examining physician, I have determined and certify this person to be-

- Fit for Diving
- Cleared for Topside Operations only
- Cleared with the following restrictions \_\_\_\_\_
- Unfit for Diving \_\_\_\_\_

This certification shall expire 12 months from the above date or sooner in the event of a serious diving injury or illness.

Medical Provider (Print): Timothy Lee, MD.

Signature: [Signature]

Date: 1-28-13

Taylor Made Diagnostics is SWaM certified (small, woman-owned business)

801 Poindexter Street, Suite 218, Chesapeake, VA 23324

Office: 757-494-1688 Fax: 757-494-1973

www.tmdocmed.com

*"Protecting the Health of Your Business"*

## OSHA MEDICAL RECOMMENDATION FOR RESPIRATOR USE

### *Section 1: Employee Complete*

*Protecting  
Health  
of  
Your  
Business*

COMPANY: Precon Marine

EMPLOYEE: Jessica T Fuller

SSN: XXX-XX-8971

DATE OF QUESTIONNAIRE: 1/28/2013

### *Section 2: Medical Provider Complete*

29 CFR 1910.134(e)(6)(i)(A)

Based on the answers presented to questions on the OSHA "Respirator Medical Evaluation Questionnaire" -- (Appendix C to Section 1910.134) -- the above employee is:

Not restricted on use of respirators identified by the company for clearance.

Restricted to use only the types of respirator(s) indicated:

Open Circuit SCBA (e.g. Scott Airpack)

Supplied Air Respirator (air-line)

Air-Purifying (non-powered, cartridge)

Closed Circuit SCBA (rebreather)

Combination Air-Line and SCBA

Air-Purifying (powered, cartridge)

Subject to other restrictions for respirator use as follows:

Not permitted to use a respirator, unless cleared through Primary Care Provider

Not permitted to use a respirator.

29 CFR 1910.134(e)(6)(i)(B)

Recertification exam is required in 1 year(s). Employee/Company understands if any medical condition arises, immediate reevaluation is required by Taylor Made Diagnostics.

29 CFR 1910.134(e)(6)(i)(C)

The employee ( has) or ( has not) been provided a copy of this certificate or a wallet size certificate.

Physician's Signature: \_\_\_\_\_

Albert Molina, PA

Date: \_\_\_\_\_

1/29/13

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Office: 757-494-1688 Fax: 757-494-1973

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*"Protecting the Health of Your Business"*

## OSHA MEDICAL RECOMMENDATION FOR RESPIRATOR USE

### *Section 1: Employee Complete*

*Protecting  
Health  
of  
Your  
Business*

COMPANY: Precon Marine

EMPLOYEE: Jessica T Fuller

SSN: XXX-XX-8971

DATE OF QUESTIONNAIRE: 1/28/2013

### *Section 2: Medical Provider Complete*

29 CFR 1910.134(e)(6)(i)(A)

Based on the answers presented to questions on the OSHA "Respirator Medical Evaluation Questionnaire" -- (Appendix C to Section 1910.134) -- the above employee is:

Not restricted on use of respirators identified by the company for clearance.

Restricted to use only the types of respirator(s) indicated:

Open Circuit SCBA (e.g. Scott Airpack)

Supplied Air Respirator (air-line)

Air-Purifying (non-powered, cartridge)

Closed Circuit SCBA (rebreather)

Combination Air-Line and SCBA

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Subject to other restrictions for respirator use as follows:

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Not permitted to use a respirator.

29 CFR 1910.134(e)(6)(i)(B)

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29 CFR 1910.134(e)(6)(i)(C)

The employee ( has) or ( has not) been provided a copy of this certificate or a wallet size certificate.

Physician's Signature: \_\_\_\_\_

Albert Molina, PA

Date: \_\_\_\_\_

1/29/13

Taylor Made Diagnostics is SWaM certified (small, woman-owned business)

801 Poindexter Street, Suite 218, Chesapeake, VA 23324

Office: 757-494-1688 Fax: 757-494-1973

www.tmdocmed.com

American  
Red Cross



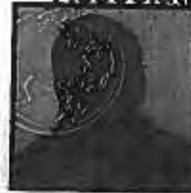
This recognizes that  
**Jessica Fuller**  
has completed the requirements for  
**Administering Emergency Oxygen**  
conducted by  
**Divers Academy International**  
Date completed: **07/02/2012**  
The American Red Cross recognizes  
this certificate is valid from  
completion date for: **2 Years**

American  
Red Cross



This recognizes that  
**Jessica Fuller**  
has completed the requirements for  
**First Aid**  
conducted by  
**Divers Academy International**  
Date completed: **07/02/2012**  
The American Red Cross recognizes  
this certificate is valid from  
completion date for: **2 Years**

**Association of Diving Contractors  
International**



**Cert. # 45218**

**Expires 07/24/2014**



**ENTRY LEVEL TENDER/DIVER**

**Jessica Fuller I.D. 8971**

**Commercial Diver Certification Card**

American  
Red Cross



This recognizes that  
**Jessica Fuller**  
has completed the requirements for  
**Adult CPR**  
conducted by  
**Divers Academy International**  
Date completed: **07/02/2012**  
The American Red Cross recognizes  
this certificate is valid from  
completion date for: **2 Years**



**Association of  
Commercial  
Diving  
Educators**



ACDE Accredited School	Date	Cert. No.
DIVERS ACADEMY	7/24/12	11254

**JESSICA FULLER**

American  
Red Cross



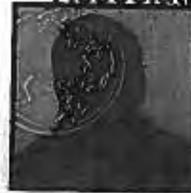
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American  
Red Cross



This recognizes that  
**Jessica Fuller**  
has completed the requirements for  
**First Aid**  
conducted by  
**Divers Academy International**  
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**Association of Diving Contractors  
International**



**Cert. # 45218**

**Expires 07/24/2014**



**ENTRY LEVEL TENDER/DIVER**

**Jessica Fuller I.D. 8971**

**Commercial Diver Certification Card**

American  
Red Cross



This recognizes that  
**Jessica Fuller**  
has completed the requirements for  
**Adult CPR**  
conducted by  
**Divers Academy International**  
Date completed: **07/02/2012**  
The American Red Cross recognizes  
this certificate is valid from  
completion date for: **2 Years**



**Association of  
Commercial  
Diving  
Educators**



ACDE Accredited School	Date	Cert. No.
DIVERS ACADEMY	7/24/12	11254

**JESSICA FULLER**

**30. A.08**

**Dive Logs**

**Dive Logs**

**M. Smith**

# DIVING CHART / AIR



Date: 8/2/2012	Dive # 01	Job # 1107
Diver 1 Martin	STANDBY DIVER Morin	Supervisor Perkoski
tender: Gray	STANDBY TENDER Spruill	Ex. Personnel

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus SL-77
Work Vessel KS-1355	Current .5	visibility 1'	Dive Station SHALLOW AIR

DIVE LOG				Descent Max. 75 fpm / Ascent Max. 30 fpm			
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
Martin	61'	8:46	11:01	2:13			
Bail out 2000PSI							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks		
<b>70/150</b>									
Time To First Stop: 1:36				<b>Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.</b>					
Ascent Rate: 30FPM									
Depth	Reached	Time	Left	Medium	<b>Chamber Decompression</b> Commerce Blowdown: 11:08 Depth Reached: 11:09				
180					Depth	Reached	Time	Left	Medium
170					50	11:10	10	11:20	O2
160					50-40	11:20	10	11:30	O2
150					40	11:30	5	11:35	air
140					40	11:35	20	11:55	O2
130					40	11:55	5	12:00	air
120					40	12:00	11	12:11	O2
110					40-0	12:11	10	12:21	O2
100									
90									
80									
70									
60									
50									
40									
30	11:02	:03	11:05	Air	Start O2 PSI		Finish O2 PSI		
20					750x1PSI		300		
10									
RS	11:06								

Diver Signature: <i>Rex Martin</i>	Date: 8-2-12	Time: 12:21
Supervisor Signature: <i>[Signature]</i>	Chamber Operator: <i>[Signature]</i>	
Work Accomplished: Diver airlifting at work point 2		

# DIVING CHART / AIR



Date: 7/23/12	Dive # 02	Job #
Diver 1 Smith	STANDBY DIVER Stapleton	Supervisor Rohlfing
Tender 1 Miller	STANDBY TENDER PARKER	Ex. Personnel

Location R-6	Sea State CALM	Water Temp 80	Apparatus 17B
Work Vessel JMC 120	Current MOD	Visibility 2'	Dive Station SHALLOW AIR

DIVE LOG								Descent Max. 75 fpm / Ascent Max. 30 fpm	
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group		
J. Smith	63	1051	1249	1:59					

DECOMPRESSION LOG							
Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks

Deco Table: 70/150					Chamber Decompression				
Time To First Stop: N/A					Commerce Blowdown: 1257				
Ascent Rate:					Depth Reached: 1258				
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50	1259	10	1309	02
170					50-40	1309	10	1319	02
160					40	1319	5	1324	AIR
150					40	1324	20	1344	02
140					40	1344	5	1349	AIR
130					40	1349	11	1400	02
120					40-0	1400	10	1410	02
110									
100									
90									
80									
70									
60									
50									
40									
30	1251	03	1254						
20									
10									
RS	1255								

Total Time From Last Water Stop To Chamber Stop Not To Exceed 5 Min.

Diver Signature: <i>Mark S. Smith</i>	Date: 7/23/12	Time:
Supervisor Signature:	Chamber Operator: AUSTIN LESTER <i>Austin Lester</i>	

Work Accomplished: Stone Placement UM 18-16

<b>PRECON Marine</b>	<b>DIVE RECORD</b>		Date:	Dive #
			9/20/12	1204
Customer: <b>KINDER M.</b>	Co. Rep:	Vessel: <b>BARGE</b>	Job# <b>1204 PIER(9)</b>	
Block/Area:	Wind Knots:	Sea State: <b>CALM</b>	Water Temp:	
Current: <b>CALM</b>	Visibility: <b>CLEAR</b>	Bottom: <b>N/A</b>	Work Load: <b>WELDING</b>	

Diver: <b>S. SMITH</b>	Standby Diver:	Rack Operator:	Supervisor: <b>SMITH</b>
Depth: <b>10 FT.</b>	Diver Dress:	Helmet:	Bail Out:
Dive Notice Given:	Pre-Dive Briefing:	Equipment Inspected:	Checklist Completed:
Sur. Air: <b>325</b>	Mixed Gas: <b>N/A</b>	HeO2 Bank PSI:	Start
Leave Surface: <b>7:20 A.M.</b>	Surface Interval:	1:	Finish
Reach Bottom:	Group Before Dive:	2:	
Leave Bottom: <b>3:00 P.M.</b>	Group After Dive:	3:	
Bottom Time: <b>6 HRS</b>	Deco Table:	Nitrox:	
+ Penalty:	Sur. Deco Schedule:	Oxygen:	
Total Bottom Time: Feet: <b>PENATRATION</b>		HP Air:	

**Repet Up Schedule**

Depth	Start Group	Reached	Left	BT	RNT	TBT	Final Group	Remarks	
<b>In Water Decompression</b>					<b>Chamber Decompression</b>				
Time To First Stop:					Commence Blow down:				
Ascent Rate:					Depth Reached:				
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180									
170									
160									
150									
140									
130									
120									
110									
100									
90									
80									
70									
60									
50									
40									
30									
20									
10									
R.S.									

**Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Minutes**

Work Accomplished: <b>WELDING</b>	Date: <b>9/20/12</b>	Time: <b>3:00 P.M.</b>
Diver Signature:	Chamber Operator: <b>N/A</b>	
Supervisor Signature:		





# Single Diver Log

401 Precon Drive, Suite 102  
Chesapeake VA 23320  
P (757) 545-4400  
F (757) 545-2832

No Deco Air Dive

Job Name: K.M

Job Number: \_\_\_\_\_

Job Location: K.M

Dive Supervisor: Allen Cutler

Repet Dive Group: —

Work Description: welding skins to wall

Equipment Used: SL-27

Date: 5-5-13 Time: 1800

Breathing Medium: SSA

Surface Conditions: good

Under Water Conditions: good

Diver Name:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Martin Siff</u>	<u>1900</u>	<u>2300</u>	<u>4 hr</u>	<u>—</u>	<u>10'</u>

Additional Comments: 2000 psi bailout

Dive Supervisor: \_\_\_\_\_

**Dive Logs**

**L. Brightmen**



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Kindel MORGAN

Job Number: 1204

Job Location: Dier 9

Dive Supervisor: MARTIN KANE

Repet Dive Group: \_\_\_\_\_

Work Description: welding

Equipment Used: \_\_\_\_\_

Date: 4/21/13 Time: \_\_\_\_\_

Breathing Medium: Air

Surface Conditions: Calm

Under Water Conditions: Cool

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Lenny Brightman</u>		<u>1519</u>	<u>1600</u>	<u>41</u>	<u>22</u>	<u>10 ft</u>
		<u>1622</u>	<u>1831</u>	<u>129</u>		<u>10 ft</u>

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: KINDER MORGAN

Job Number: 1204

Job Location: PIER 9

Dive Supervisor: \_\_\_\_\_

Repet Dive Group: \_\_\_\_\_

Work Description: WELDING

Equipment Used: KM 17B

Date: 4-22-13 Time: 1200

Breathing Medium: AIR

Surface Conditions: CALM

Under Water Conditions: COLD

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
Lenny BrightMAN		1200	1545	225		12ft
		1632	<del>1500</del> 1900	<del>148</del> 148		12ft

3:45

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Kinder Morgan

Job Number: \_\_\_\_\_

Job Location: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_

Repet Dive Group: \_\_\_\_\_

Work Description: \_\_\_\_\_

Equipment Used: \_\_\_\_\_

Date: 4/23/13 Time: 6:50

Breathing Medium: \_\_\_\_\_

Surface Conditions: \_\_\_\_\_

Under Water Conditions: \_\_\_\_\_

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Lenny B.</u>	<u>5:30 4/23/13</u>	<u>5:50</u>	<u>6:50</u>			

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Song S  
 Job Number: 1215  
 Job Location: Cali  
 Dive Supervisor: M. Smith  
 Repet Dive Group: \_\_\_\_\_  
 Work Description: Dredging  
 Equipment Used: 5120-77

Date: 5-16-13 Time: \_\_\_\_\_  
 Breathing Medium: Surface Supplied  
 Surface Conditions: Swelling  
 Under Water Conditions: good

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reach Bottom:	Left Bottom:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>L. Brightman</u>	<u>—</u>	<u>0800</u>	<u>0801</u>	<u>0929</u>	<u>0930</u>	<u>:90</u>		<u>31'</u>

Additional Comments: \_\_\_\_\_

Dive Supervisor: M. Smith

Diver's Signature: \_\_\_\_\_

**Dive Logs**  
**Travis Gray**

# DIVING CHART / AIR



Date: 8/2/2012	Dive # 01	Job # 1107
Diver 1 Gray	STANDBY DIVER Morin	Supervisor Perkoski
tender: <del>Gray</del> <i>marlin</i> (SP)	STANDBY TENDER <del>Mutter</del> <i>Spud</i> (S)	Ex. Personnel

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus SL-77
Work Vessel KS-1355	Current .5	visibility 1'	Dive Station SHALLOW AIR

DIVE LOG				Descent Max. 75 fpm / Ascent Max. 30 fpm			
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
<b>Gray</b>	61'	11:35	13:29	1:54			
Bail out 200PSI							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks			
70/150					<b>Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.</b>	Chamber Decompression				
Time To First Stop: 1:36						Commerce Blowdown: 13:37				
						Depth Reached: 13:38				
Depth	Reached	Time	Left	Medium		Depth	Reached	Time	Left	Medium
180						50	13:38	10	13:48	O2
170						50-40	13:48	10	13:58	O2
160						40	13:58	5	14:03	air
150						40	14:03	20	14:23	O2
140						40	14:23	5	14:28	air
130						40	14:28	11	14:39	O2
120					40-0	14:39	10	14:49	O2	
110										
100										
90										
80										
70										
60										
50										
40										
30	13:30	:03	13:33	Air						
20										
10										
RS	13:34									

Diver Signature:	Date: 8-2-12	Time: 14:49:03
Supervisor Signature:	Chamber Operator: <i>Rex Martin</i>	

Work Accomplished: Diver airlifting from work point 2.5 to east

# DIVING CHART / AIR



Date: 8/5/2012	Dive # 01	Job # 1107
Diver 1 Gray	STANDBY DIVER Morin	Supervisor Perkoski
tender: Martin	STANDBY TENDER Nutter	Ex. Personnel

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus SL-77
Work Vessel KS-1355	Current .5	visibility 1'	Dive Station SHALLOW AIR

<b>DIVE LOG</b>		Descent Max. 75 fpm / Ascent Max. 30 fpm					
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
Gray	55'	9:54	11:42	1:48			
Bail out 2500							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks		
<b>70/120</b>					<b>Chamber Decompression</b>				
Time To First Stop: 1:36					Commerce Blowdown: 1149				
Ascent Rate: 30FPM					Depth Reached: 1150				
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50	1150	10	1200	O2
170					50-40	1200	10	1210	O2
160					40	1210	5	1215	air
150					40	1215	20	1235	O2
140					40	1235	5	1240	air
130					40	1240	3	1243	O2
120					40-0	1243	10	1253	O2
110					<b>Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.</b>				
100									
90									
80									
70									
60									
50									
40									
30	11:43	:03	11:46	Air					
20									
10									
RS	11:47								

Diver Signature:	Date:	Time:
Supervisor Signature:	Chamber Operator: D. Chang	

Work Accomplished: Diver airlifted duct bank to depth at work point 4

# DIVING CHART / AIR



Date: 8/4/2012	Dive # 01	Job # 1107
Diver 1 Gray	STANDBY DIVER Morin	Supervisor Perkoski
tender: Martin	STANDBY TENDER Spruill	Ex. Personnel

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus SL-77
Work Vessel KS-1355	Current .5	visibility 1'	Dive Station SHALLOW AIR

DIVE LOG		Descent Max. 75 fpm / Ascent Max. 30 fpm					
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
Gray	55'	8:18	10:30	2:12			
Bail out 2000							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks		
70/150				Chamber Decompression					
Time To First Stop: 1:36				Commerce Blowdown: 10:38					
Ascent Rate: 30FPM				Depth Reached: 10:39					
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50	10:39	10	10:49	O2
170					50-40	10:49	10	10:59	O2
160					40	10:59	5	11:04	air
150					40	11:04	20	11:24	O2
140					40	11:24	5	11:29	air
130					40	11:29	11	11:40	O2
120					40-0	11:40	10	11:50	O2
110					Total Time From Last Water Stop To Chamber Stop Not To Exceed 5 Min.				
100									
90									
80									
70									
60									
50									
40									
30	10:31	:03	10:34	Air					
20									
10									
RS	10:35								
Start O2 PSI						Finish O2 PSI			
2000x1PSI						1300 1300			

Diver Signature:	Date: 8-4-12	Time: 11:50
Supervisor Signature:	Chamber Operator:	
Work Accomplished: Diver airlifted 90' from work point 3 to work point 4		



# Simple Diver Log

401 Precon Drive, Suite 102  
Chesapeake VA 23320  
P (757) 545-4400  
F (757) 545-2832

No Deco Air Dive

Job Name: C13BT

Job Number: \_\_\_\_\_

Job Location: Ches Bay

Dive Supervisor: M. Smith

Repet Dive Group: —

Work Description: cut lines out of tugboat

Equipment Used: SL-17, Hack Saw, Knife

Date: 9-12-13 Time: 4pm

Breathing Medium: SSA

Surface Conditions: 2' waves

Under Water Conditions: 2kt current

Diver Name:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Travis Gray</u>	<u>1700</u>	<u>1900</u>	<u>2hr</u>	<u>—</u>	<u>10'</u>

Additional Comments: 1800 psi bail out

Dive Supervisor: M. Smith

**Dive Logs**  
**Austin Lester**

# DIVING CHART / AIR



Date: 8 /25/12	Dive # 01	Job # 1107
DIVER 1 LESTER	STANDBY DIVER POWELL	Supervisor Rohlfing
Tender 1 powell	STANDBY TENDER spruill	Ex. Personnel Kane

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus 37ssKMB
Work Vessel	Current .5	visibility 1'	Dive Station SHALLOW AIR

<b>DIVE LOG</b>		Descent Max. 75 fpm / Ascent Max. 30 fpm					
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
<b>LESTER</b>	60	8:27	10:47	:140			
BAIL OUT 2000psi							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks			
Deco Table: 70/150										
Time To First Stop: N/A										
Ascent Rate:										
Depth	Reached	Time	Left	Medium	Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.	Chamber Decompression				
						Commerce Blowdown: N/A 1055				
						Depth Reached: 1056				
Depth	Reached	Time	Left	Medium		50	1056	10	1106	O2
180						50-40	1106	10	1116	O2
170						40	1116	5	1121	air
160						40	1121	20	1141	O2
150						40	1141	5	1146	air
140						40	1146	11	1157	O2
130						40-0	1157	10	1207	O2
120										
110										
100										
90										
80										
70										
60										
50										
40										
30	10:49	:03	10:52	Air						
20										
10										
RS	10:53									
					Start O2 PSI		Finish O2 PSI			
					1800		1500			

Diver Signature: <i>Austin Lester</i>	Date: 25/8/2012	Time: 1208
Supervisor Signature:	Chamber Operator: OSCAR ROMAN	
Work Accomplished:	<i>[Signature]</i>	

# DIVING CHART / AIR



Date: 7 /5/2012	Dive # 03	Job # 1107
Diver 1 Lester	STANDBY DIVER Miller	Supervisor Rohlfing
Tender 1 Roman	STANDBY TENDER Roman	Ex. Personnel Kane

Location SEWELLS POINT	Sea State: Calm	Water Temp 74	Apparatus 17b KMB
Work Vessel JMC 120	Current .5	visibility 1'	Dive Station SHALLOW AIR

<b>DIVE LOG</b>				Descent Max. 75 fpm / Ascent Max. 30 fpm			
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
<b>Lester</b>	64	13:51	15:08	1:17			
Bail out 2100 Psi							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks			
70/90					<b>Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.</b>	<b>Chamber Decompression</b>				
Time To First Stop: N/A						Commerce Blowdown: N/A				
Ascent Rate:						Depth Reached:				
Depth	Reached	Time	Left	Medium		Depth	Reached	Time	Left	Medium
180						50	1516	10	1526	O2
170						50-40	1526	10	1536	O2
160						40	1536	5	1541	air
150						40	1541	15	1556	O2
140						40-0	1556	10	1607	O2
130										
120										
110										
100										
90										
80										
70										
60										
50										
40										
30	15:09	:03	15:12	Air						
20										
10										
RS	15:13									

Diver Signature: <i>Lester Lester</i>	Date: 7-5-12	Time: 1607
Supervisor Signature:	Chamber Operator: <i>Chris Stepan</i>	
Work Accomplished: Diver		

# DIVING CHART / AIR



7-8-12 //2012	DIVE#2	Job # 1107
LESTER	MILLER	Supervisor Rohlfing
ROMAN	SQUIRES	Ex. Personnel Kane

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus 37ssKMB
Work Vessel JMC 120	Current .5	visibility 1'	Dive Station SHALLOW AIR

<b>DIVE LOG</b>		Descent Max. 75 fpm / Ascent Max. 30 fpm					
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
<b>LESTER</b>	62'	10:55	13:00	2:05			
Bail out 2000 Psi							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks		
70/150					Chamber Decompression				
Time To First Stop: N/A					Commerce Blowdown: N/A				
Ascent Rate:					Depth Reached: 13:10				
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50	13:10	10	13:20	O2
170					50-40	13:20	10	13:40	O2
160					40	13:30	5	13:35	air
150					40	13:35	20	13:55	O2
140					40	13:55	5	14:00	air
130					40	14:00	11	14:11	O2
120					40-0	14:11	10	14:21	O2
110									
100									
90									
80									
70									
60									
50									
40									
30	13:02	:03	13:05	Air					
20									
10									
RS	13:06								

**Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.**

Diver Signature: <i>[Signature]</i>	Date: 7/8/12	Time: 14:21
Supervisor Signature: <i>[Signature]</i>	Chamber Operator: <i>[Signature]</i> KRISKA Sauer	
Work Accomplished: Diver		

# DIVING CHART / AIR



Date: 7 /9/2012	Dive # 01	Job # 1107
Diver 1 lester	STANDBY DIVER stapleton	Supervisor Rohlfing
Tender 1 miller	STANDBY TENDER roman	Ex. Personnel Kane

Location SEWELLS POINT	Sea State: Calm	Water Temp 70	Apparatus 37ssKMB
Work Vessel JMC 120	Current .5	visibility 1'	Dive Station SHALLOW AIR

<b>DIVE LOG</b>		Descent Max. 75 fpm / Ascent Max. 30 fpm					
Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
<b>lester</b>	65	7:58	10:23	2:25			
Bail out 2100 Psi							

## DECOMPRESSION LOG

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks		
+									
Time To First Stop: N/A				<b>Chamber Decompression</b>					
Ascent Rate:				Commerce Blowdown: N/A 1031					
				Depth Reached: 1032					
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50	1032	10	1042	O2
170					50-40	1042	10	1052	O2
160					40	1052	5	1057	air
150					40	1057	20	1117	O2
140					40	1117	5	1122	air
130					40	1122	11	1133	O2
120					40-0	1133	10	1143	O2
110									
100									
90									
80									
70									
60									
50									
40									
30	10:25	:03	10:28	Air					
20									
10									
RS	10:29								

**Total Time From Last Water Stop To Chamber Stop Not To Exceed 5 Min.**

Start O2 PSI		Finish O2 PSI	
900		500	

Diver Signature: <i>Lester</i>	Date: 09/07/2012	Time: 1144
Supervisor Signature: <i>Oscar Roman</i>	Chamber Operator: <i>Oscar Roman</i>	
Work Accomplished: Diver		

**Dive Logs**

**Jeff Huff**



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Kinder Morgan

Job Number: \_\_\_\_\_

Job Location: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_

Repet Dive Group: \_\_\_\_\_

Work Description: Pressure washing cell 16

Equipment Used: \_\_\_\_\_

Date: 4/21/13 Time: \_\_\_\_\_

Breathing Medium: Air

Surface Conditions: Calm

Under Water Conditions: Bad

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>S HUFF 2400 PSI</u>	<u>First Dive w/Precon</u>	<u>0614</u>	<u>0200</u>			

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: KM  
 Job Number: 1204  
 Job Location: Newport News  
 Dive Supervisor: M. Smith  
 Repet Dive Group: N/A  
 Work Description: Painting  
 Equipment Used: SLM/77

Date: 4/26/13 Time: 2130  
 Breathing Medium: Air  
 Surface Conditions: CalM  
 Under Water Conditions: CalM

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Jeff - Huff</u>		<u>2130</u>	<u>0600</u>			

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Songs  
 Job Number: 1215  
 Job Location: Longbeach, Cali  
 Dive Supervisor: M. Smith  
 Repet Dive Group: \_\_\_\_\_  
 Work Description: cleaning - measuring  
 Equipment Used: 5120 - 77

Date: 5-14-13 Time: \_\_\_\_\_  
 Breathing Medium: Surface Supplied  
 Surface Conditions: swelly  
 Under Water Conditions: good

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reach Bottom:	Left Bottom:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
Jeff Holtz	NO	1353	1354	1614	1615	2hr 40 min		

Additional Comments: B/O - 2000 RSS

Dive Supervisor: M. Smith

Diver's Signature: [Signature]



1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

# Single Diver Log

No Deco Air Dive

Job Name: CBBT Fender system  
 Job Number: 1209  
 Job Location: Ches Bay 4th Is.  
 Dive Supervisor: M. Smith  
 Repet Dive Group: —  
 Work Description: Blasting Marine Growth off Fender  
 Equipment Used: SL-27, pressure washer

Date: 5-31-13 Time: 12:30  
 Breathing Medium: SSA  
 Surface Conditions: choppy  
 Under Water Conditions: good

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reach Bottom:	Left Bottom:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<u>Jeff Huff</u>	<u>NO</u>	<u>12:30</u>	<u>12:31</u>	<u>1429</u>	<u>1430</u>	<u>2 hrs</u>	<u>0</u>	<u>10'</u>

Additional Comments: 2100 psi Bsil out

Dive Supervisor: M. Smith

Diver's Signature: \_\_\_\_\_

**Dive Logs**  
**Cody Shires**

**Record of Dive/Supervision**

Date of Dive: 23<sup>rd</sup> July 2013  
 Diver/Supervisor (Choose one) Signature: [Signature]  
 Dive number from diving operation log book: \_\_\_\_\_ Page no. \_\_\_\_\_  
 Name of Client Representative: \_\_\_\_\_  
 Name of Diving Contractor: Deep Water Training Center  
 Address of Diving Contractor: 9481 NW 115th Ave, Ocala FL  
 Dive Location: Ocala, FL Vessel/Installation: Cachalot 330  
 Type of Dive  Scuba  Surface  Supervisor  Other \_\_\_\_\_  
 If Supervisory, list diver names: \_\_\_\_\_

	Dive 1		Dive 2		Dive 3	
Maximum Depth of Dive	<input type="text"/>					
	METRES	FEET	METRES	FEET	METRES	FEET
Time left surface or started pressurization	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Bottom Time	<input type="text"/>					
	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES
Started Decompression	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Decompression completed	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Total Dive time	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES

Breathing apparatus used: Kirby Morgan 77  
 Breathing mixture used: Air  
 Work description, equipment used, remarks: Pre dive visual, JSA/JHA  
BOP 2400 Psi,  
Bell run, Sur DO<sub>2</sub>

Name of decompression schedule used: DCIEM 170/30 Sur DO<sub>2</sub>  
 Note regarding any decompression sickness or other illness or injury: None Noted

Approved and Signed: [Signature]  
 Diving Supervisor of Contractor Representative: Alex Tumaniszwili  
 Signature: [Signature] Date: \_\_\_\_\_

Accumulated Supervisor Time (hrs):  Accumulated Dive Time (hrs):  49  
:2938

**Record of Dive/Supervision**

Date of Dive: 24<sup>th</sup> July 2013  
 Diver/Supervisor (Choose one) Signature: [Signature]  
 Dive number from diving operation log book: \_\_\_\_\_ Page no. \_\_\_\_\_  
 Name of Client Representative: \_\_\_\_\_  
 Name of Diving Contractor: Deep Water Training Center  
 Address of Diving Contractor: 9481 NW 115th Ave, Ocala, FL  
 Dive Location: Ocala, FL Vessel/Installation: Cachalot 330  
 Type of Dive  Scuba  Surface  Supervisor  Other \_\_\_\_\_  
 If Supervisory, list diver names: \_\_\_\_\_

	Dive 1		Dive 2		Dive 3	
Maximum Depth of Dive	<input type="text"/>					
	METRES	FEET	METRES	FEET	METRES	FEET
Time left surface or started pressurization	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Bottom Time	<input type="text"/>					
	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES
Started Decompression	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Decompression completed	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Total Dive time	<input type="text"/>					
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES

Breathing apparatus used: Kirby Morgan 77  
 Breathing mixture used: Air  
 Work description, equipment used, remarks: Pre dive visual, JSA/JHA  
BOP 2500 Psi, Flange project  
Dry suit buoyancy exercises

Name of decompression schedule used: SO/60 DCIEM, SO/60 DCIEM  
 Note regarding any decompression sickness or other illness or injury: None Noted

Approved and Signed: [Signature]  
 Diving Supervisor of Contractor Representative: Alex Tumaniszwili  
 Signature: [Signature] Date: 7/25/13

Accumulated Supervisor Time (hrs):  Accumulated Dive Time (hrs):  51  
:3058

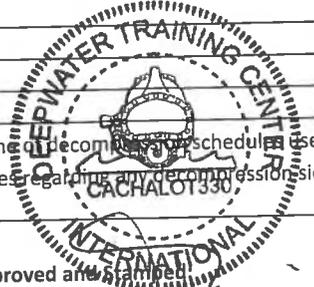
## Record of Dive/Supervision

Date of Dive: 21<sup>st</sup> July 2013  
 Diver/Supervisor (Choose one) Signature: [Signature]  
 Dive number from diving operation log book: \_\_\_\_\_ Page no. \_\_\_\_\_  
 Name of Client Representative: \_\_\_\_\_  
 Name of Diving Contractor: Deep Water Training Center  
 Address of Diving Contractor: 9481 NW 115<sup>th</sup> Ave, Ocala FL  
 Dive Location: Ocala FL Vessel/Installation: Cachalot 330  
 Type of Dive  Scuba  Surface  Supervisor  Other \_\_\_\_\_  
 If Supervisory, list diver names: \_\_\_\_\_

	Dive 1		Dive 2		Dive 3	
Maximum Depth of Dive	<u>132</u>	<u>70</u>				
	METRES	FEET	METRES	FEET	METRES	FEET
Time left surface or started pressurization	<u>10</u>	<u>02</u>	<u>15</u>	<u>19</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Bottom Time		<u>30</u>		<u>36</u>		
		MINUTES		MINUTES		MINUTES
Started Decompression	<u>10</u>	<u>32</u>	<u>15</u>	<u>55</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Decompression completed	<u>11</u>	<u>22</u>	<u>16</u>	<u>30</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Total Dive time		<u>80</u>		<u>71</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES

Breathing apparatus used: Kirby Morgan 77  
 Breathing mixture used: Air  
 Work description, equipment used, remarks: Pre dive visual, JSA/JHA  
BOP 2500 psi  
Straight pipe project

Name of decompression schedule used: 140/30 DCIEM, 70/60 DCIEM  
 Notes regarding any decompression sickness or other illness or injury: None Noted



Approved and stamped:  
 Diving Supervisor or Contractor Representative: Alex Tumaniszwili  
 Signature: [Signature] Date: 7/22/13

Accumulated Supervisor Time (hrs):  Accumulated Dive Time (hrs): 47  
:2818

## Record of Dive/Supervision

Date of Dive: 22<sup>nd</sup> July 2013  
 Diver/Supervisor (Choose one) Signature: [Signature]  
 Dive number from diving operation log book: \_\_\_\_\_ Page no. \_\_\_\_\_  
 Name of Client Representative: \_\_\_\_\_  
 Name of Diving Contractor: Deep Water Training Center  
 Address of Diving Contractor: 9481 NW 115<sup>th</sup> Ave, Ocala FL  
 Dive Location: Ocala, FL Vessel/Installation: Cachalot 330  
 Type of Dive  Scuba  Surface  Supervisor  Other \_\_\_\_\_  
 If Supervisory, list diver names: \_\_\_\_\_

	Dive 1		Dive 2		Dive 3	
Maximum Depth of Dive	<u>132</u>	<u>50</u>				
	METRES	FEET	METRES	FEET	METRES	FEET
Time left surface or started pressurization	<u>10</u>	<u>11</u>	<u>15</u>	<u>45</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Bottom Time		<u>30</u>		<u>60</u>		
		MINUTES		MINUTES		MINUTES
Started Decompression	<u>10</u>	<u>41</u>	<u>16</u>	<u>45</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Decompression completed	<u>11</u>	<u>32</u>	<u>17</u>	<u>09</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES
Total Dive time		<u>81</u>		<u>84</u>		
	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES

Breathing apparatus used: Kirby Morgan 77  
 Breathing mixture used: Air  
 Work description, equipment used, remarks: Pre dive visual, JSA/JHA  
BOP 2500 Psi, Practice knots @  
132', performed inspection  
with MPI & UT gun

Name of decompression schedule used: 140/30 DCIEM, 50/100 DCIEM  
 Notes regarding any decompression sickness or other illness or injury: None Noted



Approved and stamped:  
 Diving Supervisor or Contractor Representative: Alex Tumaniszwili  
 Signature: [Signature] Date: 7/25/13

Accumulated Supervisor Time (hrs):  Accumulated Dive Time (hrs): 48.5  
:2908

**Dive Logs**

**Jordon Johnston**

**BOTTOM CONDITION:** (X appropriate blocks) Sand  Fair  Gravel  Hard  Soft**SEA STATE:** Calm  Fair  Moderate  Heavy  Gale Sea**BOTTOM TEMPERATURE:** Cold (below 55)  Normal (55 to 75)  Warm (above 75)

Vessel or Platform:

**BOTTOM VISIBILITY:** Poor (0 to 5')  Moderate (5' to 20')  Good (20' +)**BOTTOM CURRENT:** Weak (0 to 0.5KT)  Moderate (0.5 to 2)  Strong (2 +)

Vessel or Platform:

CEBBECARR, BBew Jade

	Dive One	Dive Two	Dive Three
<b>Bell Bounce or Surface Dives:</b> Maximum depth of dive: Time left surface or started pressurization: Bottom time: Decompression completed at:	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min
<b>For Surface Decompression Only:</b> Surface interval and time spent in chamber:	[ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] min [ ] [ ] H [ ] [ ] min
<b>Saturation Dives:</b> Storage depth: Maximum depth of dive: Time leaving storage depth: Bottom time:	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min

Breathing Apparatus Used: SuperliteBreathing Mixture Used: AirWork Description, Equipment, and Tools Used: PROP

Record of all Equipment Testing and Maintenance: \_\_\_\_\_

Name of Decompression Schedules Used: No D

Note Regarding Any Decompression Sickness or Any Other Illness or Injury: \_\_\_\_\_

 Penetration Dive Length of Penetration: N/A

Describe Structure: \_\_\_\_\_

**APPROVED**

Name of Diving Contractor: \_\_\_\_\_

Address of Diving Contractor: \_\_\_\_\_

Name of Diving Supervisor (print): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**BOTTOM CONDITION:** (X appropriate blocks) Sand  Fair  Gravel  Hard  Soft**SEA STATE:** Calm  Fair  Moderate  Heavy  Gale Sea**BOTTOM TEMPERATURE:** Cold (below 55)  Normal (55 to 75)  Warm (above 75)

Vessel or Platform:

**BOTTOM VISIBILITY:** Poor (0 to 5')  Moderate (5' to 20')  Good (20' +)**BOTTOM CURRENT:** Weak (0 to 0.5KT)  Moderate (0.5 to 2)  Strong (2 +)

Vessel or Platform:

Yacht transport

	Dive One	Dive Two	Dive Three
<b>Bell Bounce or Surface Dives:</b> Maximum depth of dive: Time left surface or started pressurization: Bottom time: Decompression completed at:	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min [ ] [ ] H [ ] [ ] min
<b>For Surface Decompression Only:</b> Surface interval and time spent in chamber:	[ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] min [ ] [ ] H [ ] [ ] min	[ ] [ ] min [ ] [ ] H [ ] [ ] min
<b>Saturation Dives:</b> Storage depth: Maximum depth of dive: Time leaving storage depth: Bottom time:	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min	[ ] [ ] [ ] feet [ ] [ ] [ ] feet [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min on [ ] [ ] day [ ] [ ] H [ ] [ ] min

Breathing Apparatus Used: ScubaBreathing Mixture Used: AirWork Description, Equipment, and Tools Used: 100ft

Record of all Equipment Testing and Maintenance: \_\_\_\_\_

Name of Decompression Schedules Used: No D

Note Regarding Any Decompression Sickness or Any Other Illness or Injury: \_\_\_\_\_

 Penetration Dive Length of Penetration: N/A

Describe Structure: \_\_\_\_\_

**APPROVED**

Name of Diving Contractor: \_\_\_\_\_

Address of Diving Contractor: \_\_\_\_\_

Name of Diving Supervisor (print): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**BOTTOM CONDITION:** (X appropriate blocks) Sand  Fair  Gravel  Hard  Soft**SEA STATE:** Calm  Fair  Moderate  Heavy  Gale Sea**BOTTOM TEMPERATURE:** Cold (below 55)  Normal (55 to 75)  Warm (above 75)**BOTTOM VISIBILITY:** Poor (0 to 5')  Moderate (5' to 20')  Good (20' +)**BOTTOM CURRENT:** Weak (0 to 0.5KT)  Moderate (0.5 to 2)  Strong (2 +)**Geographic Location:**MIAMI FL, OFFSHORE**Vessel or Platform:**Port Said,**Bell Bounce or Surface Dives:**

Maximum depth of dive:

Time left surface or

started pressurization:

Bottom time:

Decompression

completed at:

**Dive One**    feet H   min  min H   min**Dive Two**    feet H   min  min H   min**Dive Three**    feet H   min  min H   min**For Surface****Decompression Only:**

Surface interval and time

spent in chamber:

  min H   min  min H   min  min H   min**Saturation Dives:**

Storage depth:

Maximum depth of dive:

Time leaving

storage depth:

Bottom time:

    feet    feet H   min on  day H   min on  day H   min    feet    feet H   min on  day H   min on  day H   minBreathing Apparatus Used: RebreatherBreathing Mixture Used: AirWork Description, Equipment, and Tools Used: Work on Rebreather

Record of all Equipment Testing and Maintenance:

Name of Decompression Schedules Used: NO D

Note Regarding Any Decompression Sickness or Any Other Illness or Injury:

 Penetration Dive Length of Penetration: N/A

Describe Structure:

**APPROVED**

Name of Diving Contractor:

Address of Diving Contractor:

Name of Diving Supervisor (print):

Signature:

Date:

**BOTTOM CONDITION:** (X appropriate blocks) Sand  Fair  Gravel  Hard  Soft**SEA STATE:** Calm  Fair  Moderate  Heavy  Gale Sea**BOTTOM TEMPERATURE:** Cold (below 55)  Normal (55 to 75)  Warm (above 75)**BOTTOM VISIBILITY:** Poor (0 to 5')  Moderate (5' to 20')  Good (20' +)**BOTTOM CURRENT:** Weak (0 to 0.5KT)  Moderate (0.5 to 2)  Strong (2 +)**Geographic Location:**MIAMI ANCHORAGE**Vessel or Platform:**Port Said, DUSK**Bell Bounce or Surface Dives:**

Maximum depth of dive:

Time left surface or

started pressurization:

Bottom time:

Decompression

completed at:

**Dive One**    feet H   min  min H   min**Dive Two**    feet H   min  min H   min**Dive Three**    feet H   min  min H   min**For Surface****Decompression Only:**

Surface interval and time

spent in chamber:

  min H   min  min H   min  min H   min**Saturation Dives:**

Storage depth:

Maximum depth of dive:

Time leaving

storage depth:

Bottom time:

    feet    feet H   min on  day H   min on  day H   min    feet    feet H   min on  day H   min on  day H   minBreathing Apparatus Used: seperintcBreathing Mixture Used: AirWork Description, Equipment, and Tools Used: Inspect and Clean scuba

Record of all Equipment Testing and Maintenance:

Name of Decompression Schedules Used: NO D

Note Regarding Any Decompression Sickness or Any Other Illness or Injury:

 Penetration Dive Length of Penetration: N/A

Describe Structure:

**APPROVED**

Name of Diving Contractor:

Address of Diving Contractor:

Name of Diving Supervisor (print):

Signature:

Date:

**Dive Logs**

**J. Fuller**

# DIVING CHART / AIR



Date: <b>3-8-13</b>	Dive # <b>1</b>	Job # <b>SHOP BARGE</b>
Diver 1 <b>FULLER</b>	STANDBY DIVER <b>OSKAR</b>	Supervisor <b>KANG</b>
Tender 1 <b>CJ</b>	STANDBY TENDER <b>SMITH</b>	Ex. Personnel

Location <b>Precor MARINE</b>	Sea State: <b>10W</b>	Water Temp <b>30</b>	Apparatus <b>K-bottle</b>
Work Vessel <b>BARGE</b>	Current	visibility <b>0</b>	Dive Station <b>TRUCK</b>

**DIVE LOG** Descent Max. 75 fpm / Ascent Max. 30 fpm

Diver	Depth	LS	LB	BT	RNT	TBT	Rep Group
	<b>20'</b>						

**DECOMPRESSION LOG**

Depth	Start Group	Reached	Left	BT	RNT	Final Group	Remarks

Deco Table:					Chamber Decompression				
Time To First Stop: N/A					Commerce Blowdown: N/A				
Ascent Rate:					Depth Reached:				
Depth	Reached	Time	Left	Medium	Depth	Reached	Time	Left	Medium
180					50		10		O2
170					50-40		10		O2
160					40		5		air
150					40		20		O2
140					40		5		air
130					40		11		O2
120					40-0		10		O2
110									
100									
90									
80									
70									
60									
50									
40									
30									
20									
10									
RS									

**Total Time From Last Water Stop To First Chamber Stop Not To Exceed 5 Min.**

Diver Signature: <i>Jon Z...</i>	Date:	Time:
Supervisor Signature:	Chamber Operator:	

Work Accomplished: **Rig 12,500 pound plate - with crane out of the water**



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Kinder Morgan  
 Job Number: 1204  
 Job Location: Pier 9  
 Dive Supervisor: M. KANE

Date: 4-25-13 Time: \_\_\_\_\_  
 Breathing Medium: Air  
 Surface Conditions: Calm  
 Under Water Conditions: COOL

Repet Dive Group: \_\_\_\_\_  
 Work Description: stuffing foam installies  
gullbone plates  
 Equipment Used: KM 77

Diver Name:	Last Dive within 48 Hours:	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
Jessica filler		0930	1135	125	—	12 ft

Additional Comments: \_\_\_\_\_

Dive Supervisor: \_\_\_\_\_



# Single Diver Log

1401 Precon Drive, Suite 102  
 Chesapeake VA 23320  
 P: (757) 545-4400  
 F: (757) 545-2832

No Deco Air Dive

Job Name: Kinder Morgan  
 Job Number: 1204

Job Location: Newport News

Dive Supervisor: Buddy KANE

Repet Dive Group: N/A

Work Description: cleaning

Equipment Used: 37 / RACK

Date: 4/22/13 Time: 7:22  
 Breathing Medium: Surface supplied  
 Surface Conditions: CALM  
 Under Water Conditions: CALM

Diver Name:	Last Dive within 48 Hours: <sup>mk</sup>	Left Surface:	Reached Surface:	TBT:	Surface Interval:	Max Depth:
<del>GRAB SERVICES</del>	<del>6:50 4/21/13</del>					
Jessica Fuller	N/A	8:05	10:25 5:25 min	17' / 12'	→	

Additional Comments: \_\_\_\_\_

Dive Supervisor: Buddy KANE



