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FINAL REMOVAL ACTION WORK PLAN AT AREA OF CONCERN 7 ( AOC 7) FISC  
WILLIAMSBURG VA  
07/01/2015  
TETRA TECH EC INC

**DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC  
REMEDIAL ACTION CONTRACT (RAC)  
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**FINAL  
REMOVAL ACTION WORK PLAN  
REMOVAL ACTION AT AOC 7  
NAVAL WEAPONS STATION, YORKTOWN – CHEATHAM ANNEX  
WILLIAMSBURG, VIRGINIA**

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Prepared for



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## ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
APP	Accident Prevention Plan
bgs	below ground surface
BMP	Best Management Practice
CAX	Cheatham Annex
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Contaminant of Potential Concern
CPR	Contractor Production Report
CTO	Contract Task Order
DRO	Diesel Range Organic
EE/CA	Engineering Evaluation / Cost Analysis
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
E&S	Erosion and Sedimentation
FISC	Fleet and Industrial Supply Center
ft	feet/foot
GRO	Gasoline Range Organic
lft	lineal feet
mg/kg	milligram per kilogram
MSDS	Material Safety Data Sheet
Navy	United States Department of the Navy
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	Non-Time Critical Removal Action
OSR	Off Site Rule
PCB	Polychlorinated Biphenyls
PM	Project Manager
POC	Point of Contact
PQCP	Project Quality Control Plan
PQCM	Project Quality Control Manager
PRG	Preliminary Remediation Goal
QC	Quality Control
RAC	Remedial Action Contract
RAWP	Remedial Action Work Plan
R/C/I	Reactivity/Corrosivity/Ignitability
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDS	Safety Data Sheet
sf	square foot
SHPO	State Historic Preservation Office
SI	Site Inspection

SSHO	Site Safety and Health Officer
SVOC	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
T&D	Transportation and Disposal
TPH	Total Petroleum Hydrocarbon
TtEC	Tetra Tech EC, Inc.
VESCH	Virginia Erosion and Sediment Control Handbook
VOC	Volatile Organic Compound
WMP	Waste Management Plan
WPNSTA	Naval Weapon Station

## **1.0 INTRODUCTION**

Tetra Tech EC, Inc. (TtEC) has been contracted by the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic under Remedial Action Contract (RAC) N62470-13-D-8007, Contract Task Order (CTO) WE35 to perform a Non-Time Critical Removal Action (NTCRA) at Area of Concern (AOC) 7 at Naval Weapons Station (WPNSTA) Yorktown – Cheatham Annex (CAX) located in Williamsburg, Virginia. The NTCRA at AOC 7 will include removal action activities for the Drum Disposal Area Hot Spot and Can Pit per the revised Statement of Work, dated September 22, 2014, and as described in the Engineering Evaluation/Cost Analysis (EE/CA) (CH2M Hill, 2014b) and Action Memorandum (CH2M Hill, 2014a). This Removal Action Work Plan (RAWP) and supporting appendices present the operational approach for the successful completion of the project.

The NTCRA will be performed in accordance with the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA), as amended, the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

### **1.1 Location and Background Information**

CAX is located on the site of the former Penniman Shell Loading Plant, a large powder and shell loading facility operated by the DuPont Company during World War I, which closed in 1918 and was dismantled shortly thereafter. Between 1923 and 1943, the property was used for farming or remained idle until CAX was commissioned in 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities and to serve as an assembly and overseas shipping point during World War II. The facility is divided into two separate parcels, with the larger parcel situated along the banks of the York River. Almost all of the activities at CAX (administration, training, maintenance, support, and housing) take place in the larger parcel. The smaller parcel is used mainly as a watershed protection area. In 1987, CAX was designated as the Hampton Roads Navy Recreational Complex. In 1998, control of CAX was transferred from Fleet and Industrial Supply Center (FISC) to WPNSTA Yorktown. The current mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel.

AOC 7 is located along a nature trail that runs through a wooded area located behind the CAX warehouse area and south of one of the southern fingers of the Cheatham Pond. AOC 7 was identified in April 2004 when the Navy discovered two small debris disposal areas in this wooded area. One of the debris disposal areas, referred to as the Drum Disposal Area, contained several empty, rusted pails and two empty, rusted 55-gallon drums on the ground surface. The other debris disposal area, referred to as the Can Pit, is an approximately 30-foot by 20-foot pit open to a depth of 4 feet below ground surface (bgs). The Can Pit contained numerous empty, 5-gallon rusted cans labeled “tetrachloroethane” on the ground surface within the pit. A pile of soil, assumed to be the soil excavated to create the Can Pit, is located immediately adjacent to the Can Pit. The Drum Disposal Area and Can Pit are two separate areas within AOC 7. They are located on opposite ends of AOC 7, roughly 300 feet apart. There are no wetlands or surface water bodies located within AOC 7. The topography generally slopes northeast towards Cheatham Pond, and

surface runoff is expected to flow northeast to the Pond as well. A facility and site location map is included as Figure 1.

## **1.2 Summary of Previous Activities**

In March and April 2006, a housekeeping effort was performed to remove the surface debris from the Drum Disposal Area and Can Pit. Following the housekeeping removal effort, all recovered surface debris from AOC 7 was transported offsite for proper disposal (Shaw, 2006). The Can Pit was encircled with an orange safety fence and left open following the housekeeping removal effort.

A Site Inspection (SI) conducted at AOC 7 in October 2008 identified potential unacceptable risk to human health and the environment posed by exposure to contaminants in surface soil and subsurface debris. No surface debris remains at AOC 7. Some subsurface debris is still present within the Can Pit. No debris was identified in test pits dug outside of the Can Pit or Drum Disposal Area. The human health and ecological risk screenings conducted as part of the SI concluded there is potential risk to human or ecological receptors. Potential unacceptable human health risks were identified from exposure to inorganics in surface soil at both areas of AOC 7. In addition, the Tier 1 Partnering Team has made an educated assumption that subsurface debris within the Can Pit presents the potential for future impacts to site media, and is, therefore, assumed to pose a potential future risk to human health. An unacceptable carcinogenic risk is also associated with arsenic and chromium (assumed to be in the hexavalent form). Potentially unacceptable ecological risks were identified from exposure to lead and manganese in surface soil within the Can Pit and lead, manganese, and zinc in surface soil at a localized hotspot in surface soil at the Drum Disposal Area.

In 2014, an EE/CA (CH2M Hill, 2014b) for a NTCRA at AOC 7 was completed to evaluate removal action alternatives. Following review of the EE/CA and agreement for the selection of EE/CA Alternative 3 by the Tier I Partnering Team, an Action Memorandum (CH2M Hill, 2014a) was prepared to document approval of the NTCRA at AOC 7 for addressing surface soil and subsurface debris. Both documents were then submitted for a public review and comment period.

## **1.3 Summary of Project Activities**

The major components of the NTCRA are listed below and are discussed further in Section 3.0.

- Sampling Activities,
- Mobilization and Site Preparations,
- Excavation of Soil and Debris,
- Transportation and Disposal (T&D) of Waste,
- Site Restoration, and
- Demobilization.

## **1.4 Project Schedule**

Activity-specific timelines and critical paths are presented in the Project Schedule located in Appendix A.

## **1.5 Plan Organization**

The remainder of this RAWP is organized as follows:

- Section 2.0: Addresses project management and planning activities.
- Section 3.0: Describes field activities that will be performed in support of the NTCRA.
- Section 4.0: Presents the Stormwater Pollution Prevention Plan (SWPPP).
- Section 5.0: Presents the Waste Management Plan (WMP).
- Section 6.0: Presents the Environmental Protection Plan (EPP).
- Section 7.0: Presents references used in preparation of this RAWP.
- Appendix A: Presents the project schedule.
- Appendix B: Presents the Accident Prevention Plan (APP).
- Appendix C: Presents the Project Quality Control Plan (PQCP).
- Appendix D: Presents the Sampling and Analysis Plan (SAP).

## **2.0 PROJECT MANAGEMENT AND PLANNING**

### **2.1 Key Personnel**

TtEC personnel involved in the successful completion of this project include the Project Manager (PM), Project Superintendent, Project Quality Control Manager (PQCM), and Site Safety and Health Officer (SSHO).

#### **2.1.1 Project Manager**

The PM will ensure compliance with the RAWP and is the project team point of contact (POC) with the Navy. The PM is responsible for managing the day-to-day project activities, ensuring documentation and deliverables meet contract requirements, monitoring costs and accounting, and controlling the overall schedule.

The Contract Administration Manager and Project Controls Manager will support the PM with contractual and budget issues. The Contract Administration Manager is the POC with the Navy Contracting Officer and ensures compliance with prime contract requirements. The Project Controls Manager is responsible for accumulating project costs expended to date, forecasting costs to completion, preparing monthly invoices, and maintaining and updating the project schedule.

#### **2.1.2 Project Superintendent**

The Project Superintendent will report directly to the PM and is responsible for daily oversight of field activities, interface with facility personnel, and obtaining necessary permits. The Project Superintendent is responsible for conformance of all site work with requirements and procedures identified in the APP (Appendix B) and the PQCP (Appendix C). In addition, the Site Superintendent will complete a daily Contractor Production Report (CPR).

### 2.1.3 Project Quality Control Manager

The PQCM is responsible for implementation of the PQCP and reports directly to the Quality Control (QC) Program Manager. The PQCM will conduct the three phases of inspection, conduct surveillance of site activities, prepare Daily QC Reports, and conduct QC meetings. The PQCM will attend and assist the Navy at the pre-final inspection and the final acceptance inspection. The PQCM has the authority to stop work. For this project, the Project Superintendent will also serve as the PQCM.

### 2.1.4 Site Safety and Health Officer

The SSHO is responsible for implementing the APP to satisfy that federal, state, and local regulations are consistent with site conditions and activities. The SSHO will oversee the day-to-day activities to ensure that work is in compliance with the APP. For this project, the Project Superintendent will also serve as the SSHO.

## 2.2 **Subcontractors**

As part of the implementation of field activities, various subcontractors will be utilized throughout the project duration. Subcontractor services may include site setup, clearing, utility locating, excavation, T&D of waste, and site restoration.

## 2.3 **Meetings, Plans, and Reports**

This section describes meetings that will be conducted, plans that have been prepared, and reports that will be submitted during the implementation of the NTCRA at AOC 7.

### 2.3.1 Pre-Construction and Mutual Understanding Meeting

Prior to the start of construction activities, a pre-construction and mutual understanding meeting will be attended by TtEC representatives to: Discuss the planned work activities and schedule, establish lines of communication, address facility and site access requirements, address site logistics, confirm work hours, review reporting requirements, and discuss other pertinent site information.

### 2.3.2 QC Progress Meetings

QC Progress meetings will be held on a regular basis to discuss work progress, submittal status, and any quality issues. Invitees will include representatives from NAVFAC, CAX, TtEC, and any other pertinent personnel. The TtEC PQCM will prepare and distribute the meeting agenda and minutes.

### 2.3.3 Pre-Construction Plans

Plans prepared as part of the pre-construction effort include this RAWP and the supporting Site Plan, Traffic Plan, SWPPP, WMP, EPP, APP, PQCP, and SAP. The Site Plan and Traffic Plan

are described below and the remaining plans are included as appendices to this RAWP as noted in Section 1.5.

#### *2.3.3.1 Site Plan*

The proposed site plan is included as Figure 2. The site plan identifies the work area, support areas, and lay-down areas that will be used during the field activities. High-visibility fencing, barriers, and signage will be used to restrict access to the site as necessary. Proposed locations for the support and lay-down areas will be subject to approval by the Navy.

#### *2.3.3.2 Traffic Plan*

Personnel vehicles, vendor delivery trucks, and material haul trucks will gain access to CAX via the main gate located on Sanda Avenue and proceed to the site using the route shown on Figure 3. All vendor delivery trucks and material haul trucks will be required to go through the truck inspection station at the Yorktown Naval Weapons Station prior to gaining access aboard CAX. Access to AOC 7 will be provided by a temporary stone haul road starting at the security fence adjacent to the warehouse area between Buildings WH-13 and WH-14 and following the nature trail to AOC 7. Traffic controls will be implemented as necessary to provide for the safe passage of vehicles, minimize impact to facility operations, and enable field activities to be completed in an efficient and safe manner. On-site traffic patterns will be established, spotters will be used, and signage will be placed as appropriate.

#### 2.3.4 Daily Reports

A daily CPR and QC Report will be completed whenever on-site activities occur and will be submitted to pertinent personnel as determined at the pre-construction meeting. Copies of the daily reports will be retained in the project files.

#### 2.3.5 Post-Removal Report

Upon completion of all field activities, a Post-Removal Report will be prepared to document site activities. The report will document the details of the activities conducted to complete the NTCRA and will include text, tables, photos, and figures to present the results of the project. The text will include a summary of the field activities, a description of each project task, and any problems encountered along with corrective measures. The results of the site surveys including the pre-construction, post-excavation, and final site conditions will be included. Analytical reports and data summary tables will be included as well as all waste disposal documentation.

An internal draft Post-Removal Report will be submitted to the Navy for review and comment following the completion of field activities. Following Navy review, comments will be addressed and incorporated into a draft report for regulatory review. Upon receiving regulatory review, comments will be addressed and incorporated into a final report submitted to all pertinent parties.

### 3.0 FIELD ACTIVITIES

This section details the project activities that will be implemented by TtEC and its subcontractors to complete the NTCRA. Field activities include sampling, mobilization and site setup, excavation, T&D of waste, site restoration, and demobilization.

#### 3.1 Sampling Activities

Sampling activities shall include pre-excavation confirmation sampling at the Drum Disposal Area Hot Spot, clean fill verification sampling, and waste disposal characterization sampling. It is anticipated that all sampling activities will occur prior to full mobilization such that the Drum Disposal Area is fully delineated, clean fill is approved, and landfill waste acceptance approval is obtained prior to commencing removal activities. Confirmation sampling and analysis at the Can Pit is not required since visual confirmation of encountering native soil will determine successful completion of that excavation.

##### 3.1.1 Pre-Excavation Confirmation Sampling

Pre-excavation confirmation samples will be collected to delineate the horizontal extent of excavation required at the Drum Disposal Area. The vertical extent of the Drum Disposal Area excavation has been delineated as six inches below ground surface. Confirmation samples will be analyzed by an off-site laboratory for the constituents of potential concern (COPCs) at AOC 7. The COPCs and their respective preliminary remediation goals (PRGs) are shown in Table 3-1.

**Table 3-1 Surface Soil PRGs for the Drum Disposal Area**

COPC	PRG	Reference
Arsenic	6 mg/kg	Maximum Background Soil Concentration
Chromium (hexavalent)	18.3 mg/kg	Maximum Background Soil Concentration
Lead	120 mg/kg	Ecological Soil Screening Concentration
Manganese	340 mg/kg	Maximum Background Soil Concentration
Zinc	120 mg/kg	Ecological Soil Screening Concentration

Notes:  
 mg/kg = milligram per kilogram

Pre-excavation confirmation samples will be collected from 0-6 inches bgs at 25, 30, and 35 foot distances extending radially from previous sample point CAA07-SO03. Eight samples will be collected at each distance, one in each of the cardinal and intermediate directions (i.e. north, northeast, east, southeast, etc.) as shown on Figure 4. All samples will be shipped to an off-site laboratory; however, only the samples at the 25-foot distance will initially be analyzed. If any of the initial samples do not meet the PRGs, the next sample in that direction will be analyzed until the PRGs are met in all directions. If the results of the pre-excavation sampling indicate the removal area is larger than the anticipated 2,000 square feet, the Navy will be notified immediately of the changed condition. Additional details of the pre-excavation confirmation sampling are included in the SAP found in Appendix D.

### 3.1.2 Clean Fill Verification Sampling

Clean fill verification sampling will be performed prior to importing any backfill materials to the site. One representative sample will be collected for each type of material (i.e. common fill and topsoil) from each potential source and shipped to an off-site laboratory for analysis. The clean fill verification samples will be analyzed for the parameters indicated in the table below.

**Table 3-2 Clean Fill Verification Testing Parameters**

<b>Parameter</b>	<b>Analytical Method</b>
Target Compound List (TCL) Volatile Organic Compounds (VOCs)	EPA SW-846 Method 8260B
TCL Semi-Volatile Organic Compound (SVOCs)	EPA SW-846 Method 8270C
TCL Pesticides	EPA SW-846 Method 8081
Polychlorinated Biphenyls (PCBs)	EPA SW-846 Method 8082
Explosives	EPA SW-846 Method 8330B
Herbicides	EPA SW-846 Method 8151
Total Petroleum Hydrocarbons	EPA 600/4-79/020 Method 418.1
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)	EPA SW-846.3-3 Method 5030/8020
Target Analyte List (TAL) Metals (including mercury, cyanide, & hexavalent chromium)	SW-846 3050B/6010C/6020A/7471A

Upon receipt of the laboratory analytical report for each clean fill verification sample, a borrow source assessment report will be prepared and submitted to the Tier I Partnering Team for review. The report will include: Type of material; proposed use of material; name and address of borrow source; quantity available; physical description and origin of the representative material; and a data summary table comparing the results to the established maximum concentrations agreed upon by the Tier I Partnering Team and provided in the SAP (Appendix D). Borrow material will not be imported to the site until approved by the Tier I Partnering Team.

### 3.1.3 Waste Disposal Characterization Sampling

Sampling and analysis will be conducted for the Drum Disposal Area and Can Pit to properly characterize the waste material for off-site transport and disposal. It is anticipated that two waste characterization samples will be collected, one each from the Can Pit and Drum Disposal Area. Each sample will be a five-point composite (discrete grab for VOC analysis) representative of the waste material to be removed and disposed. The samples will be shipped to an off-site laboratory for analysis. Analytical methods will be determined by the disposal facility's acceptance criteria, but are expected to include full toxicity characteristic leaching procedure (TCLP), reactivity/corrosivity/ignitability (R/C/I), PCBs, and Total Petroleum Hydrocarbon (TPH) Diesel Range Organics (DRO)/Gasoline Range Organics (GRO). The sample results will be submitted to the Navy as part of the waste profile package for generator signature by a Navy representative prior to submitting to the proposed landfill for waste acceptance approval. Based on site history

and prior sampling data, it is expected that the soil/debris will be suitable for non-hazardous transport and disposal.

### **3.2 Mobilization and Site Preparations**

#### **3.2.1 Mobilization**

Project personnel, equipment, materials, and temporary facilities will be mobilized to CAX as needed to execute the project activities. Temporary facilities may include an office trailer, tool storage trailer, mobile generator, portable toilets, hand wash stations, dumpster for general trash service, and a diesel fuel tank with secondary containment. TtEC employees and subcontractors will comply with WPNSTA Yorktown and CAX security requirements upon mobilization and throughout the course of the project. All site personnel will require RapidGate badges for base access. All vendor equipment and material delivery trucks and waste haul trucks will be required to go through the truck inspection station at the Yorktown Naval Weapons Station each day prior to accessing CAX. In advance of these trucks arriving to the truck inspection station, required information for each truck will be submitted to the Facility Engineering and Acquisition Division (FEAD) representative for providing to the appropriate Base security personnel.

#### **3.2.2 Utility Mark-out**

A utility mark-out will be completed for the work areas prior to performing any intrusive activities. Virginia Miss Utility will be notified at least 72 hours, but no more than 10 working days before the start of intrusive work. In addition, a third party utility locator will be utilized to locate and identify subsurface utilities. Utility markings identified will be maintained throughout the duration of the project and dig permit tickets will be updated as needed.

#### **3.2.3 Initial Site Survey**

A surveyor licensed in the Commonwealth of Virginia will be subcontracted to perform an initial site survey. The survey will be conducted to: Capture the pre-construction topography and any pertinent features of AOC 7, survey and stake sample locations, locate and stake excavation extents, and locate and identify archaeological sensitive areas that may be encountered during the removal action.

#### **3.2.4 Vegetative Clearing**

Vegetative clearing will be completed for the construction of a temporary access road to AOC 7 and within the limits of AOC 7 to enable safe operations and access to the Drum Disposal Area and Can Pit. Tree clearing will be required to enable construction of the temporary access road for approximately 50 lineal feet (lft) from the security fence to the nature trail and to widen approximately 750 lft of the existing nature trail leading to AOC 7 from approximately 5 feet (ft) wide to approximately 12 ft wide. Tree clearing will also be required within AOC 7 to provide equipment access to the excavation areas and provide adequate clearance for equipment movement. Trees that are removed shall be cut to just above the ground surface such that no intrusive ground disturbance occurs. Stumps and root balls shall remain undisturbed. Also, tree

removal will be minimized by strategic selection of access pathways and such that preference will be given for the removal of small, unhealthy, or dead trees rather than mature healthy trees whenever reasonably possible. Felled trees will be appropriately sized and left in place until after the temporary haul road is installed. Once the haul road is installed, sized timbers will be transferred to a designated staging area near the site for removal and disposition by the Base. Small trees and branches will be chipped on site and reused as mulch during site restoration.

### 3.2.5 Installation of Erosion and Sediment Controls

Because the limits of disturbance for the NTCRA are less than 1 acre, a formal SWPPP and Erosion and Sediment (E&S) Control Plan are not required. However, temporary erosion controls will be used to protect the surrounding land and water resources at the site. Control measures to be used will include a stone construction entrance, down gradient perimeter filter socks, dust control measures, and filter socks or hay bales surrounding material stockpiles. A streamlined SWPPP further describing the controls to be implemented at the site has been included in Section 4.0.

### 3.2.6 Access Road Installation

The temporary stone access road will be installed for providing equipment and haul truck access to the two excavation areas as shown on Figure 2. Following vegetative clearing of the pathway, non-woven geotextile will be placed on the ground and approximately 6 inches of stone will be placed, graded, and tracked in for compaction utilizing a small bull dozer or other tracked equipment as determined most effective and efficient. The access road will be approximately 10 to 12 feet wide and will include a turn-around area at AOC 7. Roadway installation activities shall be carefully performed to minimize earth disturbance (i.e., rutting, scraping, gouging), especially within archaeological sensitive areas. Removal of the access road is discussed in **Section 3.5**.

## 3.3 **Excavation of Soil and Debris**

Following the completion of site setup activities and once required approvals are received for waste disposal and clean fill, excavation activities at the Drum Disposal Area and Can Pit will commence.

### 3.3.1 Can Pit

The subsurface soil and debris within the Can Pit are expected to be excavated to a depth of 14 feet bgs (10 feet below the current ground surface) within the existing excavation footprint which is approximately 600 square feet (20 x 30 ft). An estimated total of 220 cubic yards of material will be excavated. The existing excavation extents will be initially surveyed to document existing conditions. An appropriately sized tracked excavator will be used to remove the waste soil/debris and direct load it into dump trucks for transport to the approved disposal facility. Due to the anticipated excavation depth of 14 ft bgs within the 600 square foot (sf) footprint, sloping of the excavation sidewalls will be necessary to safely excavate to the required depth. It is assumed that 1:1 sloping will be required. It is expected that all material outside of the existing excavation footprint that is removed for sloping purposes will not be impacted by debris or contaminants and will be staged adjacent to the excavation area for later reuse as backfill. The existing pile of soil

adjacent to the existing excavation will also be used as backfill material. If debris is encountered outside the existing excavation footprint or below 14 ft bgs, the Navy will be immediately notified of the changed condition. Excavation will continue until all visible subsurface debris has been removed, at which point the surveyor will return to the site to capture the vertical and horizontal excavation extents. Photographs of the excavation will be taken to document the removal of all debris. No post-excavation confirmation sampling will be performed.

The groundwater depth in this area is assumed to be approximately 20 ft bgs and should not be encountered during excavation activities. If groundwater is encountered, the Navy will be notified immediately of the changed condition.

### 3.3.2 Drum Disposal Area

The surface soil within the Drum Disposal Area will be excavated to a depth of 6 inches bgs. The lateral extent of the excavation area will be determined during the pre-excavation sampling event and will be staked and surveyed prior to beginning excavation. An appropriately sized tracked excavator will be used to remove the soil and direct load it into dump trucks for transport to the approved disposal facility. Excavation will continue until all soil/debris is removed to a depth of 6 inches bgs within the staked extents, at which point the surveyor will return to the site to capture the actual excavation extents. Photographs will be taken to document the excavation activities. No post-excavation confirmation sampling will be performed.

## 3.4 **Transportation and Disposal**

The Can Pit and Drum Disposal Area waste material will be characterized and a generator signed waste profile form and supporting laboratory analytical reports will be submitted to the proposed disposal facility for waste acceptance approval. Following waste acceptance approval from the landfill, the contaminated soil and debris will be removed from the Drum Disposal Area and Can Pit and direct loaded into dump trucks for transport to the approved disposal facility. Waste transport and disposal volumes are estimated at 40 cubic yards from the Drum Disposal Area and 220 cubic yards from the Can Pit. It is assumed that the waste material will be suitable for non-hazardous transport and disposal at a Resource Conservation and Recovery Act (RCRA) Subtitle D landfill facility. All dump trucks will be dry decontaminated, inspected, loads covered, and provided with manifests prior to leaving the site. All dump trucks will follow the designated traffic route for traveling to and from the site and not exceed posted speed limits. Base roadways shall be periodically inspected and kept clean at all times.

## 3.5 **Site Restoration**

The excavation areas will be backfilled using approved clean fill materials (i.e., common fill and topsoil) to original grade. Backfill material will be imported from the approved borrow source(s) directly to the AOC 7 excavation areas and dumped for placement. At the Can Pit, existing stockpiled soil and soil removed for excavation sloping will also be reused as backfill material. A tracked excavator will be used to place the backfill in the excavations. Fill will be placed in 6 to 12-inch lifts and compacted to grade. General fill will be placed to approximately 6 inches below

the final grade, followed by the placement of a 6-inch layer of topsoil. Fill source sampling and approval is discussed in Section 3.1.2.

Following completion of excavation and backfill activities, the site will be restored to pre-construction conditions. Site restoration will include seeding disturbed areas with an appropriate seed mix and stabilizing with straw or wood mulch and/or erosion control matting. Additional site restoration details are included in the SWPPP. Once restoration is complete, the surveyor will return to the site to capture the as-built site conditions.

After restoration of the AOC 7 work area is completed, the access road and construction entrance will be removed. The gravel will be removed and stockpiled at a designated location for future reuse by CAX. The underlying fabric will be removed and disposed of as general construction debris. Removal of the stone and fabric will be carefully conducted to minimize ground surface disturbance and avoid gouging, rutting, and/or excessive scraping of soil from the existing surface, especially in archaeological sensitive areas. Mulch will be applied to the nature trail as needed to aid in stabilization of the ground surface. Disturbed grassy areas will be restored via topsoil placement, seeding, and placement of mulch or erosion control matting. Upon stabilization of the restored areas, temporary erosion controls will be removed and disposed of as general construction debris.

### **3.6 Demobilization**

Upon completion of the site activities and acceptance of the site by the Navy, demobilization activities will commence. Demobilization will include removal of temporary facilities and demobilization of personnel, equipment, and materials.

## **4.0 STORMWATER POLLUTION PREVENTION PLAN**

A formal SWPPP and E&S Control Plan are not required since the limits of disturbance are expected to be less than one acre. However, this streamlined SWPPP has been prepared to describe the E&S controls that will be implemented at the site to limit the migration of soil and sediment from disturbed areas. Additional measures will be provided for stabilization and restoration of the site following fill placement and grading. All E&S control devices and procedures will be installed, inspected, and maintained in accordance with the “Virginia Erosion and Sediment Control Handbook (VESCH),” Third Edition, 1992, as prepared by the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

The total site footprint, including the excavation areas, access road, support area, and laydown area is expected to be less than one acre. Earth disturbing activities may include vegetative clearing, excavation of soil/debris, backfill placement, and access road installation/removal. All E&S controls will be inspected at least once per week and within forty-eight hours of precipitation events. Any identified deficiencies will be promptly corrected.

Proposed E&S control measures include:

- Filter socks and straw bales,
- Stone construction entrance and access road,
- Dust control,
- Soil stabilization matting, and
- Permanent seeding and mulching.

#### **4.1 Filter Socks and Straw Bales**

Filter socks will be installed as necessary on the down slope side of disturbed areas to minimize migration of sediment. Filter socks will be anchored with wood stakes except in archaeological sensitive areas where the socks will be anchored with sand bags or concrete blocks. At a minimum, filter socks will be installed as part of site setup and will be in place prior to commencement of ground disturbing activities. Straw bale reinforcements will be placed in areas where there is a potential for concentrated flow and replaced in accordance with the VESCH requirements. The filter socks will be removed upon satisfactory stabilization of disturbed ground surfaces following site restoration activities as described in Section 3.5.

#### **4.2 Stone Construction Entrance and Access Road**

A stone construction entrance will be installed where the temporary access road meets the existing paved roadway as shown on Figure 2. Installation and maintenance will be conducted as outlined in VESCH Standard and Specification 3.02. Access road installation is discussed in **Section 3.2.6**. The construction entrance will be removed along with the access road at the completion of the project as described in Section 3.5.

#### **4.3 Dust Control**

Dust control measures will be implemented as necessary during construction activities by spraying water on to areas of disturbed earth. Care shall be taken not to apply too much water such that ponding or run-off conditions are created. Dust control will be performed in accordance with the guidance provided in VESCH Standard and Specification 3.39.

#### **4.4 Soil Stabilization Matting**

As an alternative to straw or wood mulch, soil stabilization matting may be utilized in some areas to temporarily prevent erosion until vegetation is established. If used, soil stabilization matting will be installed in accordance with the guidance provided in VESCH Standard and Specification 3.36.

#### **4.5 Permanent Seeding and Mulching**

A seasonally and regionally appropriate seed mixture will be applied to the disturbed areas of the site to promote quick and effective establishment of a permanent vegetative cover. Seeding will be accomplished by hand broadcasting or through the use of a manual seed spreader. Mulch or

matting will be then applied to the seeded areas to prevent erosion and foster vegetative growth. Seed and mulch application will be performed in conformance with VESCH Standard and Specification 3.32 and 3.35, respectively.

## **5.0 WASTE MANAGEMENT PLAN**

This section outlines procedures to facilitate the proper handling, on-site management, and T&D of wastes generated during the field activities. The following wastes will be generated during the remediation activities:

- Contaminated soil and debris, and
- General construction debris and municipal waste.
- Cleared vegetation

The general construction debris and municipal waste will be collected in dumpsters or roll-off containers and shipped to a municipal waste facility for proper disposal. Cleared trees will be appropriately sized and staged at a designated location near the site for disposition by CAX. Smaller trees and branches will be chipped and reused as mulch during site restoration. No profiling or tracking of these wastes is required. It is anticipated that the contaminated soil and debris will be non-hazardous CERCLA waste and the procedures and practices in this plan pertain to management and disposal of that waste only.

### **5.1 Waste Characterization**

Removed waste soil and debris will require sampling and laboratory analysis for waste characterization. Two composite waste characterization samples will be collected, one each from the Can Pit and Drum Disposal Area. It is anticipated that these samples will be collected from the in-situ waste such that waste disposal approvals are received prior to commencing excavation and load-out activities. Each sample will be a five-point composite (discrete grab for VOCs) representative of the volume of soil to be disposed. The samples will be shipped to an off-site laboratory for analysis. Analytical methods will be confirmed by the disposal facility's acceptance criteria, but are expected to include full TCLP, R/C/I, PCBs, and TPH DRO/GRO.

### **5.2 On-Site Waste Management**

Contaminated soil and debris will be excavated and direct loaded into dump trucks for transport to the approved disposal facility. Each truck shall be inspected prior to loading to ensure it is in good operating condition and road worthy. Equipment operators will use caution when loading the trucks to minimize the potential for spillage, ensure a balanced load, and avoid over-loading. Truck gauges will also be utilized to ensure the trucks are not over-loaded. Ground personnel will inspect the trucks after loading to ensure the tailgate is secured and no loose soil is present on the truck body. The trucks will be tarped and manifested prior to leaving the site and shall follow the designated haul route.

### **5.3 Shipping Documentation**

#### **5.3.1 Waste Profile**

Waste characterization information for wastes will be documented on a waste profile form that will be provided by the designated off-site disposal facility and completed by TtEC with assistance from the Navy. The profile will be reviewed, approved, and signed by the Navy. The signed profile will then be submitted to the designated disposal facility for acceptance. The disposal facility must approve the profile prior to transporting any waste from the site.

The profile typically requires the following information:

- Generator information including name, address, contact name, and phone number.
- Site name including street/ mailing address.
- Process generating waste (i.e. soil and debris removal).
- Source of contamination (i.e. former disposal area).
- Waste composition (i.e. 90% soil, 10% debris).
- Physical state of waste (i.e. solid).
- Results of waste characterization sample analysis.

#### **5.3.2 Waste Manifests**

Each load of waste material shall be manifested prior to leaving the site. The generator (Navy) and transporter must sign the manifest prior to the load leaving the site. The disposal facility will sign the manifest upon receipt. The original, completed manifest will be returned to the generator and copies will be included in the Post-Removal Report. At a minimum, the manifest shall include the following information:

- Generator information including name, address, contact name, and phone number.
- Transporter information including name, address, contact name, and phone number.
- Disposal facility information including name, address, and phone number.
- Site name including street/ mailing address.
- Type and number of container (i.e. 1 truck load).
- Quantity of waste (volumetric estimate).
- Waste profile number.

### **5.4 Transportation**

Each vehicle used for off-site transportation of waste will be inspected upon arrival. Vehicles in poor condition or lacking proper license, registration, and insurance will be turned away. Each transportation vehicle and load of waste will be inspected before leaving the site. Transportation will be completed by a transporter licensed for commercial transport. All personnel involved in off-site transportation activities shall follow appropriate safety procedures and obey local traffic laws. For each load of material, weight measurements will be obtained for the full and empty

truck. The disposal quantity will be based on the difference in weight measurements and will be recorded on the waste manifest or an accompanying weight ticket.

## **5.5 Disposal of Waste Streams**

Consistent with the CERCLA Off-Site Rule (OSR), any hazardous substance, pollutant, or contaminant generated from a CERCLA project may only be transferred to off-site facilities that have been determined acceptable by the Environmental Protection Agency (EPA) Regional OSR Coordinator. Therefore, the facility that will receive the contaminated soil/debris from AOC 7 will need to be approved by the Region 3 OSR Coordinator, Gary Morton, before it can be shipped off-site. TtEC will submit an OSR approval request on behalf of the Navy as part of the waste profiling process.

## **5.6 Recordkeeping**

Final documentation including copies of the completed waste profiles, waste manifests, certificates of disposal, and weight tickets shall be provided in the Post-Removal Report.

## **6.0 ENVIRONMENTAL PROTECTION PLAN**

This EPP identifies the applicable environmental protection measures to be implemented throughout the course of the fieldwork for the NTCRA at AOC 7. This EPP describes the measures to be implemented to protect land resources, water resources, air resources, cultural resources, and fish and wildlife resources. Additional best management practices (BMPs) that TtEC will implement to maintain effective environmental protection of these resources during the project are also included in this EPP.

### **6.1 Environmental Manager**

A Project Environmental Manager will be assigned prior to the start of field work. This person will have a minimum of five years construction experience with environmental procedures similar to those of this project, familiarity with Environmental Management Systems, and familiarity with environmental regulations applicable to construction operations. The Environmental Manager will be supported by TtEC's Senior Environmental Compliance Manager, Jennifer Peters, when required. The Project Environmental Manager is responsible for overseeing the environmental goals for the project and implementing procedures for environmental protection.

The Project Environmental Manager is responsible for:

- Compliance with applicable federal, state, and local environmental regulations including maintaining required documentation.
- Implementation of the WMP.
- Implementation of this EPP.
- Environmental training for project personnel in accordance with their position requirements.

- Monitoring and documentation of environmental procedures.

## **6.2 Chemical Inventory Control**

Consistent with the requirements of Section 311 of the Emergency Planning and Community Right-To-Know Act, an inventory of any chemicals and hazardous materials brought onsite must be maintained. The SSHO will obtain and keep on site record of Material Safety Data Sheets (MSDSs)/Safety Data Sheets (SDS) for any chemical delivered to the site. The SSHO will also perform the following tasks:

- Train site personnel on required site-specific hazard communication.
- Confirm the inventory of chemicals brought onsite is available.
- Obtain an MSDS/SDS for each hazardous chemical before or as the chemicals arrive on site.
- Label chemical containers with the identity of the chemical and with hazard warnings as applicable.

## **6.3 Waste Transportation and Disposal**

Waste transportation and disposal requirements and best practices are described in **Section 5.0**.

## **6.4 Protection of Existing Resources**

Air quality, water resources, land resources, cultural resources, and fish and wildlife shall be protected during project activities as described below.

### **6.4.1 Protection of Air Quality**

Construction activities shall be kept under surveillance, management, and control to minimize the discharge of air pollutants. The following general practices will be implemented to protect air quality:

- Construction equipment shall be operated and maintained within manufacturer's recommendations to ensure minimal discharge of exhaust emissions.
- Dust emissions shall be controlled during earth-disturbing activities using misting of water, as needed.
- Traffic routes shall be designated to limit the area that is disturbed.
- Completed areas shall be seeded or otherwise stabilized to reduce dust levels and prevent the migration of sediment to adjacent wetlands and bodies of water.
- Burning shall not be allowed as a means of clearing.
- Equipment will be operated in a manner to minimize airborne particulates whenever possible (i.e. the drop height of excavators will be limited).

#### 6.4.2 Protection of Water Resources

Controlling stormwater run-on and run-off and preventing erosion and sedimentation is the primary water resource concern during construction activities. Various temporary and permanent erosion controls will be used as outlined in **Section 4.0**. Disturbance of wetland areas will be avoided and it is not anticipated that wetlands will be encountered or impacted during removal action activities.

#### 6.4.3 Protection of Land Resources

All reasonable attempts shall be made to minimize landscape disturbance beyond the planned limits. The removal of trees will be minimized as much as possible and selective such that dead, unhealthy, or small trees will be preferred for removal over healthy larger trees. Operation of equipment shall be limited to the confines of the work area to minimize the potential for residual damage to landscape features. Land resources (i.e. trees and shrubs) outside the clearing limits shall be preserved in their present condition. No ropes, cables, or guy lines are to be fastened or attached to any existing trees for anchorage.

#### 6.4.4 Protection of Cultural Resources

AOC 7 is directly adjacent to archaeological sensitive areas and a portion of the temporary access road runs through the edge of an archaeological sensitive area as shown on Figure 5. In advance of conducting any site activities, a Site Plan will be provided by the Navy to the State Historic Preservation Office (SHPO) for their review and approval. Removal activities will be conducted such that adjacent archaeological sensitive areas are not impacted. Regarding the temporary access road, installation and removal of the geotextile and stone used to construct the temporary road will be carefully done in such a manner to minimize earth disturbance within this sensitive area. Measures taken to minimize adverse impact in cultural resource sensitive areas, include: Removing trees by cutting to the ground surface such that root balls and stumps are not removed, installing a temporary access road with geotextile and stone to minimize rutting/gouging of the existing ground surface by dump trucks and heavy equipment, and installing filter socks anchored with blocks or sand bags rather than trenching for the installation of silt fence for erosion control implementation.

#### 6.4.5 Protection of Fish and Wildlife

Site operations shall be managed to the extent practicable to minimize interference with fish and/or wildlife habitat. Care shall be taken to ensure that temporary E&S controls are installed to prevent stormwater discharges. Site personnel shall not otherwise feed, harass, or intentionally harm or kill animals, including birds or snakes if present. If an animal becomes a nuisance which could endanger the safety of workers, TtEC will notify the Navy and a representative from a fish and wildlife agency will be contacted to handle the animal.

## **6.5 Spill Prevention, Control, and Response**

The following procedures will be followed for the prevention and mitigation of minor spills and releases during construction activities.

General spill prevention procedures are as follows:

- Fuel and waste containers/tanks shall be secondary contained or otherwise bermed to prevent releases. The bermed volume shall be equal to the full capacity of the container/tank, at a minimum.
- Fueling operations and vehicle/equipment maintenance shall be performed at designated off-site facilities, when practical.
- Each location having fueling operations, fuel containers/tanks, and/or waste containers/tanks shall have a sufficient number of spill kits to contain minor spills and leaks.

Detailed spill response procedures are provided in the APP. The general procedures for spill response are as follows:

- Assure personal safety, then evaluate the area and nature of the spill.
- Identify the source and stop the flow of pollutants, if it can be done safely.
- Contain the spill with absorbent materials or by berming the area.
- Remove and contain the spilled material, contaminated media, and cleanup material, and transport to a designated location for collection of such material.
- Contact the appropriate personnel listed in the APP.
- Record pertinent facts.

## **7.0 REFERENCES**

CH2M Hill. 2014a. Action Memorandum Area of Concern 7 – Drum Disposal Area and Can Pit, Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia. April.

CH2M Hill. 2014b. Final Engineering Evaluation and Cost Analysis for Area of Concern 7 – Drum Disposal Area and Can Pit, Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia. March.

CH2M Hill. 2012. Final Site Inspection Report for AOCs 1, 2, 6, 7, 8, Naval Weapons Station Yorktown, Cheatham Annex, Williamsburg, Virginia. May.

Shaw Environmental, Inc. (Shaw). 2006. Completion Letter Report for Housekeeping Actions at CAX Site 1 – AOC 7, Naval Weapons Station Yorktown, Cheatham Annex Site, Williamsburg, Virginia. June.

## **FIGURES**

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CAD FILE: WE35 FIGURE1.DWG

SOURCE: CH2M



TETRA TECH EC, INC.

Cheatham Annex AOC 7  
**NON-TIME CRITICAL REMOVAL ACTION**  
 LOCATION MAP

PREP	CHK	APPR	DATE

**FIGURE**  
**1**

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CAD FILE: ACAD-WE35 FIGURE2-REV.DWG



IMAGE SOURCE: ESRI Maps

**NOTES**

- Temporary access road is approximately 800 ft long from security fence to AOC-7. The road will be approximately 10-12 ft wide and constructed with geotextile fabric and an overlying 6-inch layer of 1-2 inch stone and/or 21a stone. The road will include a turn-around area for dump trucks at AOC-7.
- Approximately 750 lft of the temporary access road will be on an existing 4-5 ft wide earthen nature trail.
- Tree clearing will be required for installation of the temporary access road. Tree clearing will be minimized as much as practical and selective such that dead, unhealthy, or smaller trees are removed rather than healthy and larger trees. Trees will be cut to just above the ground surface such that root balls are undisturbed.
- A stoned construction entrance will be installed in the grassy area between the security fence and the paved roadway.
- The support area will include a small office trailer, portable generator, portable toilets with wash station, tool storage box/trailer, and a temporary diesel fuel tank with secondary containment.

**LEGEND**

- APPROXIMATE AREA OF FORMER DRUM DISPOSAL
- APPROXIMATE AREA OF FORMER CAN PIT
- APPROXIMATE EXTENT OF DRUM DISPOSAL AREA HOT SPOT
- <sup>sf</sup> FILTER SOCK
- - - TEMPORARY ACCESS ROAD

**Cheatham Annex AOC 7  
NON-TIME CRITICAL REMOVAL ACTION  
SITE PLAN**

PREP	CHK	APPR	DATE

**FIGURE  
2**



TETRA TECH EC, INC.

CAD FILE: ACAD-WE35 FIGURE3-REV.DWG



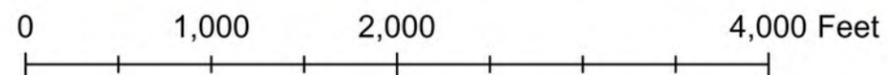
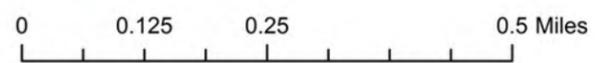
**NOTE:**

ALL TRUCKS ARE REQUIRED TO GO THROUGH TRUCK INSPECTION AT YNWS PRIOR TO ACCESSING CAX.

**LEGEND**

- ON-ROAD TRAFFIC ROUTE
- - - OFF-ROAD TRAFFIC ROUTE

SOURCE: ESRI Maps



TETRA TECH EC, INC.

Cheatham Annex AOC 7  
**NON-TIME CRITICAL REMOVAL ACTION**  
 TRAFFIC PLAN

PREP	CHK	APPR	DATE

**FIGURE 3**

CAD FILE: ACAD-WE35 FIGURE4-REV.DWG



SOURCE: ESRI Maps



**Cheatham Annex AOC 7**  
**NON-TIME CRITICAL REMOVAL ACTION**  
**PRE-EXCAVATION SAMPLE LOCATIONS**

PREP	CHK	APPR	DATE

**FIGURE 4**

CAD FILE: ACAD-WE35 FIGURE5-REV.DWG

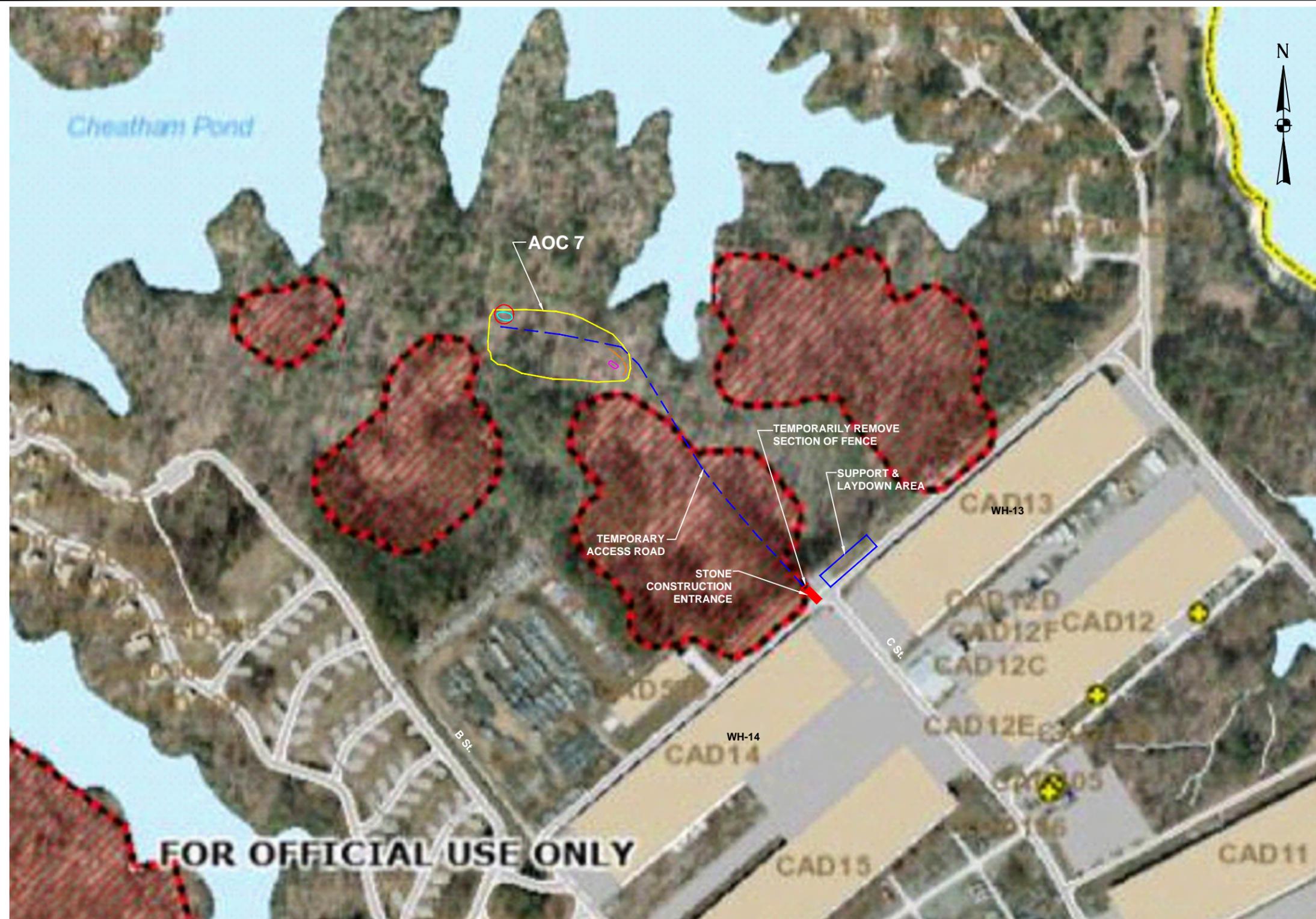
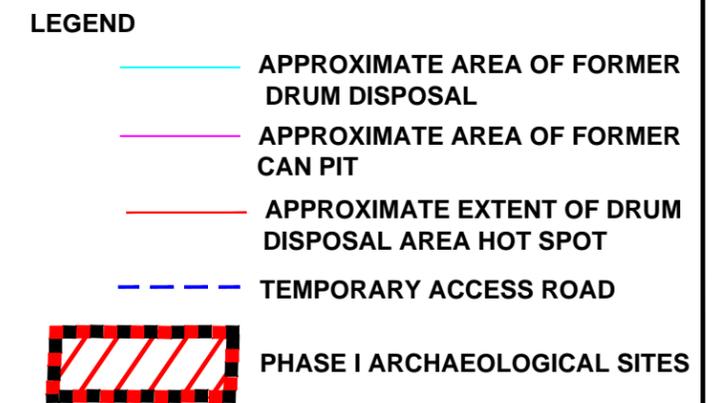


IMAGE SOURCE: GeoReadiness Explorer (GRX)



TETRA TECH EC, INC.

**Cheatham Annex AOC 7  
NON-TIME CRITICAL REMOVAL ACTION  
ARCHAEOLOGICAL SITE LOCATIONS**

PREP	CHK	APPR	DATE

**FIGURE 5**

**APPENDIX A**  
**PROJECT SCHEDULE**

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Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	2015												2016		
						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3							
<b>CTO WE35 Removal Action at AOC 6 and 7, NWS Yorktown, VA</b>																				
<b>Contract Award</b>																				
A1000	Contract Award	0	100%	26-Sep-14 A	26-Sep-14 A	◆ Contract Award														
<b>Period of Performance</b>																				
A1010	Period of Performance Start	0	100%	26-Sep-14 A	26-Sep-14 A	◆ Period of Performance Start														
A1020	Period of Performance End	0	0%	30-Sep-15	30-Sep-15	◆ Period of Performance End														
<b>Work Element 1 - Project Management</b>																				
<b>Work Element 2 - Preconstruction Activities</b>																				
<b>Work Plan</b>																				
A1030	Internal Draft Work Plan to Navy	30	100%	26-Sep-14 A	04-Feb-15 A	■ Internal Draft Work Plan to Navy														
A1040	Navy Review of Internal Draft Work Plan	10	100%	04-Feb-15 A	24-Apr-15 A	■ Navy Review of Internal Draft Work Plan														
A1050	Respond to Navy Comments to Internal Draft Work Plan	10	100%	27-Apr-15 A	04-May-15 A	■ Respond to Navy Comments to Internal Draft Work Plan														
A1060	Submit Draft Work Plan	1	100%	05-May-15 A	05-May-15 A	■ Submit Draft Work Plan														
A1070	Regulator Review of Draft Work Plan	20	100%	06-May-15 A	15-Jul-15 A	■ Regulator Review of Draft Work Plan														
A1080	Respond to Regulator Comments to Draft Work Plan	5	20%	16-Jul-15 A	22-Jul-15	■ Respond to Regulator Comments to Draft Work Plan														
A1090	Submit Final Work Plan	1	0%	23-Jul-15	23-Jul-15	■ Submit Final Work Plan														
<b>Work Element 3 - Mobilization and Setup</b>																				
A1100	Mobilization and Setup	11	0%	08-Sep-15	22-Sep-15	■ Mobilization and Setup														
<b>Work Element 4 - Fieldwork</b>																				
A1110	AOC-7 Can Pit Excavation & Loadout	7	0%	23-Sep-15	01-Oct-15	■ AOC-7 Can Pit Excavation & Loadout														
A1120	AOC-7 Drum Disposal Area Excavation & Loadout	4	0%	02-Oct-15	07-Oct-15	■ AOC-7 Drum Disposal Area Excavation & Loadout														
<b>Work Element 5 - Waste Characterization/Confirmation Sampling</b>																				
A1160	Waste Characterization/Confirmation Sampling	2	0%	05-Aug-15	06-Aug-15	■ Waste Characterization/Confirmation Sampling														
<b>Work Element 6 - Transport and Disposal</b>																				
A1170	Transport and Disposal	11	0%	23-Sep-15	07-Oct-15	■ Transport and Disposal														

Primary Baseline
  Remaining Work
  Baseline Mile...
  Actual Work
  Critical Remaining Work
  Milestone





**APPENDIX B**  
**ACCIDENT PREVENTION 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. WE35**

**FINAL  
ACCIDENT PREVENTION PLAN  
REMOVAL ACTION AT AOC 7  
NAVAL WEAPONS STATION, YORKTOWN – CHEATHAM ANNEX  
WILLIAMSBURG, VIRGINIA**

**July 2015**

Prepared for



Department of the Navy  
Naval Facilities Engineering Command, Mid-Atlantic  
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Revision	Date	Prepared by	Approved by	Pages Affected
0	7/24/15	R. Whalen	R. Margotto	All

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## ACRONYMS AND ABBREVIATIONS

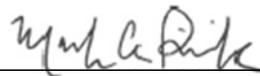
AED	automated external defibrillator
AHA	Activity Hazard Analysis
AIDS	Acquired Immune Deficiency Syndrome
AOC	Area of Concern
APP	Accident Prevention Plan
APR	air purifying respirator
ASTM	American Society for Testing Materials
bgs	Below Ground Surface
BLS	Bureau of Labor Statistics
CAX	Cheatham Annex
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
°C	degrees Celsius
CP	Construction Procedure
CPR	cardiopulmonary resuscitation
CRZ	Contaminant Reduction Zone
CSIR	Contractor Significant Incident Report
CSP	Certified Safety Professional
DART	Days Away/Restricted Duty/Transfer Rate
DEET	N, N -Diethyl- meta -toluamide
EC	Emergency Coordinator
EE/CA	Engineering Evaluation/Cost Analysis
EHS	Environmental Health and Safety
EM	Engineer Manual
EPP	Environmental Protection Plan
EZ	Exclusion Zone
°F	degrees Fahrenheit
FEAD	Facility Engineering and Acquisition Division
FCR	Field Change Request
HAZCOM	hazard communication
GHS	Global Harmonization System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HIV	Human Immunodeficiency Virus
kg	kilogram
mg/kg	milligrams per kilogram
MSDS	Material Safety Data Sheet
MIDLANT	Mid Atlantic
mph	miles per hour
NAICS	North American Industry Classification System

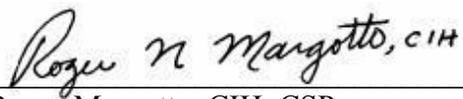
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
OICC	Officer in Charge of Construction
OSHA	Occupational Safety and Health Administration
NTCRA	Non-Time Critical Removal Action
NTR	Navy Technical Representative
PEL	permissible exposure limit
PM	Project Manager (Tetra Tech)
PPE	personal protective equipment
PRG	Preliminary Remediation Goals
RPM	Remedial Project Manager
SDS	Safety Data Sheet
SHM	Safety and Health Manager
SI	Site Inspection
SS	Site Superintendent
SSHO	Site Safety and Health Officer
SZ	support zone
TtEC	Tetra Tech EC, Inc.
TRIR	Total Recordable Incident Rate
UL	Underwriter's Laboratory
USACE	U.S. Army Corps of Engineers
VA	Virginia
WBGT	wet bulb globe thermometer
WNV	West Nile virus
WPNSTA	Naval Weapons Station
ZIP	Zero Incident Performance

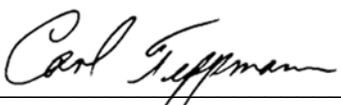
## 1.0 APPROVALS

By their signatures, the undersigned hereby certify that this Accident Prevention Plan (APP) has been prepared in accordance with the requirements of Engineering Manual (EM) 385 1-1 (current version including revisions) and has been reviewed and approved for use during field operations to perform a Non-Time Critical Removal Action (NTCRA) at Area of Concern (AOC) 7 at Naval Weapons Station (WPNSTA) Yorktown – Cheatham Annex (CAX) located in Williamsburg, Virginia.

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## 2.0 BACKGROUND INFORMATION

- a. **Contractor:** Tetra Tech EC, Inc. (TtEC)
- b. **Contract Number:** N62470-13-D-8007, Task Order WE35.
- c. **Project Name:** Non-Time Critical Removal Action (NTCRA) at Area of Concern (AOC) 7 at Naval Weapons Station (WPNSTA) Yorktown – Cheatham Annex (CAX) located in Williamsburg, VA.
- d. **Project Description:**

AOC 7 is located along a nature trail that runs through a wooded area located behind the CAX warehouse area and south of one of the southern fingers of the Cheatham Pond. AOC 7 was identified in April 2004 when the Department of the Navy (Navy) discovered two small debris disposal areas in this wooded area. One of the debris disposal areas, referred to as the Drum Disposal Area, contained several empty, rusted pails and two empty, rusted 55-gallon drums on the ground surface. The other debris disposal area, referred to as the Can Pit, is an approximately 30-foot by 20-foot pit open to a depth of 4 feet below ground surface (bgs). The Can Pit contained numerous empty, 5-gallon rusted cans labeled “tetrachloroethane” on the ground surface within the pit. A pile of soil, assumed to be the soil excavated to create the Can Pit, is located immediately adjacent to the Can Pit. The Drum Disposal Area and Can Pit are two separate areas within AOC 7. They are located on opposite ends of AOC 7, roughly 300 feet apart. There are no wetlands or surface water bodies located within AOC 7. The topography generally slopes northeast towards Cheatham Pond, and surface runoff is expected to flow northeast to the Pond as well. A facility and site location map is included as Figure 1.

In March and April 2006, a housekeeping effort was performed to remove the surface debris from the Drum Disposal Area and Can Pit. Following the housekeeping removal effort, all recovered surface debris from AOC 7 was transported offsite for proper disposal (Shaw, 2006). The Can Pit was encircled with an orange safety fence and left open following the housekeeping removal effort.

A Site Inspection (SI) conducted at AOC 7 in October 2008 identified potential unacceptable risk to human health and the environment posed by exposure to contaminants in surface soil and subsurface debris. No surface debris remains at AOC 7. Some subsurface debris is still present within the Can Pit. No debris was identified in test pits dug outside of the Can Pit or Drum Disposal Area. The human health and ecological risk screenings conducted as part of the SI concluded there is potential risk to human or ecological receptors. Potential unacceptable human health risks were identified from exposure to inorganics in surface soil at both areas of AOC 7. In addition, the Tier 1 Partnering Team has made an educated assumption that subsurface debris within the Can Pit presents the potential for future impacts to site media, and is, therefore, assumed to pose a potential future risk to human health. An unacceptable carcinogenic risk is also associated with arsenic and chromium (assumed to be in the hexavalent form). Potentially unacceptable ecological risks were identified from exposure to lead and manganese in surface soil at the Can Pit and lead, manganese, and zinc in surface soil at a localized hotspot in surface soil at the Drum Disposal Area.

In 2014, an Engineering Evaluation/Cost Analysis (EE/CA) (CH2M Hill, 2014b) for a NTCRA at AOC 7 was completed to evaluate removal action alternatives. Following review of the EE/CA and agreement for the selection of EE/CA Alternative 3 by the Tier I Partnering Team, an Action Memorandum (CH2M Hill, 2014a) was prepared to document approval of the NTCRA at AOC 7 for addressing surface soil and subsurface debris. Both documents were then submitted for a public review and comment period.

This project entails the excavation and transport and disposal of non-hazardous waste soil from the AOC 7 Drum Disposal and Can Pit areas. 220 cubic yards of waste material are estimated to be removed from the Can Pit Area and 40 cubic yards are estimated to be removed from the Drum Disposal Area. Other associated activities will include site setup, tree clearing, constructing 1,500 linear feet of temporary haul road, confirmation sampling, backfilling, and site restoration.

### **2.1 Phases of Work Requiring Activity Hazard Analyses:**

The work activities described above will consist of the following primary work tasks, each of which is addressed in an Activity Hazard Analysis (AHA) included as Appendix A to this APP. AHAs will be updated or developed accordingly when a process changes, new information is obtained, or when new tasks will be performed. The following is a list of AHAs developed for this project:

AHA – 1	Mobilization and Site Setup
AHA – 2	Sampling
AHA – 3	Excavation of Soil and Debris
AHA – 4	Transportation and Disposal
AHA – 5	Backfill and Site Restoration
AHA – 6	Demobilization

The above activities present hazards to workers. Mitigations for the hazards associated with the work are presented in this APP. Identified chemical contaminants of concern for this removal action include arsenic, hexavalent chromium, lead, manganese, and zinc. 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. TtEC's Experience Modification Rates are as follows:

(Policy Year October 1–September 30):

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

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

### **4.1 Statement of Responsibility**

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 throughout the duration of this project.

#### 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.
- 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 – Mark Pisarcik

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

- Ensure implementation of this APP through coordination with the SS and Safety and Health

#### Manager (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, Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), Certified Hazardous Materials Manager (CHMM)

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 Site Safety and Health Officer (SSHO) 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 personal protective equipment (PPE)
- Assist in the investigation of incidents

#### 4.2.4 Site Superintendent – To Be Determined

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 onsite intrusive activities.

- Be responsible for the day-to-day work at the site.
- Be responsible for implementing and enforcing all work plans.
- Conduct daily activities such as:
  - Supervising employees in daily operations
  - Overseeing the implementation of specified levels of PPE.
  - Identifying potential problem areas and making corrective action recommendations to the PM.
  - Implementing all corrective actions, and maintaining a daily log of work activities including noting any extraordinary occurrences.
  - Conduct weekly safety inspections jointly with the 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; Occupational Safety and Health Administration (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 Remedial Project Manager (RPM), Officer-In-Charge of Construction (OICC), and PM.

#### 4.2.5 Site Safety and Health Officer – To Be Determined

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 over 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 onsite implementation of TtEC 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 or in the daily safety report.
- 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 TtEC 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 onsite monitoring to determine appropriate levels and use of PPE.
- Perform site surveillances, hazard identification, and health risk analysis.
- Act as EC when the SS is not immediately available.
- Implement procedures and programs to eliminate risk to site personnel, including initiating changes to the plan.
- Implement site control measures.
- Maintain the field health and safety logbook.
- Provide summaries of field operations and progress to the SHM.

#### 4.2.6 Field Crew Personnel – Various (TtEC and subcontractors)

Field crew personnel include TtEC personnel and subcontractor personnel as well as 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 PM and OICC 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

#### 4.2.7 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.

#### 4.2.8 Competent Persons

A competent person will be identified, in writing by the PM, for other tasks (i.e., confined space entry) that may require a competent person. Competent persons for tasks such as excavation, hoisting and rigging and other tasks where a competent person is required by regulations or the EM 385-1-1 will be included in the AHAs and APP sections prepared that address specific tasks and the need to identify a competent person. Subcontractor personnel will provide competent persons as required where their tasks require a competent person.

#### 4.2.9 Pre-task 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 SSHO will work with the subcontractor in the preparation of the AHA. The AHA must be reviewed by the Contracting Officer and the SHM. 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 and the Contracting Officer for review.

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.

#### 4.2.10 Visitors

All visitors to the project site will report to the TtEC SS for a safety briefing and assignment of an escort, as applicable. Visitors, including TtEC employees who are not assigned to the project, will

sign in and out on the project visitor's log, maintained at each site, each time they visit the site.

At no time will visitors be allowed onto the project site until they have acknowledged training and understanding of the APP, and have received a briefing specific to the hazards of the area they intend to visit and don the required PPE. Visitors, other than as provided for by contract for Navy personnel, are responsible for supplying any PPE required for access to the project site.

### **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 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**

All subcontractors are prequalified following the requirements of EHS 1-4 Subcontractor Selection and Management. Subcontractors working on this project include:

- Site Setup, Excavation, and Restoration – Sealaska
- Analytical Testing Services – To be determined
- Transportation and Disposal – To be determined
- Third Party Utility Locating Services – To be determined
- Imported Fill Material and Delivery – To be determined

## **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/ qualified 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.

## **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 onsite, 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 this APP. 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 trained on the APP requirements and specific work tasks they will be performing and supervised with on the job training as discussed below.

## **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 four years. As previously discussed, 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 Hazardous Waste Operations Training and Refresher**

This project will be implemented in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Workers who interact directly with or break the surface of the soil or handle the soil have some risk for contact with chemical contaminants. Site workers working within the exclusion zone on this project are required by 29 Code of Federal Regulations (CFR) 1910.120/1926.65 to have completed 40 hours of hazardous waste operations training and an 8-hour annual refresher course. Supervisors such as the SS and SSHO, and subcontractor's supervisors (as applicable), must have completed 8 hours of relevant supervisory health and safety training and first aid/cardiopulmonary resuscitation (CPR)/bloodborne pathogen training.

## **6.5 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)/safety data sheets (SDS) for hazardous chemical materials that are used during site operations or that may be present onsite will be available from the onsite SSHO. The SSHO will conduct hazard communication (HAZCOM) training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59, EM 385-1-1 (current version), and the HAZCOM program. Training will include, but will not be limited to, all hazards or potential hazards associated with work activities and any hazardous chemical materials brought to or found on the site. All personnel must have received the most current HAZCOM training on the Global Harmonization System (GHS). The workers must know the new labeling system, the symbols used to identify the hazards of chemicals, and how to use the new format for SDS.

Lead awareness training will be provided by the SSHO as part of this project. A lead awareness training guidance document is provided as Attachment 1, which will be reviewed with all employees that will be working in the exclusion zone and potentially exposed to lead contaminated soil.

## **6.6 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, hazards, procedures, monitoring, and equipment for the work operations. Training will include site layout, hazards, evacuation route(s), emergency services at the site, emergency procedures, and the HAZCOM program (see Section 6.5); 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. Specific training using AHAs for each task to be performed will be done at the start of each activity. If additional training is required for completion of field tasks during the site work, then the SHM or SSHO (as appropriate) 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 will have received confined space training to fulfill their assigned duties. The subcontractor's training program must be reviewed and accepted by the SHM prior to any confined space entry work. At the present time, confined space entry is not anticipated for this project.

## **6.7 First Aid and Cardiopulmonary Resuscitation**

The SSHO will identify those individuals who have current first aid, automated external defibrillator (AED), and CPR training. At a minimum, two people (including the SSHO and SS) will have current CPR/first aid certification. The names of all CPR/first aid-qualified workers will be posted on the site near the work area.

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.

## **6.8 Bloodborne Pathogens Training**

Individuals onsite 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. Blood Borne Pathogen training is required annually.

## **6.9 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.

## **6.10 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.

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

Project personnel and visitors will participate in daily onsite health and safety briefings conducted by the SS, SSHO, or delegated subcontractor supervisors 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. 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.

## **6.12 Training Certificates**

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

## **6.13 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.



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 designee 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 SSHO meet the training and experience criteria to serve 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 or equivalent and meets the requirements of EM 385 1-1 Section 01.A.17 in the role of Site Safety and Health Officer.

#### **7.2.1 Documentation Procedures**

The SSHO will record any deficiencies in the onsite field logbook or in a daily safety report that is submitted with a daily report to the OICC and a copy submitted daily to the SHM.

#### **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 verbally notify the PM, OICC, and the SSHO immediately. The PM will notify the RPM. The SSHO will notify the SHM. If the incident is an injury requiring more than first aid or government property damages exceeding \$2,000, the PM will immediately notify the Contracting Officer.

### **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 verbal 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 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) (Appendix D), 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 OICC and/or the PM and SHM. 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 Navy Technical Representative (NTR) or RPM as soon as possible. The NTR may follow up with a request for submission of the CSIR within 48 hours. The NTR may initiate a report into the Navy Contractor Incident Reporting System (CIRS) that will generate an e-mail to a TtEC Manager so that data can be made into the CIRS. TtEC will give the NTR the name and e-mail address of the PM or other designated person. 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 United States Army Corps of Engineers (USACE) in current accident reporting regulations (currently we report government property damage \$2,000 or greater);
- f. Arc Flash Incident/Accident that results in a Class A or B injury;
- 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.

### **9.1 Layout Plans**

Layout plans are provided in the work plan. Approval to stage materials and equipment and set up work areas and access to these areas, including but not limited to private and work related contractor vehicle parking and laydown areas will be coordinated through the OICC. Erosion controls and dust control measures will be established in construction areas as per the Work Plan and maintained throughout the project, as required, to minimize erosion and runoff.

An office trailer may be procured as part of this task order. Temporary facilities may include accessible and regularly serviced portable toilet and hand washing stations. These will be set up in locations approved by the OICC.

Security of the Base is through the Navy, as it is an active Base. Access into the Base to gain entry to where the work will be performed will require badging for personnel and delivery vendors. The work sites and equipment will be secured appropriately to minimize potential unauthorized access and tampering or theft during non-working hours. Restricted work areas will be conspicuously posted with signage warning of the hazard and whom to contact for permission (including escort) to enter.

Traffic Control will be implemented to control the site during working hours and to comply with Base security requirements and facility operation plans (refer to work plan for more detail). TtEC personnel and any subcontractors will become familiar with and obey Base, 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.

Construction staging areas will be delineated with high-visibility fencing, barriers, and signage. Equipment and material staging areas will be established for the laydown of equipment (including heavy equipment), materials, supplies, and tools. The equipment and material staging areas will be used for storage in support of construction. Small temporary staging areas will be set up at work areas as necessary.

## **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 or chemicals 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, with assistance from the SSHO, will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. In addition, atmospheric conditions will be monitored through the use of air monitoring equipment when fire hazards exist. 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 providing support 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 onsite work, the primary response action by onsite 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.

Base emergency services (spills, fires,) or offsite emergency responders (medical emergency) are capable of providing the most effective response to site emergencies in the event of a fire or explosion, injury or medical emergency. The PM or SHM will be notified as soon as possible after an emergency as well as the OICC and RPM as stated in this APP.

All personnel are to take shelter for personal safety in the event of certain emergencies. The procedure for sheltering in place is included in Section 9.2.1.3.

TtEC personnel will provide incipient 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, 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 and Facility 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 onsite that can be important in the event of an emergency situation, including:
  - A chemical inventory of hazardous chemicals onsite
  - Corresponding MSDS/SDS
  - Completed medical data sheets (Appendix E) for onsite personnel
  - An entry/exit log identifying personnel onsite each day, including any entry into controlled work zones
  - Hospital route maps with directions from each site location
  - Emergency notification - phone numbers
- At the beginning of the field work, the EC will hold an emergency evacuation drill.

The drill requires evacuations of the site to the assembly area (main gate) and to the evacuation area (main gate). 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 onsite and take command. If the SS is not present or is involved in the incident, the SSHO is the alternate EC. In the event of an emergency, personnel will evacuate (unless it is a Base Shelter-in-Place type emergency, see below) and the EC will be in charge until emergency responders arrive and take command. TtEC will not provide emergency response support beyond their onsite capabilities and their training.

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

#### **Shelter-In-Place**

All personnel will take shelter for personal safety in the event of certain emergencies. The most appropriate protective action for certain emergencies is to take shelter. Personnel shall immediately seek shelter while an assessment is made of the threat and determinations are being made regarding subsequent actions such as "all clear" notifications.

The following procedures have been put in place in the event of an emergent condition that the Facility declares as Shelter-in-Place:

- NOTIFICATION: The primary means of alerting personnel shall be emergency alert signals given by the Base. The alerting signal to seek shelter shall be **three steady tones that last for thirty seconds separated by ten seconds of silence.**
- SHELTERING: When personnel hear the alert signal, the area of work must be secured in a manner that will leave the site in safe condition. Personnel shall seek shelter in the nearest occupied building (building location to be determined in consultation with the OICC) in calm and orderly manner. If possible, secure all windows and doors and shut off ventilation. If in a vehicle, park the vehicle so that it does not block the normally traveled portion of the road and proceed into the nearest occupied building.
- ALL CLEAR: The notification for "all clear" shall be **three short tones repeated three times.**

#### **TtEC Initiated Emergency**

In the event of an emergency situation such as fire or explosion, where TtEC is making the determination to evacuate the site, the EC will activate an air horn (or vehicle horn if available) indicating the initiation of evacuation procedures. The emergency signal will be:

- NOTIFICATION: Long steady beeps will be used to indicate emergency situations. As required, cellular telephone, handheld radio, and voice may be used if the horn is not heard.
- EVACUATION: Personnel will leave the site and assemble at the main gate (shown on Figure 9-1). Supervisors will account for team members and initiate further response and notification. If further evacuation is warranted, personnel will evacuate to the Base exit.
- Once nonessential personnel are evacuated, appropriate response procedures will be enacted to control the situation. Notification will be made to the Navy RPM, OICC, Fire Department or offsite Medical Services) and TtEC internal points of contact.
- ALL CLEAR: Verbal notification by SS, SSHO, or PM must be given to all employees to return to the site.
- Follow on reporting after emergency response is over.

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, evidence of acute or unusual signs or symptoms of personnel exposure to

potential contaminants; and could also occur due to activities of other contractors or conditions not directly related to site work (Base emergency).

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 main gate has been designated as the primary evacuation and assembly area for project work activities (Figure 9-1). However, if the main gate is not considered to be safe, an alternate evacuation area and route may be required and will be identified prior to start of site work.

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 if information changes. 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 location of the primary evacuation area and route for the site. The SSHO will use this same map to diagram egress routes from work areas to the evacuation area and to the Base exit. From this point, the map showing the route to the nearest emergency hospital (Figure 9-2), **Riverside Doctors' Hospital Williamsburg**, located at 1500 Commonwealth Avenue, Williamsburg, Virginia 23185, will be used if medical services are required (See Section 9.2.6 below). This hospital can handle moderate emergencies.

#### *9.2.1.4 Emergency Equipment*

The following emergency equipment listed in Table 9.1 will be strategically placed and maintained onsite in accessible locations where active work is taking place:

- Fire extinguishers will be maintained onsite 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 Underwriter's Laboratory (UL) approved safety cans properly labeled.

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

This Section is prepared in complement to the spill response and reporting procedures included in the Environmental Protection Plan (EPP) and both sets of procedures will be reviewed by project staff. This plan deals with response and notification from a health and safety standpoint, while the EPP focuses on prevention of spills as well as cleanup and notification for spills to the environment, including agency notification and what spills are reportable to outside agencies:

In the event of a spill (any amount, regardless of how small):

- The SS or SSHO will notify the PM, OICC, and the Facility Environmental Department.
- The PM will notify the RPM.
- The SSHO will notify the SHM.
- Any spill quantity is reportable the OICC, Facility Environmental Department, as well as to the PM and SHM.
- TtEC will assist the OICC with any required notification to regulatory agencies if the spill is reportable (refer to Environmental Management Plan).
- In no case will TtEC report a spill to a regulatory agency without first notifying the OICC and Facility Environmental Department and gaining permission.
- An investigation and incident report will be prepared and corrective actions identified.

### 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 in each piece of mobile construction equipment (minimum 1:A:10BC) 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 (Facility Fire Department) 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.

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, which will be located on a clip board in each site vehicle. Please note, the Environmental Protection Plan contains additional numbers for reporting spills to outside agencies, and these are not included in the table.

#### 9.2.5 Man Overboard/Abandon Ship

Not Applicable

#### 9.2.6 Medical Support

##### 9.2.6.1 *First Aid*

TtEC will ensure that a minimum of two people, including subcontractors have current certifications in CPR, AED, first aid, and bloodborne pathogens. Other than rendering basic CPR and first aid, these employees are not expected to perform emergency medical duties; however, they are authorized to perform emergency rescue or other duties up to the level of their training.

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<sup>®</sup> during mobilization for these non-emergency injuries or illnesses. WorkCare<sup>®</sup> 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. 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. 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.
- 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.
- 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 as well as the OICC. The PM will notify the RPM

The nearest emergency hospital to each of the work sites is the Riverside Doctors' Hospital Williamsburg, located at 1500 Commonwealth Avenue, Williamsburg, Virginia 23185.

The location of and directions to **Riverside Doctors' Hospital Williamsburg** is included in Figure 9-2, and contact numbers for the hospital and WorkCare<sup>®</sup> are provided in Table 9.2. The SSHO is instructed to drive by the nearest hospital to ensure that it is accessible and available and that the most efficient routes (primary and alternate) are identified during mobilization.

#### *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 Virginia (VA) OSHA office contact information is as follows:
  - (757) 441-3820
- The work activities on the project must be stopped for 24 hours.
- Assist the SHM and OSHA, (VA) 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 E). 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 TtEC's WorkCare<sup>®</sup> 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 as necessary, but not less than on a weekly basis, maintained in good condition, and located in an accessible location for active work being performed.

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 Facility instruction.

Potable water will be provided for washing hands and face and for any drinking water provided to employees.

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

TtEC will utilize existing roads and pathways to the extent possible to access work locations where the remedial action will be performed; however temporary haul roads will be constructed to access the removal areas and signage will be posted to direct incoming and outgoing traffic. Areas where construction equipment operates and where controlled work zones are established will be marked and controlled to prevent unauthorized access or conflicts with other operations and tenants.

Appropriate barricades and warning signs will be posted to control access and prevent accidents. As required, the SS will coordinate with the NTR and base designated point of contacts.

## **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. PPE for site workers is selected and used based upon the existing and potential hazards anticipated, and the requirements of 29 CFR, Part 1910.120. Different levels of personal protection will be provided to workers depending on specific work tasks performed. The selection of PPE also requires an evaluation of chemical contaminants, concentrations of these chemical contaminants, and physical hazards that may be encountered.

### **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 milligrams per kilogram (mg/kg) up to 980 mg/kg (see Section 9.7.1 for more information on lead hazards and controls) making it 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 Permissible Exposure Limit (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 TtEC's 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.

In addition to dust inhalation hazards, hazardous vapors may be present in confined spaces (14-foot deep excavation). However, confined spaces will not be entered as part of this project. Therefore, formal air monitoring will not be required.

#### 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 basic level of PPE selection, as required by 29 CFR 1910.132, on the project site are a standard work uniform consisting of long pants and long sleeved shirt and includes a hardhat when overhead hazards are present, safety glasses, safety boots that comply with American Society for Testing Materials (ASTM) F2412 and ASTM F2413 (except during geophysical operations), leather work gloves, work clothes, high visibility Class 2 safety vests, 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 anticipated.
- Change in site condition that decreases the hazard.
- Change in work task that will reduce contact with hazardous materials.

If hazardous materials are in use on the project, the MSDS/SDS will be evaluated to determine the need for any additional PPE (e.g., chemical protective gloves) prior to use of these products.

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 work are physical hazards associated with heavy equipment, tree felling, and open excavations. The physical hazards, if not properly controlled or if safe work practices are not followed, can lead to strains, sprains or breaks; punctures, lacerations, cuts, bruises or contusions; struck-by or caught-in injuries; and/or ergonomic strains from repetition or improper task positioning.

Chemical hazards at the present time include hazards related to the contaminants of concern, use of fuel, oil, and lubricants for the operation and routine maintenance of heavy equipment use. The MSDS/SDS and inventory (See Appendix F) will be onsite and workers will be trained to the

Hazard Communication Standard (see Section 9.8 of this APP). The known chemical contaminants in the soil are metals. Metals are harmful if ingested and/or inhaled via airborne dust particles.

Should unanticipated chemical contamination be discovered during excavation tasks (odor, stained or discolored soil, discovered buried containers, etc.), work will stop and the PM and SHM as well as the NTR/ Facility Engineering and Acquisition Division (FEAD) and RPM will be notified as this is a changed condition. This plan will be updated to include requirements for monitoring, chemical sampling and any upgrades to PPE and respiratory protection required.

There are also numerous construction-related or environmental physical hazards including but not limited to noise, slips, trips, and falls, heat or cold stress, and potential for severe weather. Biological hazards may be present onsite as well and include bloodborne pathogens (e.g., if first aid or CPR are required) as well as the potential for contact with poisonous plants, snakes, and bites or stings by insects.

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

#### 9.7.1 Chemical Hazards

This removal action involves handling of contaminated surface soil. Site contaminants in surface soil include heavy metals such as lead, arsenic, chromium, manganese, and zinc at various levels above the Preliminary Remediation Goals (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 removal activities. Based on soil sample data collected to date, soil contaminant concentrations are as follows:

- Arsenic – 7.9 mg/kg
- Chromium – 136 mg/kg
- Lead – 984 mg/kg

- Manganese – 436 mg/kg
- Zinc – 840 mg/kg

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 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 staging areas as necessary to control dusts that could be generated and migrate off site on windy days.
- All soil 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 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 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 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 to prevent the off-tracking of soil into other areas of the site.

It is anticipated that for the planned work activities, a two-zone approach will be used during work at this site as there is currently no anticipated potential for coming into contact with site contaminants. The two-zone approach will include an Exclusion Zone (EZ) and a SZ, where the EZ is the controlled work zone around the active excavation work areas in which special precautions are required to protect from metals contamination and physical hazards and the SZ is for staging of safety equipment (e.g., fire extinguisher, first aid kit, etc.). Even with a two-zone approach without chemical contamination, equipment and materials leaving a work area must still be inspected and any adhering soil and materials in tracks or on equipment buckets must be removed prior to their release from the work area.

When there is a potential for coming into contact with or spreading of site contaminants (currently not anticipated), a three-zone approach will be used. The three-zone approach will be comprised of an EZ, a contamination reduction zone (CRZ), and a SZ. The degree of control and the requirements for establishment and management of these zones will be at direction of the SSHO based onsite conditions, the potential for spreading of or contact with contaminants, and activities being performed.

Site control requires the establishment of a regulated area and designated site work zones appropriate to the work task.

To minimize the transfer of potentially hazardous substances from the site (in areas where this is a concern, if such areas are identified) and to control access into potentially hazardous areas where work is being performed (the EZ), project personnel will:

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

### *9.7.2.1 Exclusion Zone*

The EZ will be formed where active work areas and tasks are being performed where entry by unauthorized or uninformed persons could be hazardous or require additional controls. Barricades, high visit or cones, along with caution tape, will delineate the EZ.

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

### *9.7.2.2 Contamination Reduction and Support Zone*

Adjacent to the EZ, the CRZ and SZ will be combined and serve as a buffer zone to prevent the spread of contamination beyond the work area and for the placement of support equipment and facilities. Workers will either wrap contaminated tools and equipment with plastic, or workers will decontaminate the equipment and themselves 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.

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 SS is responsible for establishing and maintaining appropriate equipment and personnel decontamination areas and ensuring that subcontractors follow this plan. The SSHO will assist the SS to ensure that adequate decontamination procedures are identified for tasks 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, including adhering soil and mud to personnel or to non-contaminated or clean areas. Each person involved in site operations must regularly practice the methods, listed below, for contamination reduction.

- Know the limitations of the protective equipment being used.

- Do not sit or lean against anything in a contaminated area and try to limit the need for excessive contact with contaminated media.
- Use the proper tools to safely conduct the job.
- Inspect tools and equipment for gross contamination with soil and/or mud before tracking out of work area or onto paved roads.

#### *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.

In general, decontamination will consist of:

- Removing residual materials regardless of their source before taking breaks or engaging in hand-to-mouth activities.
- Employing soap and water wash and rinse for hands. Hygiene wipes may also be used but is 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 or offices.
- Proper doffing of used and contaminated PPE and proper storage of reusable PPE after decontamination and between uses.

#### *9.7.3.4 Personnel Decontamination Guidance*

It is anticipated that in most instances with this project, PPE will not be contaminated and can be doffed and stowed for further use (other than disposable Nitrile gloves, which will be removed and disposed of in a designated waste receptacle). However there may be a need to use a boot wash or other minor wet decontamination if workers walk in areas of soils or sediments and have mud adhering to PPE or boots (no soap solution required).

A hand washing station will be available for workers to wash their hands and face (if required) before leaving the work area or taking breaks. Workers will be instructed to wash hands before going on breaks.

Decontamination levels may require amendment should other chemical contamination be discovered in the work area or if dust control measures prove to be ineffective.

#### *9.7.3.5 Equipment Decontamination Guidance*

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. Heavy equipment tires and tracks are not anticipated to come into contact with contaminated soil and wet decontamination methods are

not anticipated to be required for equipment at this time. Tracked vehicles will not be operated onto roadways.

The SS will be responsible for evaluating equipment both arriving onsite and leaving the site. The Equipment Inspection Checklist 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 onsite in the form of biting or stinging insects, venomous snakes, potential wild animals that could bite, contact with poisonous plants, and bloodborne pathogens in the event that first aid/CPR is performed. Workers should anticipate the likelihood of encountering insect, snake, and wild animals, 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, and especially 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 are instructed to have allergy medication (that prescribed to them by their physician) onsite. The following is a list of preventive measures:

- Apply insect repellent prior to fieldwork and as often as needed throughout the work shift. Apply N, N -Diethyl- meta -toluamide (DEET) (vapor-active repellent) to any exposed skin surface (except eyes and lips), and apply the permethrin repellent spray to field clothing. Note: Allow the permethrin to dry before using the treated clothing.
- Wear proper protective clothing (work boots, socks and pants).
- Tuck pant legs into socks and wear long-sleeved shirts (see more information in tick section below)
- When walking in vegetated areas, avoid contact with bushes, tall grass, or brush as much

as possible.

- Avoid placing bare hands under rocks or loose debris.

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 and cause localized itching or discomfort; however, there is a very limited potential for dangerous spiders of particular concern (Northern Black Widow, Sac spiders) in the area. Report any suspected spider bites to the SSHO and observe for any signs that the bite may be more serious (very itchy, painful, red, ulcerating, body temperature or blood pressure increasing, excessive sweating, nausea, vomiting). Seek medical attention if an allergic reaction or venomous bite is suspected.

#### *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:

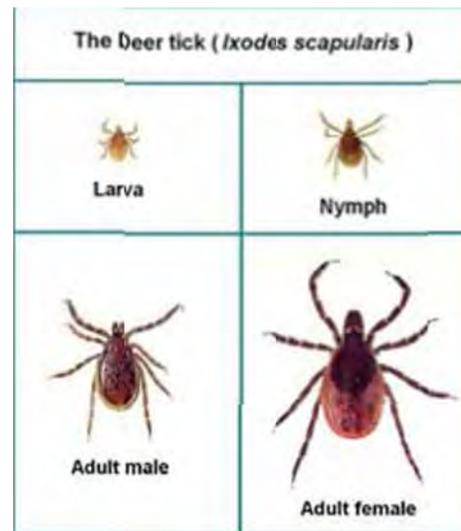
- Mosquitoes are most active at dawn and dusk. Limit outdoor activities at those times, when possible.
- Wear long-sleeved shirts and long pants.

- 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®). 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 may 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, poison sumac, and poison oak may present in Virginia and may be encountered in vegetated areas of the site if such plants have become established in these areas. The potential for contact with poisonous plants 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. Atlantic Poison Oak is a woody, perennial plant that occurs as a low-growing shrub (average height, 2 to 4 feet, maximum, 10 feet). It does not climb as a vine. Stems generally grow upright. Leaflets occur in threes, and are variable in size and shape. The middle leaflet usually is lobed alike on both margins and resembles a small oak leaf, while the two lateral leaflets are often irregularly lobed. Each leaflet is about 6 inches long, shiny above, velvety beneath. Leaves are generally bright green in the spring (or bronze when first unfolding), yellow-green to reddish in the summer, and bright red or pink in the fall. Small yellow-white flowers develop into greenish white or tan colored berries, arranged in slender, axillary 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 Zanfel, 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 Zanol to wash the affected area, use 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*

There are three species of snakes indigenous to the state of Virginia known to be venomous. These snakes include the Northern Copperhead, Eastern Cottonmouth, and 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, including burrows, crevices, 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 SSHO 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.

#### *9.7.4.6 Bloodborne Pathogens*

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

(HIV)/Acquired Immune Deficiency Syndrome (AIDS).

Potential bloodborne pathogen exposures include:

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

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

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

When cleaning up blood or other bodily fluids:

- Clean up the spill immediately or soon as possible after the spill occurs.
- Use disposable gloves and other PPE when cleaning spills.
- Wipe up the spill with paper towels or other absorbent materials.
- After the area has been wiped up, flood the area with a solution of one quarter cup of liquid chlorine bleach to 1 gallon of fresh water and allow it to stand for at least 20 minutes.
- Dispose of the contaminated material used to clean up the spill in a labeled biohazard container.

The SSHO should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job. Site personnel will be given bloodborne pathogens training.

## **9.8 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 spray paint for marking ground). When any material or chemical is brought onto the site, a MSDS/SDS must be provided to the SSHO. This includes all hazardous materials brought onsite by the subcontractors for their operations. Copies of MSDSs/SDSs are included in Appendix F of this APP.

The SSHO will include all MSDSs in an Appendix F to the APP in the field and a copy 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. In addition, a hazardous material inventory will be maintained onsite.

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. All workers will have received training in the GHS labeling, marking, and SDS formats.

### **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 WPNSTA CAX 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. The SSHO will implement TtEC EHS Procedure 4-6, Temperature Extremes.

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) when temperatures exceed 70° F.
- 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 Kg) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat.

#### **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 remedial action. All work will be performed during daylight hours.

#### **9.17 Fire Prevention Plan**

Fire prevention and protection measures require preplanning. At least one 10A:20BC fire extinguisher will be located at each work area and at least one 1:A: 10-BC fire extinguisher will be located within each site vehicle and each piece of heavy equipment.

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 SSHO in accordance with Base instruction.
- Personnel will follow hot work procedures to ensure that work is performed in a safe environment. Hot work is not anticipated for this project.
- 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.
- Any spills will be promptly cleaned up and sorbent materials will be placed in a closed metal container for disposal.

Hot work is not planned, but, if required (for instance if grinding or cutting 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, EHS 6-5 and its permit system will be implemented if any work is considered to be hot work, including fire watch. The facility may require notification of base authorities if hot work is planned. This will be coordinated through the RPM and/or FEAD.

In the event of a fire or explosion, contact the appropriate emergency authorities by calling 911 as specified in Table 9.2 – Emergency Contact Information. Any fire must also be reported to the RPM, FEAD, PM, and 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 OICC in coordination with the SS will manage notifications and follow-on reporting as required.

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

Not applicable.

### 9.19 Hazardous Energy Control Plan

Not applicable.

### 9.20 Lift Plan

Not applicable.

### 9.21 Contingency Plan for Severe Weather

The potential for severe weather is possible as the site is located near the Atlantic Ocean where storms can occasionally be severe, including hurricane force winds. 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. 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 onsite as an indicator of approaching storms.

The SS and the SSHO will assess what work procedures can be safely performed when wind conditions exceed 25 miles per hour (mph), lesser wind speeds may require consideration of work suspension for certain tasks. 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 eye-wall, 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 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 Government property.

It is advised that before an emergency, each contractor secure emergency disaster kit with non-perishable food, potable water and other supplies (e.g., flashlights, first aid kit, emergency sideband radio or weather radio, 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:

- **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.
- **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 Condition of Readiness updates and completion of required actions.

- **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 updates and completion of required actions.
- **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 gather together offsite in a safe place of refuge such as a storm shelter. 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 OICC and Contracting Officer permission) conduct an evaluation of any worksite damages and precautions that may be required prior to returning to work and will report damages to the PM, SHM, and Contracting Officer.

## 9.22 Float Plan

Not applicable.

## 9.23 Site-Specific Fall Protection and Prevention Plan

Workers could potentially be exposed to a fall hazard of 6 feet or more during the excavation of the Can Pit area, which is anticipated to be excavated to a depth of 14 feet below ground surface. Workers will not be permitted to enter the excavation and high visibility fencing and signage will be installed to warn of the open excavation. Additionally, workers will not climb onto the top of a building, above-ground bulk storage tank, or onto any other platform that exposes them to a fall of 6 feet or more.

Should a worker be exposed to a fall hazard of 6 feet or more or a task be identified where a worker will need to access an area that is higher than 6 feet from lower level without proper guardrails, they wear fall protection and a competent person develops, submits and implement onsite, a Site-Specific Fall Protection and Prevention Plan in accordance with Section 21.C of EM 385 1-1. This plan, if required shall include, in detail, the specific practices, equipment and methods used to protect workers from falling to lower levels. The plan will be updated as conditions change and at least every 6 months.

## **9.24 Demolition Plan (Engineering and Asbestos Surveys)**

Not applicable.

## **9.25 Excavation/Trenching Plan**

The soil and subsurface debris within the Can Pit are expected to be excavated to a depth of 14 feet bgs (10 feet below the current ground surface) over a 600 square foot area. Because of the depth of the excavation, the sidewalls will be sloped away from the Can Pit area as needed to provide a safe work area and to prevent sloughing and/or cave in. It is expected that a 1:1 slope will be required.

Excavations greater than 4 feet deep will be treated as a confined space and therefore, confined space procedures would need to be implemented if workers enter these excavations (not anticipated). In addition, for excavations that are 6 feet or greater in depth (not anticipated), field personnel must be at least 6 feet from the edge of the excavation unless fall protection systems are used. Fall protection systems include guard rails or personal fall arrest systems. For excavations greater than 4 feet deep, work will be completed using non-entry techniques. In addition, workers will not work on potentially unstable slopes or be downslope when excavation activities are performed. Workers will not walk on slopes that are greater than 45 degrees.

The following are additional considerations for conducting excavations:

- Excavation areas are identified onsite drawings. The location will be evaluated for presence of underground and overhead utilities and a utility search (including a One-Call, 811) 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. 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.
- Unless otherwise designated, the SS is considered to be the excavation competent person. The competent person will have a background in soil mechanics or previous construction experience involving excavations. The PM 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.
- Inspections will be performed daily on all excavations, adjacent areas, and protective systems (if used) before personnel enter the excavation. The checklist provided in EHS Procedure 6-3 or equivalent will be used.

## **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.

### **9.34 Blasting Safety Plan**

Not applicable.

### **9.35 Diving Plan**

Not Applicable.

### **9.36 Confined Spaces**

Not applicable.

## **10.0 RISK MANAGEMENT PROCESSES**

AHAs for the planned activities are listed in Section 2.1 of this plan and AHAs are included in Appendix A of this APP. 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. 20014. Project Orientation, Rules and Safety Guidelines Handbook. January 2014.

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 BLS Data for NAICS 562190 (TRIR and DART Rates)**

	NAICS 562910 Remediation Services 2013	TtEC 2012	TtEC 2013	TtEC 2014
Total Recordable Incident Rate (TRIR)	2.7	0.30	0.59	0.81
Days Away/Restricted Duty/Transfer Rate (DART)	1.6	0.15	0.59	0.27

Additional information  
 0.7 DA BLS 2013  
 0.9 RT BLS 2013

**Table 9.1 Type and Location of Emergency Equipment**

Equipment	Location
Industrial First Aid Kit with Bloodborne Pathogens Kit	SZ for active work locations
Fire Extinguisher, one 6A:80BC	SZ for active work locations
Fire Extinguisher, one 1:A:10BC	Site vehicles and heavy equipment
Fire Extinguisher, one 40-BC	Refueling Areas
Portable eye wash (15-minute/0.4 gallon per minute)	SZ for active work locations
Air Horn (if not equipped with vehicle horn)	Active work location
Spill Kit (appropriately stocked with sorbent pads, socks, gloves, and bags)	Each active working area and refueling areas
Cellular Telephones and handheld radios	Minimum of SS and SSHO (others as required for safety and communication purposes)

**Table 9.2 Emergency Contact List**

Ambulance/Fire/Police (cellular) (757) 887-4911 (land line) 911	
Medical:	
Riverside Doctors' Hospital Williamsburg 1500 Commonwealth Avenue Williamsburg, Virginia 23185 (See Figure 9-2)	(757) 585-2200
WorkCare® Case Intervention	1-800-455-6155 1-888-449-7787
Poison Control	1-800-222-1222
Navy Contracting Officer, Zane Perry	(757) 322-4777
Navy NTR, Scott Park	(757) 341-0481
Navy RPM, Scott Park	(757) 341-0481
FEAD Safety Contact, George Colley	(757) 636-7215
TtEC PM, Mark Pisarcik	(757) 518-8491 (office phone) (757) 544-2085 (cellular phone)
TtEC SHM, Roger Margotto, CIH	(619) 471-3503 (office phone) (619) 988-0520 (cellular phone)
TtEC SS, TBD	(###) ###-####
TtEC SSHO, TBD	(###) ###-####
Other subcontractor key personnel contact information (e.g., supervisors) will be added at a later date.	

Abbreviations and Acronyms:

CIH – Certified Industrial Hygienist  
 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**

Core Temperature °F	Clinical Signs
95°	Maximum shivering.
87°- 89°	Consciousness clouded; blood pressure becomes difficult to obtain; pupils
84°- 86°	Progressive loss of consciousness; muscular rigidity; respiratory rate
79°	Victim rarely conscious.
70°- 72°	Maximum risk of ventricular fibrillation.

## **FIGURES**

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CAD FILE: WE35 FIGURE1-1.DWG



SOURCE: CH2M



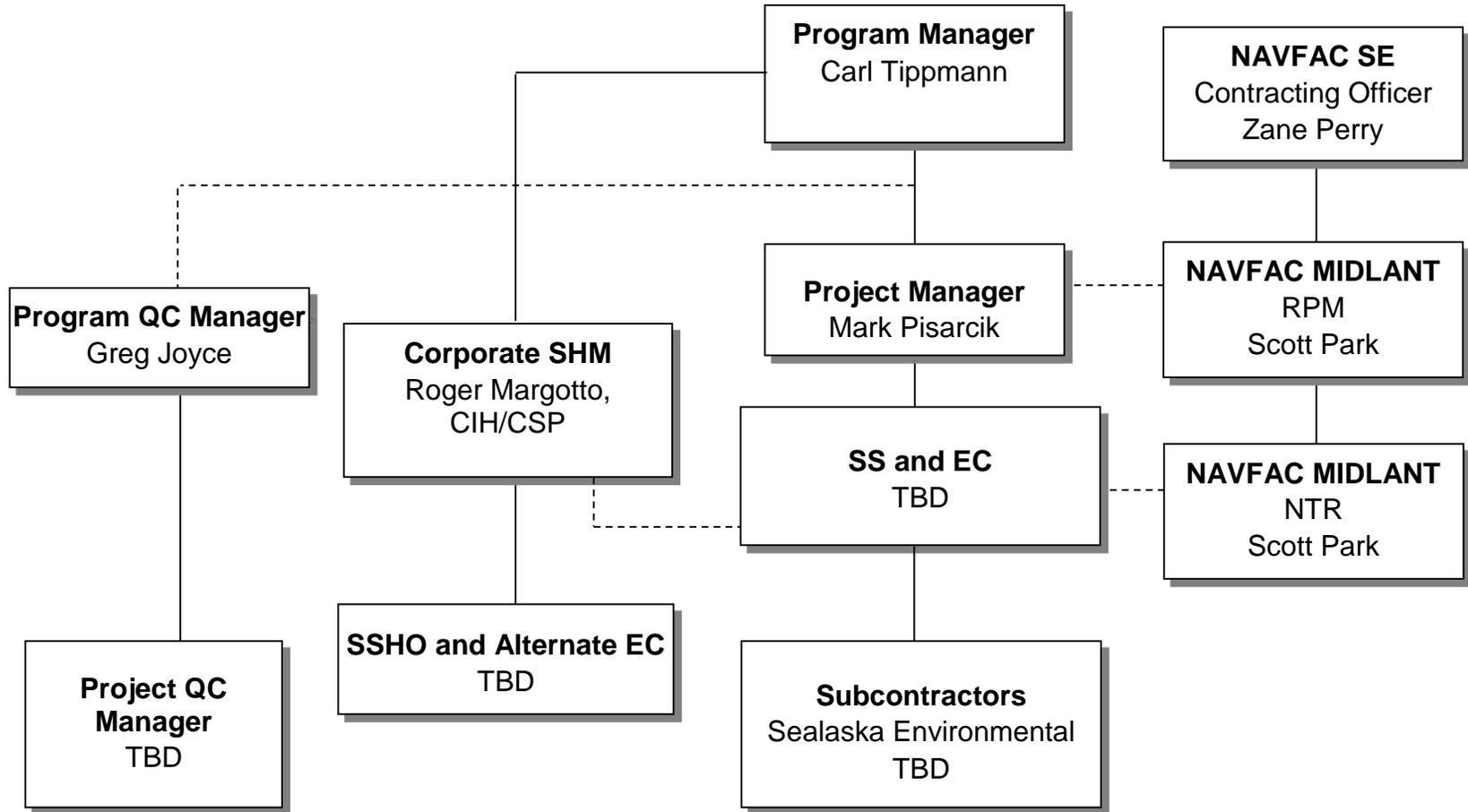
TETRA TECH EC, INC.

Cheatham Annex AOC 7  
**NON-TIME CRITICAL REMOVAL ACTION**  
 LOCATION MAP

PREP	CHK	APPR	DATE

**FIGURE 1-1**

Figure 4 - 1 Organizational Chart



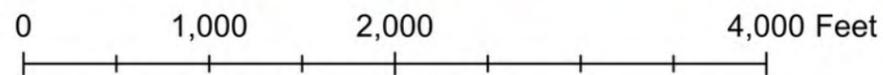
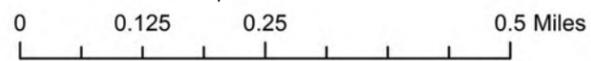
CAD FILE: APP-WE35 FIGURES-1-REV.DWG



**LEGEND:**

- PRIMARY EVACUATION ROUTE
- EVACUATION ROUTE DIRECTION

SOURCE: ESRI Maps



TETRA TECH EC, INC.

Cheatham Annex AOC 7  
**NON-TIME CRITICAL REMOVAL ACTION**  
**EMERGENCY EVACUATION ROUTE**

PREP	CHK	APPR	DATE
			NOV 10-2014

**FIGURE 9-1**



**DIRECTIONS:**

- HEAD **SOUTHWEST** ON **SANDA AVE.** TOWARD **A ST.**
- CONTINUE ONTO **STATE ROUTE 641**
- CONTINUE STRAIGHT ONTO **VA-199 W**
- TAKE THE **US 60 RAMP** TO **WILLIAMSBURG/BUSCH GARDENS**
- TURN LEFT ONTO **US-60W**
- TURN LEFT ONTO **BATTERY RD.**
- AT THE TRAFFIC CIRCLE, TAKE THE **3RD.** EXIT ONTO **COMMONWEALTH AVE.**
- DESTINATION WILL BE ON THE RIGHT
- RIVERSIDE DOCTORS' HOSPITAL WILLIAMSBURG**
- 1500 CONNONWEALTH AVE.
- WILLIAMSBURG, VA 23185

RIVERSIDE DOCTORS' HOSPITAL

SOURCE: ESRI Maps

0 0.35 0.7 1.4 Miles

0 2,550 5,100 10,200 Feet

CAD FILE: APP-WE35 FIGURES-2-REV.DWG



TETRA TECH EC, INC.

**Cheatham Annex AOC 7  
NON-TIME CRITICAL REMOVAL ACTION  
HOSPITAL ROUTE MAP**

PREP	CHK	APPR	DATE
			NOV 10-2014

**FIGURE  
9-2**

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

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# Activity Hazard Analysis (AHA) #1

<b>Activity/Work Task: Mobilization, Site Setup, and Clearing</b>	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>	<b>H</b>				
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>					
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>				
Date Prepared: January 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
	Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
	Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p style="color: red;">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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).					
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.				<b>RAC Chart</b>	
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.				<b>E = Extremely High Risk</b>	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.				<b>H = High Risk</b>	
					<b>M = Moderate Risk</b>	
<b>L = Low Risk</b>						

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
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. Coordinate with OICC and Base personnel as required. Conduct site orientation with the folks involved in mobilization tasking including establishment of laydown areas, unpacking and unloading and staging of materials, review of 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
Site Setup (Unloading and initial staging of materials and equipment)  (general site hazards)	Vehicle operations from TtEC, subcontractor, or other tenant operations and delivery vendors could cause injury to personnel or others onsite	Workers operating company or subcontractor 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. All personnel and trucks will have Base badges following Base procedures. 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 as required to identify travel and traffic patterns and to delineate work areas. Follow designated traffic routes, as indicated in the traffic plan.	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 at the waist nor 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

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Site Setup (Unloading and initial staging of materials and equipment)  (general site hazards) (continued)	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. 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. Stairs must have a 20-inch beyond door/gate swing radius platform as required by 29 CFR 1926.1052 (a) (4).	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. If using a retractable knife blade always cut away from the body. Retract the blade after use, but never put it in a pocket. Put it in a tool belt or a tool box or carrier.	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. The voltage of lines, if present, must be known.	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. SSHO to implement EHS 4-6, Temperature Extremes.	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 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 on roads and in laydown areas.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Site Setup (general site hazards) (continued)	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 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. 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– 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. Call 811 National One Call, contact base for as-built diagrams and further information regarding other potential utilities.	M
	Fall hazards (falls from heights of 6 feet or greater)	No person will climb upon any equipment, shipping container, building, 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, which are included in the APP.	L

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Site Setup (general site hazards, continued)	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 to be performed, as required.	L
	Electrical hazards could be present during tool use or 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. 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 electrical work requires arc flash protection and a permit from the base as required by EM 385-1-1 , section 11.A.02.c	M
	Workers could be injured by high winds of sudden storms.	Ensure that all debris/materials are secured. Shut down operations when wind speed is greater than 25 mph sustained or lesser based on potential hazards (e.g., tree limbs could fall) or lightning within 10 miles. Monitor the local weather report daily and as necessary for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies. Have a lightning detector on hand.	M
	Workers could be exposed to extreme temperatures and sunburn.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather and while wearing heavier clothing. Wear broad-spectrum sunscreen lotion with an SPF of 15 or greater.	M
	Lack of effective communication could lead to a delayed response in an emergency.	Ensure that each work team has 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. Test the communication systems in use to ensure they function properly. Post the emergency plan in the SZ, with emergency contact list.	M
	Exposure to poison ivy or oak.	As area is inspected, identify any “suspicious” vegetation that may be poison ivy or 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® or Zanfel post-exposure washing agent available.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Site Setup (general site hazards, continued)		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.	
	Failure to observe and prepare for encounter 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. Wear snake chaps (gaiters). 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.  Ticks are a concern on this project. Use insect repellent as needed to discourage ticks. After walking through tall brush or grass, inspect clothing for the presence of ticks. Know how to identify the insect. Fully inspect your body after the work shift for the presence of ticks.	M
Install stormwater control measures including stone construction entrance, stockpile areas, and silt fences or filter socks	Manual movement of hay bales (for stockpile containment area use) may cause injury to workers	Move using heavy equipment when possible in lieu of manual movement to avoid unnecessary strain. Use safe lifting practices to protect from straining muscles.	M
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, and debris, mark or barricade other obstructions. Keep work boots free from mud which causes a loss of traction.	M
	Biological hazards such as snakes, insects, or spiders could cause injury or bites.	Wear PPE. Look carefully for snakes before stepping into any area or before placing hands near the ground. Watch out for snakes when disturbing rubble or debris. Use insect repellent as necessary. Use care around debris and locations where spiders, especially black widow spiders, may be found (such as tall vegetation, out houses and so forth).	M
	Injury from wooden spikes used with silt fences	Wear heavy work gloves to protect from splinters. Always carry spikes in a bag to avoid getting poked by the pointed tips. Use the proper tool, a mallet or hammer, to pound the stakes into the ground.	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.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Clearing activities (for temporary access road and work areas)	Exposure to poison ivy or oak.	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® or Zanfel post-exposure washing agent available.  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 HSG 2-8 in the CRL for details.	M
	Failure to observe and prepare for encounter 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. Wear snake chaps (gaiters). 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.	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 around heavy equipment and must remain visible to the operator.	M
	Chainsaws can cut or strike workers causing severe injuries if used improperly	Workers well trained and experienced in the use of chainsaws 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 leather chaps when working with chainsaws.	M
	Eye injuries with flying wood chips and debris when using chainsaws.	Workers will wear safety glasses and a face shield (mesh) when using chainsaws. 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

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Clearing activities (continued)	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 and when using chainsaws.	M
	Slips, trips, and falls in debris piles from cutting.	As trees are felled and limbed, debris will be placed into manageable piles to keep potential trip and fall hazards to a minimum.	M
	Slips, trips, and falls while carrying saws could cause injury	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.	M
	Struck by or against heavy equipment	Wear high-visibility safety vests when working on ground in vicinity of powered or other clearing equipment. Make eye contact with operators before approaching equipment.	M
	Workers on ground around tree felling activities could be struck by falling trees	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 100 feet. Workers will wear high-visibility vests on the ground and have a means of communication. 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.	H
	Workers could be struck by falling limbs on trees they are cutting	Inspect tree for dead or unstable branches or tops prior to removing. If hazardous trees are identified, mark them and only remove using heavy equipment with cutter attachment (vs. chainsaw). 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 expediently when tree begins to fall. Wear a hard hat with face shield.	H
	Operator in cab of heavy equipment could be struck by falling trees	Operator cab will be protected by a sturdy steel mesh cab protector shield over the glass area. Operator will be familiar with and trained in the proper operation of the cutting tool and cutting technique to fell trees away from the cab. Even in cab, operator will wear safety glasses and hard hat in the event a limb comes through mesh and shatters glass.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Clearing activities (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.	L
	Strains to workers from use of tools, such as weed cutters.	Maintain steady pace when using tools, and take adequate rest periods. If possible, rotate tasks among the workers. Use appropriate tools for the task, and maintain them in good condition.	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.	M
	Venomous snakes could be present and hidden in vegetation	Watch out for venomous snakes. Wear snake chaps for walking in vegetation. Do not corner snakes. If bit, report the bite immediately and try to remember any details about the snake for identification purposes. Seek medical attention if snake bites occur.	M
	Workers could be exposed to extreme temperatures and sunburn.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather, and while wearing protective clothing. Wear broad-spectrum sunscreen lotion of SPF 15 or better.	M
	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.	M
	Workers could experience strains from manually moving materials and equipment.	Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting at the waist, 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. Use heavy equipment (e.g., excavator with thumb) to move and stack log debris.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Clearing activities (continued)	Log stacks could roll and injure personnel	Provide log restraints on sides of haul vehicles and storage areas to contain logs if they shift. Keep personnel away from log stacking operations and stage and load logs on level ground if possible. Do not ever walk on top of stacked logs.	M
	Workers could experience eye hazards.	Safety glasses are the minimum required eye protection for all work areas. Locate a portable emergency eye wash at each work area. Flush objects from eyes; do not rub. Wear face shield when using brush cutting equipment.	M

<b>AHA #1 – Activity/Work Task: Mobilization, Site Setup, and Clearing</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. All power tools will be listed by Underwriters Laboratories (UL) or the Canadian Standards Association (CSA)
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

**Abbreviations and Acronyms:**

AOC – Area of Concern  
 APP – Accident Prevention Plan  
 CAX – Yorktown – Cheatham Annex  
 CDL – Commercial Drivers License  
 CFR – Code of Federal Regulations  
 CHMM – Certified Hazardous Materials Manager  
 CIH – Certified Industrial Hygienist  
 CRL – Corporate Reference Library  
 CSP – Certified Safety Professional

dBa – decibels, A-scale  
 DEET – N,N-diethyl-m-toluamide  
 EHS – Environmental, Health, and Safety  
 EM – Engineer Manual  
 Gound Fault Circuit Interrupter  
 HGS – Health and Safety Guideline  
 mph – miles per hour  
 OFCI  
 OICC – Officer In Charge of Construction  
 P.E. – Professional Engineer

RAC – Risk Assessment Code  
 SS – Site Superintendent  
 SSHO – Site Safety and Health Officer  
 SZ – support zone  
 WPNSTA – Naval Weapon Station

**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) #2

<b>Activity/Work Task: Sampling</b>	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>				<b>M</b>	
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>					
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>				
Date Prepared: January 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p>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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).					
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.			<b>RAC Chart</b>		
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.			<b>E = Extremely High Risk</b>		
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.			<b>H = High Risk</b>		
			<b>M = Moderate Risk</b>			
			<b>L = Low Risk</b>			

<b>AHA #2 – Activity/Work Task: Sampling</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Collection of pre-excavation confirmation, waste characterization, and clean fill verification soil samples from in-situ soil.	Handling heavy objects (coolers) could cause injury to worker	Observe proper lifting techniques. Obey sensible lifting limits (50 pound maximum per person manual lifting). Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads.	M
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris. Mark, identify, or barricade other obstructions. Do not walk on slopes greater than 45 degrees.	M
	Dermal contact with potentially contaminated soil	Wear double layer nitrile gloves and avoid touching soiled gloves when removing. Wear Tyvek suit or disposable coveralls and rubber boot covers. Do not generate dust emissions.	L
Collection of clean fill samples from stockpiled soil	Slips/trips/falls	Watch footing and be alert of surroundings. Ensure work areas and pathways are cleared and free of debris.	M
Containerizing and shipping samples	Broken glass sample jars could cause cuts/lacerations	Inspect cooler contents carefully. Dispose of damaged/broken sample jars. Handle sample jars with care.	L
	Handling heavy objects (coolers) could cause injury to worker	Observe proper lifting techniques. Obey sensible lifting limits (50 pound maximum per person manual lifting). Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads.	M
General	Heat stress/cold stress	Monitor for heat/cold stress in accordance with TtEC safety procedures. Provide potable water/fluids to prevent worker dehydration. Take adequate rest periods in a warm/cool shaded area.	M

<b>AHA #2 – Activity/Work Task: 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. Receipt inspection by SS.
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
Sample supplies/tools	Samplers must be familiar with proper sampling procedures and use of tools.	Receipt inspection.
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.

**Abbreviations and Acronyms:**

- AOC – Area of Concern
- APP – Accident Prevention Plan
- CAX – Yorktown – Cheatham Annex
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- P.E. – Professional Engineer
- RAC – Risk Assessment Code
- SS – Site Superintendent
- SSHO – Site Safety and Health Officer
- WPNSTA – Naval Weapon Station

**AHA Signature Sheet**

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

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## Activity Hazard Analysis (AHA) #3

<b>Activity/Work Task:</b> Excavation of Soil and Debris	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>	<b>M</b>				
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>					
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>				
Date Prepared: January 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p style="color: red;">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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).					
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.				<b>RAC Chart</b>	
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.				E = Extremely High Risk	
					H = High Risk	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.				M = Moderate Risk	
				L = Low Risk		

<b>AHA #3 – Activity/Work Task: Excavation of Soil and Debris</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Utility Clearance	Failure to mark all utilities could cause inadvertent contact with energized lines during the demolition.	The project area has previously been excavated by another contractor. Verify that any utilities have been marked. Ensure that all lines are marked per standard color code system for utility marking. Review as-built drawings, Contact 811 National One Call.	M
Soil and Gravel Excavation	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 acknowledgment 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.	M
	Handling Heavy Objects could cause injury to personnel.	Observe proper lifting techniques.	M
	Open excavation could present a slip/trip/fall hazard.	Ensure work area is delineated and high visibility fencing or similar signage surrounds open excavations. Minimize time excavations are open. Clear walkways of equipment, vegetation, excavated material, tools, and debris. Identify and mark or remove any slip/trip fall hazards that may be present. Open excavations must be protected as required by EM 385-1-1, Section 25.B.01 and definition of Perimeter Protection in Appendix Q.	M
	Contact with underground and above-ground utilities could cause injury to workers and damage to property or equipment.	Inspect the area for utilities and clearance for heavy equipment. Subsurface lines will be hand dug within 3 feet of markings until the line is exposed. Live utility lines will remain in operation during excavation activities, and thus, care must be taken in order to prevent contact. Lines will be protected, as necessary during excavation activities. Review EHS 3-15 regarding maintaining safe zones of excavation around utilities.	H
	Contact with overhead utilities could cause injury to workers and damage to property or equipment.	Ensure that the area has been surveyed and that the boom will not contact overhead lines (minimum 15-foot clearance required).	H

<b>AHA #3 – Activity/Work Task: Excavation of Soil and Debris</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Soil Excavation (continued)	Failure to contact locator could cause damage to existing lines. The potential exists for electrocution or other release of energy that could injure workers.	Contact utility locator service (811). Ensure that all utility lines are marked. Ensure that a “ticket” number has been issued by 811 National One Call . For on base installations “One Call” is not sufficient. Review as built and perform geophysical or ground penetrating radar to locate additional lines.	M
	14-foot deep excavation presents confined space and cave-in hazards.	Personnel will not be allowed to enter excavation. Proper signage and/or high visibility fencing will be placed around the excavation to warn of hazards. Sidewalls of excavation will be sloped to prevent material cave-ins. It is expected that a 1:1 slope will be required for the can pit area excavation.	M
Hand digging	Workers may have back strains or other muscular injuries while performing hand digging.	Workers must use safe techniques when shoveling such as avoiding twisting at waist. It is better to pivot with the feet. Consider using an alternate techniques such as air lancing to dig away the soil.	M

<b>AHA #3 – Activity/Work Task: Excavation of Soil and Debris</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.
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
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.

**Abbreviations and Acronyms:**

AOC – Area of Concern  
 APP – Accident Prevention Plan  
 CAX – Yorktown - Cheatham Annex  
 CHMM – Certified Hazardous Materials Manager  
 CIH – Certified Industrial Hygienist  
 CRL – Corporate Reference Library  
 CSP – Certified Safety Professional  
 EHS – Environmental, Health, and Safety  
 P.E. – Professional Engineer

RAC – Risk Assessment Code  
 SSHO – Site Safety and Health Officer  
 SHM – Safety and Health Manager  
 SS – Site Superintendent  
 WPNSTA – Naval Weapons Station

**AHA Signature Sheet**

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

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## Activity Hazard Analysis (AHA) #4

<b>Activity/Work Task: Transportation and Disposal</b>	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>	<b>M</b>
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>	
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>
Date Prepared: January 2015		Frequent    Likely    Occasional    Seldom    Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	E    E    H    H    M
	Critical	E    H    H    M    L
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	H    M    M    L    L
	Negligible	M    L    L    L    L
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p>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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).	
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.	<b>RAC Chart</b>
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.	E = Extremely High Risk
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.	H = High Risk
		M = Moderate Risk
		L = Low Risk

<b>AHA #4 – Activity/Work Task: Transportation and Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Loading of soil and debris/waste into trucks	Construction equipment could cause injury to personnel.	Wear Class 2 or 3 high-visibility safety vests when exposed to vehicular traffic. Exit equipment slowly and maintain three point contact. Review and follow posted hand signals. Verify all workers involved know what the hand signals mean. 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 acknowledgment 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.	M
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, and debris, mark or barricade other obstructions. Clean mud from boots before climbing on equipment.	M
	High noise levels	Use hearing protection when exposed to excessive noise level (greater than 84 dBA over an 8-hour work period). Assess noise level with sound level meter if possibility exists that noise level may exceed 84dBA.	L
	Defective vehicles could cause injury to personnel and/or damage equipment	Inspect all trucks before loading. Do not load soil/gravel into defective equipment. Ensure trucks are lined and covered during transport.	M
	Contact with overhead utilities could cause injury to workers and damage to property or equipment.	Ensure that the area has been surveyed and that the boom will not contact overhead lines while loading truck (minimum 15-foot clearance required).	M
	Biological hazards such as snakes, insects, or spiders could cause injury or bites.	Wear PPE. Look carefully for snakes before stepping into any area or before placing hands near the ground. Watch out for snakes when disturbing rubble or debris. Use insect repellent as necessary. Use care around debris and locations where spiders, especially black widow spiders, may be found (such as tall vegetation, out houses and so forth).	L
Transporting soil	Roadways may fail under excessive loads	Ensure roadways on truck routes are designed to handle the weight of the vehicles and materials. Ensure transporters follow approved traffic routes while on Base.	M

<b>AHA #4 – Activity/Work Task: Transportation and Disposal</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Transporting soil (continued)	Dust generated	Use dust suppression techniques such as water spray to minimize the generation of dust while trucks are being loaded with soil and gravel. Wash truck tires and wipe accumulated soil off exterior surfaces to minimize the amount of soil tracked out of the work area. Use dust suppression on travel surfaces if dust is being kicked up.	L
Subcontractors working onsite	Lack of subcontractor understanding of TtEC safety policies could cause injury to personnel and/or equipment	Ensure that subcontractors are briefed on relevant safety policies. Ensure subcontractors are following safe practices. If unsafe activities are observed, stop work and correct immediately.	M
Disposal of soil	Inadequate communication	Verify proper transportation routes and disposal location with client before starting work. Communicate with truck drivers to ensure they are aware of where to go. Work with client to secure all proper documentation needed for disposal.	L
	Improper truck signage	Verify all required signage on the transportation trucks is correct. Improper signage could lead to fines.	
Subcontractors working onsite	Lack of subcontractor understanding of TtEC safety policies could cause injury to personnel and/or equipment damage	Ensure that subcontractors are briefed on relevant safety policies. Ensure subcontractors are following safe practices. If unsafe activities are observed, stop work and correct immediately.	M

<b>AHA #4 – Activity/Work Task: Transportation and 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.
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
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.

- Abbreviations and Acronyms:**
- AOC – Area of Concern
  - APP – Accident Prevention Plan
  - CAX – Yorktown - Cheatham Annex
  - CHMM – Certified Hazardous Materials Manager
  - CIH – Certified Industrial Hygienist
  - CSP – Certified Safety Professional
  - EHS – Environmental, Health, and Safety
  - P.E. – Professional Engineer
  - RAC – Risk Assessment Code
  - SHM – Safety and Health Manager
  - SS – Site Superintendent
  - SSHO – Site Safety and Health Officer
  - WPNSTA – Naval Weapons Station

**AHA Signature Sheet**

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## Activity Hazard Analysis (AHA) #5

<b>Activity/Work Task: Backfill and Site Restoration</b>	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>				<b>M</b>	
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>					
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>				
Date Prepared: January 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p>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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).					
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.			<b>RAC Chart</b>		
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.			<b>E = Extremely High Risk</b>		
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.			<b>H = High Risk</b>		
			<b>M = Moderate Risk</b>			
			<b>L = Low Risk</b>			

<b>AHA #5 – Activity/Work Task: Backfill and Site Restoration</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Backfill of clean soil and Grading	Hazards associated with incoming soil trucks that could cause equipment damage or personnel injury.	Ensure subcontractors abide by TtEC safety procedures. Follow posted speed limits, follow approved truck routes, use a spotter when backing, lower truck bed before moving, unload truck on level ground, and keep personnel out of the area when soil is being placed.	M
	Construction equipment could cause injury to personnel.	Wear high visibility vests when exposed to vehicular traffic. Exit equipment slowly and maintain three point contact. Review and follow posted hand signals. Verify all workers involved know what the hand signals mean. 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 make contact with the operator and have operator acknowledgment prior to approaching. 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.	M
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, and debris, mark or barricade other obstructions. Clean mud from boots before climbing on equipment.	M
	Biological hazards such as snakes, insects, or spiders (found in straw bales) could cause injury or bites.	Inspect straw bales for rodents/snakes prior to handling. Be sure to wear protective gloves.	M
Applying seed, soil amendments, and straw	Heavy lifting (straw bales, seed bags)	Do not lift more than 50 pounds per person. Ask for help when lifting items greater than 50 pounds or awkward items.	M
	Inhalation of dusts when spreading lime (if used) may cause irritation to the respiratory system	Use pelletized lime when possible. Stay upwind of material when applying. Wear dust mask, if necessary.	L
	Exposure to lime dust (if lime is used) may cause irritation of the eyes /skin	Wear safety glasses or goggles and protective gloves. Stand upwind of material when placing. Avoid rubbing eyes after handling product.	L

<b>AHA #5 – Activity/Work Task: Backfill and Site Restoration</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Applying seed, soil amendments, and straw (continued)	Biological hazards such as snakes, insects, or spiders (found in straw bales) could cause injury or bites.	Inspect straw bales for rodents/snakes prior to handling. Be sure to wear protective gloves.	L
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, and debris, mark or barricade other obstructions. Clean mud from boots before climbing on equipment.	M
Removal of erosion controls (silt fence, stone construction entrance)	Manual removal may cause injury to workers	Remove using heavy equipment in lieu of manual removal to avoid unnecessary strain.	M
	Slips/trips/falls	Clear walkways and work areas of equipment, tools, and debris, mark or barricade other obstructions. Clean mud from boots before climbing on equipment.	M
	Construction equipment could cause injury to personnel.	Wear Class 2 or 3 high visibility vests when exposed to vehicular traffic. Exit equipment slowly and maintain three point contact. 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 make contact with the operator and have operator acknowledgment prior to approaching. 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.	M
	Contact with overhead utilities could cause injury to workers and damage to property or equipment.	Ensure that the area has been surveyed and that the boom will not contact overhead lines while loading truck (minimum 15-foot clearance required).	M
	Biological hazards such as snakes, insects, or spiders could cause injury or bites.	Wear PPE. Look carefully for snakes before stepping into any area or before placing hands near the ground. Watch out for snakes when disturbing rubble or debris. Use insect repellent as necessary. Use care around debris and locations where spiders, especially black widow spiders, may be found (such as tall vegetation, out houses and so forth).	L

<b>AHA #5 – Activity/Work Task: Backfill and Site Restoration</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.
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
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.

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SSHO – Site Safety and Health Officer  
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**AHA Signature Sheet**

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## Activity Hazard Analysis (AHA) #6

<b>Activity/Work Task: Demobilization</b>	<b>Overall Risk Assessment Code (RAC) (Use highest code)</b>				<b>M</b>	
Project Location: AOC 7 at WPNSTA CAX	<b>Risk Assessment Code (RAC) Matrix</b>					
Contract Number: N62470-13-D-8007	<b>Severity</b>	<b>Probability</b>				
Date Prepared: January 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by: Rebecca Whalen, P.E., Remediation Engineer	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
Reviewed by: Roger Margotto, CIH, CSP, CHMM, Program Safety and Health Manager	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L
<p><b>Notes:</b> (Field Notes, Review Comments, etc.)</p> <p>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.</p> <p>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.</p>	Step 1: Review each “ <b>Hazard</b> ” with identified safety “ <b>Controls</b> ” and determine RAC (see above).					
	“ <b>Probability</b> ” is the likelihood to cause an incident, near miss, or accident and is identified as Frequent, Likely, Occasional, Seldom, or Unlikely.			<b>RAC Chart</b>		
	“ <b>Severity</b> ” is the outcome/degree if an incident, near miss, or accident did occur and is identified as Catastrophic, Critical, Marginal, or Negligible.			<b>E = Extremely High Risk</b>		
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on the AHA. Annotate the overall highest RAC at the top of the AHA.			<b>H = High Risk</b>		
				<b>M = Moderate Risk</b>		
			<b>L = Low Risk</b>			

<b>AHA #6 – Activity/Work Task: Demobilization</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removal/demobilization of equipment, materials, and personnel	Unsafe vehicle operations could cause injury to personnel or others onsite	Workers operating company or subcontractor 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. All personnel and trucks will have Base badges following Base procedures. 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 as required to identify travel and traffic patterns and to delineate work areas. Follow designated traffic routes, as indicated in the traffic plan.	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 at the waist nor turn while lifting. Keep the load centered and close to body. Do not lift more than 50 pounds. 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. Be alert of surroundings and watch footing.	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. SSHO to implement EHS 4-6, Temperature Extremes.	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
	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 to be performed, as required.	L

<b>AHA #6 – Activity/Work Task: Demobilization</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removal/demobilization of equipment, materials, and personnel (continued)	Workers could be injured by high winds of sudden storms.	Ensure that all debris/materials are secured. Shut down operations when wind speed is greater than 25 mph sustained or lesser based on potential hazards (e.g., tree limbs could fall) or lightning within 10 miles. Monitor the local weather report daily and as necessary for any severe weather warnings. Know the procedures to follow in the event of severe weather emergencies. Have a lightning detector on hand.	M
	Workers could be exposed to extreme temperatures and sunburn.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather and while wearing heavier clothing. Wear broad-spectrum sunscreen lotion with an SPF of 15 or greater.	M
	Lack of effective communication could lead to a delayed response in an emergency.	Ensure that each work team has 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. Test the communication systems in use to ensure they function properly. Post the emergency plan in the SZ, with emergency contact list.	M
	Exposure to poison ivy or oak.	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 or Zanfel post-exposure washing agent available.  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. Never burn plants. Refer to Health and Safety Guideline (HSG) 2-8 in the CRL for details.	M
	Failure to observe and prepare for encounter 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. Wear snake chaps (gaiters). 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. Ticks are a concern on this project. Use insect repellent as needed to discourage ticks. After walking through tall brush or grass, inspect clothing for the presence of ticks. Know how to identify the insect. Fully inspect your body after the work shift for the presence of ticks.	M

<b>AHA #6 – Activity/Work Task: Demobilization</b>			
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>	<b>RAC</b>
Removal/demobilization of equipment, materials, and personnel (continued)	Movement of heavy material or frequent bending over to pick up debris may cause back strain.	Direct personnel to use proper lifting techniques, such as keeping the back straight, lifting with the legs without twisting, and getting help when moving bulky/heavy materials and equipment. Encourage the use of lifting equipment and use of a hand-truck whenever possible. Employees will not lift more than 50 pounds alone. Encourage a steady, sustainable work pace. Take breaks and rotate the work to avoid repetitive stress to the back.	M
	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.	L
	Workers could be exposed to extreme temperatures and sunburn.	Monitor for heat or cold stress in accordance with EHS 4-6, Temperature Extremes. Provide fluids and rest breaks during warm weather, and while wearing protective clothing. Wear broad-spectrum sunscreen lotion of SPF 15 or better.	M
	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.	M
	Construction equipment could cause injury to personnel.	Wear high visibility vests when exposed to vehicular traffic. Exit equipment slowly and maintain three point contact. Review and follow posted hand signals. Verify all workers involved know what the hand signals mean. 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 make contact with the operator and have operator acknowledgment prior to approaching. 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.	M

<b>AHA #6 – Activity/Work Task: Demobilization</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.
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
Fire extinguishers	Fire Extinguisher Training including use/limitations.	At least monthly by SSHO or designee.

**Abbreviations and Acronyms:**

- AOC – Area of Concern
- APP – Accident Prevention Plan
- CAX – Yorktown - Cheatham Annex
- CDL – Commercial Driver’s License
- CHMM – Certified Hazardous Materials Manager
- CIH – Certified Industrial Hygienist
- CRL – Corporate Reference Library
- CSP – Certified Safety Professional
- dBA – decibels, A-scale
- DEET – N,N-diethyl-m-toluamide
- EHS – Environmental, Health, and Safety
- HSG – Health and Safety Guideline
- Mph – Miles Per Hour
- P.E. – Professional Engineer
- RAC – Risk Assessment Code
- SHM – Safety and Health Manager
- SPF – Sun Protection Factor
- SS – Site Superintendent
- SSHO – Site Safety and Health Officer
- SZ – Support Zone
- WPNSTA – Naval Weapons Station

**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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**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 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

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'.

<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>	
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		<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®', 'Client Service Quality®', 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**



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CP-7 Att-2 Daily Equip Insp\_m



CP-7 Att-3 FJ.doc



CP-7 Att-4 Operator Observati



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>	_____	_____	_____
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: \_\_\_\_\_



## 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.*

**Purpose:** The purpose of this program is to: (a) specify the types of events to be reported and investigated, including both safety and quality-related events; (b) define internal Tetra Tech EC, Inc.(TtEC) and external event notification requirements; (c) ensure proper management and follow-up of each event; (d) meet regulatory notification and investigation requirements; (e) provide a mechanism to identify Environmental, Safety and Quality (ESQ) issues and areas for improvement and recognize job well done through the Zero Incident Performance® (ZIP) Slip.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
<b>Version Date - Type:</b>	12/09/2009 - Revised	<b>Title:</b>	Event Reporting and Investigation
<b>Category:</b>	Company Procedures	<b>Original Issue Date:</b>	02/01/95
<b>Sub-Category:</b>	Departmental/Discipline	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
<b>Keyword Index:</b>	EHS Compliance/Waste Management, Field Activities/Environmental H&S, EHS Compliance/Spill Reporting, Field Activities/Science, Operational Control, Training, EHS Compliance/Permits, Nonconformance and Corrective and Preventive Action	<b>Document Type:</b>	Procedure
		<b>Document Owner:</b>	Skip Parry

1.0 PURPOSE

2.0 SCOPE

3.0 MINIMUM REQUIREMENTS

4.0 GUIDANCE

5.0 REFERENCES

6.0 ATTACHMENTS

**1.0 PURPOSE**

The purpose of this program is to:

- a. Specify the types of events to be reported and investigated, including both safety and quality-related events.
- b. Define internal Tetra Tech EC, Inc. (TtEC) and external event notification requirements.
- c. Ensure proper management and follow-up of each event.

- d. Meet regulatory notification and investigation requirements.
- e. Provide a mechanism to identify Environmental, Safety and Quality (ESQ) issues and areas for improvement and recognize job well done through the Zero Incident Performance® (ZIP) Slip.

## **2.0 SCOPE**

Event reporting requirements apply to all operations of TtEC and its subsidiaries (the "Company"), including subcontractor activities. The term "Event Reports" in this procedure encompasses Quality Event Reports (QERs), Near Miss, and EHS Event Reports.

## **3.0 MINIMUM REQUIREMENTS**

### **3.1 Responsibilities**

#### **3.1.1 All Personnel**

All personnel shall immediately report any event (see Section 4.1.1) to their supervisor. The report can be verbal or in writing.

Employees, including subcontractors, are required to participate in the investigation process as directed, and comply with corrective actions identified. Employees are also made aware of trends and may be asked to help develop lessons learned to prevent similar events from occurring.

#### **3.1.2 Line Management**

Line Management, including the Office Manager for office events and the Project Manager (PM) for project events shall:

- a. Be responsible for all client notifications - (Prior to initiation of project field activities, the Project Manager shall coordinate with the client to determine the appropriate agency notification responsibilities and procedures).
- b. Implement the appropriate internal notifications (see Table 1) as required by this program as soon as an event becomes known.
- c. The supervisor responsible for directly overseeing the work shall ensure completion of the Event Report. The supervisor shall directly participate in the causal analysis investigation.
- d. Ensure that corrective actions have been completed and properly documented.

#### **3.1.3 Environmental Safety and Quality Personnel**

Environmental Safety and Quality Personnel (Environmental Safety Coordinator, Environmental Safety Specialist, and Project Quality Control personnel) shall:

- a. Ensure that all notifications are made promptly.
- b. Ensure that all reports are fully completed.
- c. Ensure that all insurance and workers compensation forms are completed and submitted as necessary.
- d. Participate in event investigations of all Occupational Safety and Health Administration (OSHA)

- recordable injuries/illnesses, spills, releases, and other investigations.
- e. Communicate information about the event to applicable site and/or office employees.

#### **3.1.4 Project Quality Control Manager**

The Project Quality Control Manager shall review and approve QER investigation results, proposed remedial actions, determine the Event Risk in accordance with CRL Guideline HSG 2-7, Risk Prioritization, and identify the need to verify the effectiveness of corrective actions taken based on severity of Event Risk. The Project Quality Control Manager's evaluation of corrective action effectiveness should be summarized in the Comments section. Ineffective corrective actions should be elevated to the Director, Quality Programs for further evaluation and potential additional programmatic corrective actions.

#### **3.1.5 Project Environmental and Safety Manager (PESM)**

The PESM shall review and approve event investigation results, proposed remedial actions, determine the Event Risk in accordance with CRL Guideline HSG 2-7, Risk Prioritization, and identify the need to verify the effectiveness of corrective actions taken based on severity of Event Risk. The PESM's evaluation of corrective action effectiveness should be summarized in the Comments section. Ineffective correction actions should be elevated to the Director, EHS Services for further evaluation and potential additional programmatic corrective actions.

#### **3.1.6 Director, EHS Services**

The Director, EHS Services shall:

- a. Notify OSHA of any injuries or illnesses occurring within OSHA jurisdiction as required.
- b. Review/maintain log - which includes information on basis causes, immediate causes, and management control issues - of all investigations.
- c. Distribute summaries of events with periodic management reports.
- d. Communicate significant events to key personnel within the Company.
- e. Review basic causes of Company events to identify trends.
- f. Recommend EHS program modifications as necessary.
- g. Immediately notify the Tetra Tech Health and Safety Manager of any serious accident and provide follow-up information on serious accidents.
- h. Provide Monthly Injury Reports to the Tetra Tech Health and Safety Director.

### **3.2 Notifications**

In addition to the reporting responsibilities specified in Section 3.1, the responsible supervisor is required to notify Work Care at 800-455-6155 (available 24 hours) of employee illness or injuries. Work Care's main office must be notified promptly of all injuries and illnesses so the affected employee receives prompt and appropriate medical advice. The call to Work Care must be made in addition to taking the affected employee to the local clinic. EHS 2-1, Emergency Preparedness, provides guidance for medical response and actions.

The responsible supervisor is also required to ensure notifications are made as outlined in Table 1.

The phone numbers and other means of contact for Company personnel shall be posted with the emergency notification list and/or integrated into the site-specific emergency notification list.

### 3.3 Event Report Generation

The information portion of the Event Report should be generated by the end of the supervisor's work shift on the day of the event, if possible, but no later than 24 hours after the event was reported by the supervisor and employee(s) involved in the event. The investigation completion time is provided in Section 3.4.

The Event Report and Investigation may be completed electronically in the Company Incident Database located on Lotus Notes or by hardcopy using Attachment A, Event Report and Investigation Form, or Attachment B, Quality Event Report Form. (Attachment C, Event Sketch, may be used to graphically depict **events**).

The forms are intended to be self-explanatory. If the supervisor or the employee has any questions regarding completion of the report, an ESQ representative should be contacted for support.

Both the employee(s) and the employee's supervisor must sign the Event Report.

For low loss-potential near misses, the ZIP Slip may be substituted for the standard Event Report. (See CRL Procedure PP-10, Employee Recognition).

### 3.4 Event Investigations

Event investigations are to be initiated and completed as soon as possible, but should be completed no later than 10 working days after the event has been reported.

Guidance for conducting investigations and cause analysis may be found in Section 4.3.

**Table 1. Internal Notifications By Supervisor**

<u>EVENT TYPE</u>	<u>SUPERVISOR NOTIFIES...</u>	<u>TIMING<sup>1</sup></u>	<u>... WHO NOTIFIES</u>	<u>TIMING<sup>1</sup></u>
Spill/release or Permit Exceedence	ESS	Immediately	PESM and Director, EHS Services	Immediate external req required
	Project Manager	Immediately	Client and Area/Program Manager Government agency if required by contract/plan and Director, EHS Services not available (See 3.5.2)	Immediate external req required
Fatality, Hospitalization of 1 or more persons, Fire, or Explosion	ESS	Immediately	PESM and Director, EHS Services 0 OSHA reporting (See 3.5.1) Insurance <a href="#">AIG through Chartis</a> @ 1-800-910-2667 (Company personnel only) (Not required inside Washington State)	Immediate Immediate Immediate
	Project Manager	Immediately	Area/Program Manager VP Construction Client	Immediate Immediate Immediate
	ESS	Immediately	PESM and Director, EHS Services Insurance <a href="#">AIG through Chartis</a> @ 1-800-910-2667 (Not required in Washington State)	Same day Same day Same day
Confirmed or Potential OSHA Recordable	Project Manager	Immediately	Area/Program Manager	Same day
			VP Construction, VP Remediation, VP C&E, COO	Same day 24 hours or by contract

			Client, if required	
Equipment/Property/ Vehicle Damage	ESS	Immediately	PESM and Director, EHS Services	24 hours
	Project Manager	Immediately	Client (client property)	Immediate
			Client (other property, if required)	24 hours
			Equipment Manager	24 hours
Area/Program Manager	Immediately	VP Construction	24 hours	
		VP Construction	24 hours	
		Law Department and Procurement	24 hours	
Potential Insurance Claim, other than Worker's Compensation	Project Manager	Immediately	Law Department and Procurement	24 hours
Office Events	ESC	Immediately	Operations Manager Director, EHS Services	24 hours
Quality Events	Project Manager	Immediately	Program or Operations Manager	24 hours
	Project QC Manager	Same Day	Director of Quality Programs	24 hours

<sup>1</sup>Timing - Immediately - Real time verbal discussion or notification in writing

Same Day

24 hours - written event report copy; Client notification, or as specified in contract or project specification

ESS Environmental Safety Specialist

ESC Environmental Safety Coordinator

PESM Project Environmental and Safety Manager

QC Quality Control

VP Vice-President

Investigations that fall within the scope of the OSHA Process Safety Management Standard must meet the requirements of 29 Code of Federal Regulations (CFR) 1910.119(m). Projects that must meet this standard shall include the appropriate reporting requirements in project specific procedures or plans.

Project QC personnel should participate in the QER Cause Analysis and in determining an appropriate Action Plan.

Completed investigation reports should be submitted within 10 working days to:

- a. Project Manager or Office Manager for review and signature
- b. PESM or Project QC Manager (for QERS) for review and signature
- c. ESS (for projects) or ESC (for offices) for review and signature
- d. Director, EHS Services/Quality Services as applicable

Electronic submittal within 10 working days meets these reporting requirements. Additional reporting requirements are listed in Table 1.

The Project or Office Manager and the PESM, or Project Quality Manager must sign the report indicating their satisfaction with thoroughness of the investigation and the report and their concurrence that the action items address the identified causes. This constitutes the peer review, and the report, particularly the description, should be clear to readers not familiar with the project or incident.

### 3.5 External Notifications

#### 3.5.1 OSHA Notification

Notification to OSHA is required within 8 hours if the event resulted in one or more fatalities and/or three or more hospitalized individuals. The 8-hour notification of OSHA is also required if a fatality or hospitalization of three individuals occurs within 30 days after the event.

The Director, EHS Services, has the responsibility for making the OSHA notification. The senior site EHS representative shall make the notification if the Director, EHS Services is unavailable.

The Project Manager is responsible for notifying the client of any required OSHA notifications.

### **3.5.2 Agency Notifications for Spills, Releases, and Permit Exceedences**

It is the Company's policy that *if a spill, release, or permit exceedence is determined to be reportable, the Company or the client shall perform the reporting in a timely fashion as defined by federal, state, or local laws and regulations*. Notifications shall be made per contract requirements or the project Communications Plan. Prior to initiation of project field activities, the Project Manager shall coordinate with the client to determine the appropriate agency notification responsibilities and procedures. During the conduct of project activities, the client shall be notified regarding the spill, release, or permit exceedence and the Company's notification determination.

The Project Manager, in conjunction with the PESM must determine whether a spill, release, or permit exceedence exceeds reportable quantities to a regulatory agency under federal, state, and/or local laws and regulations or permit conditions. This determination must be made quickly because many laws and regulations require that notifications be made within short time frames (immediately upon knowledge, but no later than 24 hours).

If a spill or release is determined not to exceed reportable quantities, the PESM shall evaluate whether the spill or release poses a threat to human health (for example, has or may release into known drinking water sources, has or may cause contamination of surface soils/materials/air accessible to the public, and so forth). If a spill or release is determined to pose a threat to human health, the Project Manager, with the assistance of the Director, EHS Services, as necessary, shall consult with the client to determine whether the spill or release should be reported to a regulatory agency.

### **3.6 Documentation**

A copy of each Event Report shall be retrievable for the project or office files. The Event Report database may serve this purpose.

#### **3.6.1 Documentation of Agency and Client Notifications**

All agency and client notifications shall be documented on the **Event** Report form. Other documentation generated regarding verbal or written agency notifications (if required), including agency response to such notification, shall either be maintained in the project file or preferably, attached to the Event Report.

In instances where the client conducts the reporting, documentation shall be obtained from the client indicating that the agency was notified in accordance with federal, state, or local regulations and maintained in the project files. If the client verbally notifies the Company that the notification was made, the Project Manager shall document the conversation. In these cases, communications shall be recorded internally in accordance with EHS 1-10, External Regulatory Inspections and Notifications, for Environmental Management System reporting requirements.

If the spill, release, or permit exceedence is determined not to be reportable, the Event Report and Investigation shall include the rationale for not reporting the spill, release, or permit exceedence to a regulatory agency.

### **3.7 Training**

The Director, EHS Services, and the Director, Quality Services, have the responsibility for ensuring that site

and office supervisory personnel have the appropriate training to conduct event investigations.

ESSs shall be trained on a project-specific basis by the PESM to implement the spill/release and permit exceedance reporting requirements in conjunction with training on the requirements of the project-specific EHS Plans per Corporate Reference Library procedure EHS 3-2, Procedures—Environmental, Health & Safety Plan(s).

Personnel serving in a project or office supervision, or office supervision, ESQ position shall have completed and passed the Company provided self-study course entitled "Practical Loss Control Leadership within 3 months of initial assignment."

## **4.0 GUIDANCE**

### **4.1 Definitions**

#### **4.1.1 Event**

For the purposes of this program, an event is:

- a. An injury or illness that meets the OSHA recordability criteria
- b. Ergonomic-related pain complaints
- c. An exposure to a hazardous substance above the allowable exposure unit.
- d. A property/vehicle/equipment/heavy equipment/truck/passenger damage case that results in damage greater than \$500.
- e. A fire or explosion.
- f. A spill or release resulting from the Company, or subcontractor activities, including spills or releases from operations at a client facility of which Company employees have become aware.
- g. Discovery of chemicals or waste products in an office.
- h. A permit exceedance.
- i. Safety-related events reported by an enforcing authority (ISO 14001 Registrar requirement).
- j. Customer, or enforcing authority, complaints regarding the implementation of the Company's EMS or Quality Management System (QMS).
- k. External regulatory inspections that result in findings or citations.
- l. Quality events as defined in Section 4.1.3.
- m. Near-miss occurrences, as defined in Section 4.1.2 below<sup>1</sup>

#### **4.1.2 Near Miss**

A "near miss" is an event, that has a reasonable probability in resulting in one of the outcomes described above if the circumstances were different and for which modifications to management programs will reduce the probability of occurrence or the severity of the outcome (see examples of Immediate and Basic causes in Attachment A.

### 4.1.3 Quality Event

QERs should be generated for the following two situations:

- a. When project quality deficiency reports identify a **significant condition adverse to quality**. A significant condition adverse to quality is one that, if uncorrected, could have a serious adverse effect on operability, level of quality, or presents a high loss potential.
- b. When an event reveals an opportunity for improved performance through modification of our management system.

### 4.1.4 Recognition and EMS Communication

ZIP Slips (See PP-10, Employee Recognition Programs) may be used to document employee recognition for a job well done, suggestions for improvement, or minor safety issues that should be resolved.

ZIP Slips may be used to document external inquiries or complaints regarding the Company's EMS or project-specific environmental aspects.

## 4.2 Continuous Improvement

TTEC's event investigation procedure and event report database is a tool used by the (ESQ) organization for continuous improvement by:

- Identifying the root causes of each event
- Tracking and trending
- Selecting appropriate corrective action(s), and person(s) responsible for corrections
- Providing Lessons Learned
- Identifying additional EHS orientation and training topics
- Identifying future health and safety goals and objectives

Corporate ESQ management periodically disseminates valuable information contained in the event/investigation program, company wide to employees in the form of ZIP Bulletins, Flash Reports, and Lessons Learned.

The EMS Coordinator should also review the Event Report database to identify trends and incorporate results into the continuous improvement of the EMS.

## 4.3 Cause Analysis

### 4.3.1 Immediate Cause

Determine the immediate causes, using the examples on the form. If one or more of the examples fits the circumstance, use those words in the cause description. Explain, e.g., Improper Lifting – employee attempted to lift box by bending at the waist and twisting while lifting. Be sure that the event description is sufficiently detailed to support the causal analysis in this section. An assumption of cause (e.g., improper lifting) from the injury (low back pain) is not acceptable.

### 4.3.2 Basic Cause

Like the Immediate Causes, use the guidewords on the form whenever appropriate and explain. For example, improper motivation may be because the correct way takes more time or effort; short cutting standard procedure is tolerated or positively reinforced; or the person thinks there is no personal benefit to always doing the job correctly.

Investigators should determine if a change in the work conditions, scope, methods or personnel contributed to the event. This may occur due to inadequate assessment of hazard potential or inadequate application of

hazard controls. If “Change” was contributing, it will most likely be identified in combination with other basic causes.

**Note:** The investigator is encouraged to review the Practical Loss Control Leadership chapters on *Causes and Effects of Loss* and *Accident/Event Investigation* before doing the causal analysis. The investigation team should refer to the S.C.A.T. Chart available from the PESM when analyzing causes of high loss potential events, especially where motivation is suspected of being a Basic Cause.

#### 4.3.3 Remedial Actions

Include all actions taken or those that should be taken to *prevent recurrence*. Be sure that actions address the causes. For example, training (safety meetings) may be a necessary response for lack of knowledge, but may be inadequate for improper motivation.

#### 4.4 Loss Control Leadership for Non-Supervisory Personnel

All non-supervisory and non-ESQ positions (excluding craft workers) assigned to conduct field activities should complete the Practical Loss Control Leadership self-study course within one year of initial assignment.

## 5.0 REFERENCES

### Please Describe your Reference Here

### Place Your Link in this Column

1. OSHA 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals
2. EHS 1-10, External Regulatory Inspections and Notifications
3. EHS 2-1, Emergency Preparedness
4. EHS 3-2, Procedures - Environmental, Health & Safety Plan(s)
5. Environmental Management System
6. HSG 2-7, Risk Prioritization
7. PP-10, Employee Recognition
- 8.
- 9.

## 6.0\_ATTACHMENTS

### Please Provide a Description of the Attachment

1. Attachment A - [Event](#)/Near Miss Report and Investigation
2. Attachment B - Quality [Event](#) Report Form
3. Attachment C -[Event](#) Sketch

### Place Your Attachments Here



EHS 1-7, Att A, 2007.doc



EHS 1-7, Att B, 2007.doc



EHS 1-7, Att C, 2007.doc

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EHS 1-7 ATTACHMENT B



	<b>HAZARD REPORT AND SUGGESTION FORM</b>	<b>Hazard Type:</b> Condition <input type="checkbox"/> Practice <input type="checkbox"/>	
<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>			
<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	
Struck by or against		Chemical Exposure	
Caught in, between or under		Property damage	Fire
		Environmental Release	
		Other (Explain)	
Project/Office/Location: _____			
Report Given To: _____		Date: _____	
Tracking Number: _____			

Corporate ESQ Report # [Insert number here](#)  
 Project Name: [Insert name here](#)

### EHS 1-7, Attachment A Event/Near Miss Report and Investigation

Checkboxes can be toggled on  and off  to show an "X" or not show an "X." Double-click on the box to activate a dialog box that shows possible selections. To preserve formatting when you cut and paste text, use the "paste special" command to paste: EDIT, PASTE SPECIAL, UNFORMATTED TEXT.

Guidance for filling out this form is provided in CRL Procedure EHS 1-7.

<b>Section 1, General Information</b>		
Short Description/Title Below: (limited to 125 characters). This is the description that will appear in the database listing.		
<b>Type of Event/Near Miss (check all that apply):</b>		
Was a person injured or made ill:		
<input type="checkbox"/> By something at work <input type="checkbox"/> By something outside the work environment <input type="checkbox"/> No injury or illness		
Did this event occur in one of our major offices? <input type="checkbox"/> Yes <input type="checkbox"/> No List Office:		
Did this event occur in a foreign country? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Did this event involve:		
A strain?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire?
A motor vehicle accident?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Property damage (>\$500)?
A repetitive motion injury?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Spill/release?
A fall?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Permit exceedence?
Being struck by something?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Event Information</b>		
Case #:	Site Case #:	Workers Comp #:
Where did the event occur?		Project # (4 digits):
Site/Location Name:		Delivery Order #'s:
Date of event:		Military time:
TtEC Supervisor on duty:		Was Supervisor at event scene? <input type="checkbox"/> Yes <input type="checkbox"/> No
Event Location:		
What employee/employer category was involved in this event?		
<input type="checkbox"/> TtEC permanent <input type="checkbox"/> TtEC craft/temp service <input type="checkbox"/> Subcontractor <input type="checkbox"/> Other		
Employer of affected employee?		
Weather conditions:		Adequate Lighting at Scene? <input type="checkbox"/> Yes <input type="checkbox"/> No
<b>What was the employee doing, or what was happening, just before the event occurred?</b> Describe the activity below, as well as the tools, equipment, or material the employee was using. Be specific. For example, "climbing a ladder while carrying roofing materials," "spraying chlorine from hand sprayer," or "daily computer key-entry."		

Corporate ESQ Report # [Insert number here](#)

Project Name: [Insert name here](#)

### EHS 1-7, Attachment A Event/Near Miss Report and Investigation

<b>What happened?</b> What was the contact or event and how did it occur? Tell us below how the injury occurred. For example, "When the ladder slipped on the wet floor, the worker fell 20 feet," "worker was sprayed with chlorine when gasket broke during replacement," or worker developed soreness in wrist over time." Attach file if necessary.		
<b>Section 2, Affected Employee Information</b>		
Include injured person, driver/operator, or employee whose activities resulted in the event. A new event report must be created for each injured employee.		
Employee's name:		Sex <input type="checkbox"/> Male <input type="checkbox"/> Female
Date of Hire:	Job classification:	Number of months at TtEC:
Work hours on shift prior to event:		Years in job classification (##):
Did event relate to routine task for job classification? <input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>Section 3, Injury/Illness Information (If not applicable, check here <input type="checkbox"/> and go to Section 4)</b>		
Nature of injury or illness: Describe body part affected and how it was affected below. Be more specific than "hurt," "pain," or "sore." For example, "strained back."		
What object or substance directly harmed the employee? For example, "concrete floor," "chlorine," "radial arm saw." If this question does not apply to the event, leave it blank.		
Was First Aid provided? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Did the injury/illness result in <input type="checkbox"/> Days away (with or without restricted days) <input type="checkbox"/> Restricted days only <input type="checkbox"/> No or unknown		
Did employee die? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Medical treatment does not include examination, diagnostic tests, or First Aid. See ZIP Bulletin 109 for OSHA definition of First Aid. Attach treatment report/doctor's note or send copies to Director, EHS Services.		
Was medical treatment provided? <input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>Section 4, Vehicle and Property Damage Information (If not applicable, check here <input type="checkbox"/> and go to Section 5)</b>		
Damaged vehicle make:		Damaged vehicle model:
Damaged vehicle VIN:		Vehicle owner:
Property damaged:		
Describe property damage:		

Corporate ESQ Report # **Insert number here**  
 Project Name: **Insert name here**

**EHS 1-7, Attachment A  
 Event/Near Miss Report and Investigation**

<b>Section 5, Environmental Release (If not applicable, check here <input type="checkbox"/> and go to Section 6)</b>		
<i>Environmental Release</i>		
Substance spilled or released:		
From where:	To where:	
Estimated quantity/duration:	CERCLA Hazardous substance? <input type="checkbox"/> Yes <input type="checkbox"/> No	
RQ exceeded? <input type="checkbox"/> Yes <input type="checkbox"/> No	Specify RQ:	
Reportable to agency? <input type="checkbox"/> Yes <input type="checkbox"/> No	Specify (place telecom in project file):	
Responsibility to report: <input type="checkbox"/> TtEC <input type="checkbox"/> Client <input type="checkbox"/> Other	Time frame:	
Written report (place report in project file): <input type="checkbox"/> Yes <input type="checkbox"/> No		
Response action taken:		
<i>Permit Exceedence</i>		
Type of permit:	Permit #:	
Date of exceedence:	Parameter(s):	
Criteria:	Exceedence levels:	
Exceedence duration:	Reportable to agency: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Specify (place telecom in project file):	Written report: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Time frame:		
Response action taken:		
<b>Section 6, Notifications</b>		
Insert names of TtEC personnel notified below:		
Name:	Date:	Time:
Client rep notified:	Date:	Time:
By whom:		
Agency notified:	Date:	Time:
By whom:		
Agency Contact Name:		
<b>Section 7, Persons Preparing Report</b>		
Signature of this form verifies that all supplied information is accurate.		
Employee's name (print):	Sign:	
Employee's name (print):	Sign:	
Supervisor's name (print):	Sign:	
Supervisor's phone number:		
Date:		
<i>Note to supervisor:</i> Supervisor is to forward a copy of the Event Report to immediate supervisor, PESM, ESS or ESC, and other personnel as identified in Table 1 of this procedure ASAP, but no later than 24 hours.		

Corporate ESQ Report # **Insert number here**  
 Project Name: **Insert name here**

### EHS 1-7, Attachment A Event/Near Miss Report and Investigation

<b>Section 8, Attach Sketches or Photos</b>	
<i>Report Number:</i>	
Send sketch by mail, fax, or attach an electronic file. EHS 1-7, Attachment C, contains a template that can be used for creating sketches of accidents.	
<i>Vehicle Events</i>	
Write in the street names and, if possible, the points of the compass. Attach black-and-white hard-copy photos or JPG or BMP files (JPG file sizes are typically smaller) as appropriate. If the sketch appears on a police report or insurance form, this need not be completed. Attach the other report or send a hard copy to the Director, EHS Services.	
<b>Section 9, Investigative Report</b>	
<b>Date Information:</b>	
Date of event:	Date of investigative report:
<i>Event Cost:</i>	
Other event costs: \$	WC claim value: \$
	Estimated loss: \$
<b>Cause Analysis</b>	
Was the activity addressed in an AHA? <input type="checkbox"/> Yes (attach applicable section) <input type="checkbox"/> No	
<b>Immediate Causes</b>	
What actions and conditions contributed to this event? Check all that apply:	
Substandard Acts	
<input type="checkbox"/> Operating equipment without authority	<input type="checkbox"/> Horseplay
<input type="checkbox"/> Failure to warn	<input type="checkbox"/> Using equipment improperly
<input type="checkbox"/> Failure to secure	<input type="checkbox"/> Failure to follow procedure
<input type="checkbox"/> Operating at improper speed	<input type="checkbox"/> Personnel not properly qualified
<input type="checkbox"/> Making safety devices inoperable	<input type="checkbox"/> Failure to communicate
<input type="checkbox"/> Removing safety devices	<input type="checkbox"/> Operating equipment outside of specified parameters
<input type="checkbox"/> Using defective equipment	<input type="checkbox"/> Failure to check equipment prior to acceptance
<input type="checkbox"/> Failure to use PPE properly	<input type="checkbox"/> Acceptance of defective equipment
<input type="checkbox"/> Improper loading	<input type="checkbox"/> Failure to provide proper equipment
<input type="checkbox"/> Improper placement	<input type="checkbox"/> Improper servicing/maintenance of equipment
<input type="checkbox"/> Improper lifting	<input type="checkbox"/> Other substandard acts
<input type="checkbox"/> Improper position for task	<input type="checkbox"/> Servicing equipment in operation
<input type="checkbox"/> Under influence of alcohol/drugs	
Substandard Conditions	
<input type="checkbox"/> Guards or barriers	<input type="checkbox"/> Exposure to hazardous materials
<input type="checkbox"/> Protective equipment	<input type="checkbox"/> Extreme temperature exposure
<input type="checkbox"/> Tools/equipment or materials	<input type="checkbox"/> Illumination
<input type="checkbox"/> Congestion	<input type="checkbox"/> Ventilation
<input type="checkbox"/> Warning system	<input type="checkbox"/> Visibility
<input type="checkbox"/> Fire and explosion hazards	<input type="checkbox"/> Radiation
<input type="checkbox"/> Poor housekeeping	<input type="checkbox"/> Hazardous environmental conditions
<input type="checkbox"/> Noise exposure	<input type="checkbox"/> Other substandard conditions

Corporate ESQ Report # [Insert number here](#)  
 Project Name: [Insert name here](#)

**EHS 1-7, Attachment A  
 Event/Near Miss Report and Investigation**

Enter brief explanation of each <i>immediate cause</i> below:

**Basic Causes**

What specific personal or job factors contributed to this event? Check all that apply:

Personal Factors	Job Factors
<input type="checkbox"/> Inadequate physical/physiological capability	<input type="checkbox"/> Inadequate leadership and/or supervision
<input type="checkbox"/> Inadequate mental/psychological capability	<input type="checkbox"/> Inadequate engineering
<input type="checkbox"/> Physical or physiological stress	<input type="checkbox"/> Inadequate purchasing
<input type="checkbox"/> Lack of knowledge	<input type="checkbox"/> Inadequate maintenance
<input type="checkbox"/> Lack of skill	<input type="checkbox"/> Inadequate tools and equipment
<input type="checkbox"/> Improper motivation	<input type="checkbox"/> Inadequate work standards
<input type="checkbox"/> Other personal factors	<input type="checkbox"/> Excessive wear and tear
	<input type="checkbox"/> Abuse and misuse
	<input type="checkbox"/> Change
	<input type="checkbox"/> Other job factors

Enter brief explanation of each <i>basic cause</i> below:

**Section 10, Action Plan**

What has or should be done to control each of the causes listed? Consider the following Management Programs in developing remedial actions:

<input type="checkbox"/> Leadership and administration	<input type="checkbox"/> Health control
<input type="checkbox"/> Training	<input type="checkbox"/> System evaluation
<input type="checkbox"/> Planned inspections	<input type="checkbox"/> Engineering controls and change management
<input type="checkbox"/> Task analysis and procedures	<input type="checkbox"/> Personal communications
<input type="checkbox"/> Task observation	<input type="checkbox"/> Group meetings
<input type="checkbox"/> Emergency preparedness	<input type="checkbox"/> General promotion
<input type="checkbox"/> Rules and work permits	<input type="checkbox"/> Hiring and placement
<input type="checkbox"/> Accident/event analysis and corrective and preventive action	<input type="checkbox"/> Materials and services management
<input type="checkbox"/> Personal protective equipment	

Corporate ESQ Report # [Insert number here](#)

Project Name: [Insert name here](#)

**EHS 1-7, Attachment A  
Event/Near Miss Report and Investigation**

<b>Remedial Actions</b>			
Actions	Person Responsible	Target Date	Completion Date
1.	1.		
2.	2.		
3.	3.		
4.	4.		
<b>Section 11, Persons Performing Investigation</b>			
Investigator's name:		Date:	
Investigator's name:		Date:	
Investigator's name:		Date:	
<b>Management Review</b>			
<i>Note: Signature verifies that all supplied information is accurate; the description supports the causal analysis; and the Action Plan is sufficient to address the causes.</i>			
Project/Office Manager Approval: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Comments:			
Sign:		Date of Approval:	
ESQ (PESM) Approval: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Comments:			
Sign:		Date of Approval:	
Note: Attach additional information as necessary. Supervisor to forward copy of Investigative Report to the PM or Office Manager or ESQ as soon as possible, but no later than 72 hours after the event. A copy shall be sent to the Director, EHS Services, within 24 hours of completion of the report. Attach here.			

Corporate ESQ Report # **Insert number here**  
 Project Name: **Insert name here**

### EHS 1-7, Attachment B Quality Event Report and Investigation

Checkboxes can be toggled on  and off  to show an "X" or not show an "X." Double-click on the box to activate a dialog box that shows possible selections. To preserve formatting when you cut and paste text, use the "paste special" command to paste: EDIT, PASTE SPECIAL, UNFORMATTED TEXT.

Guidance for filling out this form is provided in CRL Procedure EHS 1-7.

Section 1, Event Description and Investigation			
Date of event:			
Office/Project Location:		Organization or Department:	
Means of identification:			
<input type="checkbox"/> Client concern	<input type="checkbox"/> Nonconformance report	<input type="checkbox"/> Audit report	<input type="checkbox"/> Corrective action request
<input type="checkbox"/> Supervisory review	<input type="checkbox"/> Peer review	<input type="checkbox"/> Project review	<input type="checkbox"/> Other (describe):
<b>Enter Short Description/Title (limited to 125 characters) below.</b> This is the description that will appear in the database listing.			
<b>Issue Summary:</b> Summarize the concern, problem, or situation that needs to be addressed. Identify who was involved and their role (e.g., performer, inspector, auditor).			
Section 2, Persons Preparing Report			
Signature of this form verifies that all supplied information is accurate.			
Employee's name (print):		Sign:	
Employee's name (print):		Sign:	
Supervisor's name (print):		Sign:	
Supervisor's phone number:			
Date:			
<i>Note to supervisor:</i> Supervisor is to forward a copy of the Event Report to immediate supervisor, PESM, ESS or ESC, and other personnel as identified in Table 1 of this procedure ASAP, but no later than 24 hours.			
Section 3, Investigative Report			
Date of investigative report:			
Other event costs: \$	WC claim value: \$	Estimated loss: \$	
<b>Cause Analysis</b>			
<b>Immediate Causes</b>			
What actions and conditions contributed to this event? Check all that apply:			
Substandard Acts			
<input type="checkbox"/> Operating equipment without authority	<input type="checkbox"/> Inadequate inspection/peer review		
<input type="checkbox"/> Failure to follow/improper execution of procedure	<input type="checkbox"/> Poor judgment		
<input type="checkbox"/> Using equipment improperly	<input type="checkbox"/> Failure to communicate—written and/or verbal		
<input type="checkbox"/> Improper servicing/maintenance of equipment	<input type="checkbox"/> Acceptance of defective equipment/material		
<input type="checkbox"/> Under influence of alcohol/drugs	<input type="checkbox"/> Other substandard acts		
<input type="checkbox"/> Horseplay			

Corporate ESQ Report # [Insert number here](#)  
 Project Name: [Insert name here](#)

### EHS 1-7, Attachment B Quality Event Report and Investigation

Substandard Conditions	
<input type="checkbox"/> Personnel not properly qualified or trained	<input type="checkbox"/> Inadequate oversight
<input type="checkbox"/> Defective equipment/material	<input type="checkbox"/> Inadequate procedure/instruction
Enter brief explanation of each <b>immediate cause</b> below:	
Basic Causes	
What specific personal or job management system factors contributed to this event? Check all that apply:	
Personal Factors	Job Factors
<input type="checkbox"/> Inadequate physical/physiological capability	<input type="checkbox"/> Inadequate leadership and/or supervision
<input type="checkbox"/> Inadequate mental/psychological capability	<input type="checkbox"/> Inadequate engineering
<input type="checkbox"/> Physical or physiological stress	<input type="checkbox"/> Inadequate purchasing
<input type="checkbox"/> Lack of knowledge	<input type="checkbox"/> Inadequate maintenance
<input type="checkbox"/> Lack of skill	<input type="checkbox"/> Inadequate tools and equipment
<input type="checkbox"/> Improper motivation	<input type="checkbox"/> Inadequate work standards
<input type="checkbox"/> Other personal factors	<input type="checkbox"/> Excessive wear and tear
	<input type="checkbox"/> Abuse and misuse
	<input type="checkbox"/> Change
	<input type="checkbox"/> Other job factors
Enter brief explanation of each <b>basic cause</b> below:	
Section 4, Action Plan	
What has or should be done to control each of the causes listed? Consider the following Management Programs in developing remedial actions:	
<input type="checkbox"/> Leadership and administration	<input type="checkbox"/> Engineering controls and change management
<input type="checkbox"/> Training	<input type="checkbox"/> Personal communications
<input type="checkbox"/> Planned inspections	<input type="checkbox"/> Group meetings
<input type="checkbox"/> Critical task analysis and procedures	<input type="checkbox"/> General promotion of Loss Control principles
<input type="checkbox"/> Task observation	<input type="checkbox"/> Hiring and placement
<input type="checkbox"/> Rules and work permits	<input type="checkbox"/> Materials and services management
<input type="checkbox"/> Accident/event analysis and corrective and preventive action	<input type="checkbox"/> Quality control
<input type="checkbox"/> System evaluation	

Corporate ESQ Report # **Insert number here**  
 Project Name: **Insert name here**

**EHS 1-7, Attachment B  
 Quality Event Report and Investigation**

<i>Remedial Actions</i>			
Actions	Person Responsible	Target Date	Completion Date
1.	1.		
2.	2.		
3.	3.		
4.	4.		
<b>Section 5, Persons Performing Investigation</b>			
Investigator's name:		Date:	
Investigator's name:		Date:	
Investigator's name:		Date:	
<b>Management Review</b>			
<i>Note: Signature verifies that all supplied information is accurate; the description supports the causal analysis; and the Action Plan is sufficient to address the causes.</i>			
Project/Office Manager Approval: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Comments:			
Sign:		Date of Approval:	
ESQ (PESM, QA) Approval: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Comments:			
Sign:		Date of Approval:	
Note: Attach additional information as necessary. Supervisor to forward copy of Investigative Report to the PM or Office Manager or ESQ as soon as possible, but no later than 72 hours after the event. A copy shall be sent to the Director, EHS Services, within 24 hours of completion of the report. Attach here.			

**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>


**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>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>	
<p><b>Equipment/Pollution Control Devices</b> (<i>Applies if project has equipment that generates or controls air pollution.</i>)</p>		
	<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>	
<p><b>Emissions Monitoring and Testing</b> (<i>Applies if project must conduct air emissions monitoring or testing.</i>)</p>		
	<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>	


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

CONFIDENTIAL

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

CONFIDENTIAL

<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**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

CONFIDENTIAL

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


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—AIR QUALITY**

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>
			<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--


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

**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 --


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— CONSERVATION RESOURCES AND ENVIRONMENTAL REVIEWS**

**CONFIDENTIAL**

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


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— CONSERVATION RESOURCES AND ENVIRONMENTAL REVIEWS**

CONFIDENTIAL

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

<b>Location or Activity-Dependent Programs</b>		
		<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--


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

<b>Drinking Water Systems.</b> <i>(Applies if project involves connection to or upgrading a drinking water system.)</i>		
		<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.
<b>Well Construction and Abandonment.</b> <i>(Applies if construction or abandonment of water supply or monitoring wells are performed.)</i>		
		<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)


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— DRINKING WATER, SOLE SOURCE AQUIFER, WELLHEAD PROTECTION AND WATER WITHDRAWAL**

CONFIDENTIAL

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

<b>Wellhead Protection.</b> <i>(Applies when project is located near water wells or "well fields" supplying public water.)</i>		
	<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)	
	<b>13. Wellhead Restrictions.</b> If the impacted area is within a wellhead protection area, all restrictions are being complied with. (State regulations)	
<b>Water Withdrawal.</b> <i>(Applies if groundwater is being withdrawn.)</i>		
	<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)	
	<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)	
<b>--End of Checklist--</b>		


**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>
		a) <b>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>
		a) EHS Daily Briefings conducted – contents properly documented, EMS issues discussed (ESQ Policy, worker impacts to environment, pollution prevention).
		b) "Major Projects" conduct weekly meetings. Documentation is maintained.
		<b>7. Incident/Regulatory Reporting (EHS 1-7)</b>
		a) Incident reports submitted for all incidents in a timely fashion.
		b) Investigation report submitted for all incidents in a timely fashion.
		c) Corrective actions identified in the investigation report have been completed and closure has been documented.
		d) Employer's first report of injury prepared and submitted on time.
		e) 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>
		a) Manifests are not signed by TtEC personnel except as allowed by EHS 1-8.
		b) No environmental permits in TtEC's name or TtEC as operator except as allowed by EHS 1-8.


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS**

**CONFIDENTIAL**

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<b>9. Recordkeeping (EHS 1-9).</b> All EHS records maintained per procedure Personnel medical clearance EHS Correspondence H&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.)		
	<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?		
	<b>11. EHS/EMS Training (EHS 1-11).</b>		
	<b>a)</b> All staff (including subcontractors) have required EHS and TtEC training. Documentation is maintained on-site as required by EHS 1-11.		
	<b>b)</b> Training on EHS, WM, and DOT Plans have occurred and is documented (EHS 3-2).		
	<b>c)</b> Are personnel trained in the environmental aspects of their activities?		
	<b>12. Ergonomics (EHS 3-1).</b> Field and Office Ergonomic evaluations have been conducted as suggested in EHS 3-1		
	<b>13. EHS Plans (EHS 3-2).</b>		
	<b>a)</b> Meets requirements of EHS 3-2, including requirements under 29 CFR 1910.120 and any other safety or environmental statute or regulation.		
	<b>b)</b> Are TIP/RMP risks incorporated into EHS plan?		
	<b>c)</b> Completed, approved, and signed copy is on-site.		
	<b>d)</b> Has been modified to reflect changing site condition/activities.		
	<b>e)</b> Is being implemented as written.		
	<b>f)</b> Identifies activity hazard analyses, which adequately address site hazards (EHS 3-5).		
	<b>g)</b> Identifies PPE, which is appropriate for site contaminants, actual, and potential exposure levels, and site activities.		
	<b>h)</b> Identifies Air/Noise monitoring strategy (s), which is appropriate for contaminants and activities.		
	<b>i)</b> Lists action levels which are appropriate and action levels are being implemented.		
	<b>j)</b> Identifies exclusion, CRZ, and support zones, site is clearly demarcating these zones per EHS plan (EHS 3-4).		


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST—EHS/EMS PROGRAMS**

**CONFIDENTIAL**

Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	k) Discusses appropriate personnel and equipment decontamination procedures. Procedures are being implemented (EHS 5-1).	
	l) Includes Emergency Response Plan, which addresses potential site emergencies (EHS 2-1).	
	m) 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.	
	n) Addresses respiratory protection program (EHS 5-2) requirements. Program being implemented.	
	o) Addresses environmental conditions and regulatory requirements.	
	p) Identifies all waste streams, management requirements (including client requirements), and transport/disposal plans. These requirements are being implemented.	
	q) 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>	
	a) Weekly/monthly inspections conducted. Closure of action items are documented.	
	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>	
	<b>Postings/ Signs/ Labeling/ Markings</b>	
	15. OSHA Job Safety & Health Poster.	
	16. OSHA 300 Log (February) posted.	
	17. OSHA Noise Regulation posted.	
	18. Department of Labor Postings.	
	19. Emergency phone numbers posted.	
	20. Other suggested postings: a) Evacuation routes posted. b) All hazard warning signs. c) Noise hazard warning signs. d) Control zones clearly identified. e) Site perimeter posted and controlled. f) Emergency exits clearly marked. g) Fire extinguishers clearly marked. h) Safety showers/ eyewashes clearly marked. i) Circuit breakers labeled. j) Low overhead hazards clearly marked.	
	21. Copy of TtEC Work Rules Posted (EHS 3-6).	


**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>		
			22. ESQ Policy posted.							
			23. TtEC Hotline Poster.							
			24. ZIP/EMS Bulletins are posted, as appropriate.							
<b>Work Practices and EHS Knowledge</b>										
			25. Identify at least 1 Safety Observation performed							
			a) Do Site Personnel: Where appropriate PPE Understand risks Implement appropriate controls Implement permit systems Comply with EHS Plan requirements							
			b) Do Supervisors: Provide appropriate tasking Identify competent persons as necessary Provide sufficient oversight							
			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.							
<b>High Loss Potential Activities (Meet TtEC and/or Regulatory Requirements)</b>										
			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.							
<b>Emergency Preparedness</b>										
			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

	Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS		COMMENTS/NOTES
	44. Sufficient trained CPR/ first aid personnel available. (See EHS 1-11 for TtEC requirements).		
	45. Site personnel trained to perform ER tasks per EHS Plan.		
	46. ER drills conducted per EHS Plan.		
	47. Emergency response phone numbers verified.		
	48. Local fire department, hazardous materials group, hospital, etc. aware of TtEC expectations for emergency situations		
<b>Environmental Management System</b>			
	49. <b>Project-Specific Significant Environmental Risks (Aspects).</b> Project-specific significant environmental risks (aspects) have been identified in TIP.		
	50. <b>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>		
	51. <b>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.		
	52. <b>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>		
	53. <b>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— 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> <i>(Applies if project involves the construction, extension, or hookup or shutoff of utilities.)</i>			
			<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. <i>(State/local regulations, Base requirements)</i></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. <i>(State/Local regulations) 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. <i>(State/Local regulations) 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. <i>(State/local regulations) If an inspection was conducted note the date and results.</i></p>


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**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>	
<b>Miscellaneous</b>				
			<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>	




**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**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)	
<b>Activities That Impact Roads/Traffic</b> ( <i>Applies if roads or traffic will be impacted by project activities.</i> )				
			<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)	




**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

**CONFIDENTIAL**

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<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 (Please complete each line in this section.)</b>		
	<b>1. ESS or Designated Waste Management Role. Discuss Role of ESS or designated individual with regards to waste management at the Site.</b> a. How is waste management handled. Is it working effectively? b. What types of problems have been encountered? c. Is ESS or designated individual receiving regulatory support/oversight from ESQ Specialists, as needed? 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.	
	<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) a. Permit is current. b. Existing physical facilities are consistent with contents in permit and application. c. Part A and B application and permit, as applicable, accurately reflect existing TSD project activities. 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	
	<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)	
	<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)	
	<b>5. Waste Analysis Plan.</b> Written waste analysis plan has been developed.	


**TETRA TECH EC, INC.**  
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Project:	Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<p>a. Contents. 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. Recordkeeping. 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. Updates. 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>	

TETRA TECH EC, INC.  
**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

CONFIDENTIAL

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".	

TETRA TECH EC, INC.  
**PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES**

CONFIDENTIAL

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: a. Is impervious: free from cracks or gaps and impervious enough to contain leaks, spills, and precipitation. b. Base is sloped (or otherwise designed) to drain and remove liquids resulting from leaks, spills, or precipitation. c. Containers are elevated or protected from contact with accumulated liquids. d. Has adequate capacity to contain 10% of volume of containers or the volume of the largest container, whichever is greater. e. Run-on into the containment system is prevented or system has sufficient capacity to contain any runoff that might enter system. f. Liquids within containment system are removed as soon as practicable. (40 CFR 264.175)		
	<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)		

TETRA TECH EC, INC.  
 PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES

CONFIDENTIAL

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

CONFIDENTIAL

Project:		Inspector:	Date:
Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<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> <p>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))</p> <p>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))</p> <p>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))</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 264.193(d) and (e) and 265.193(d) and (e))</p> <p>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.</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 kept on-site. (40 CFR 264.193(i) and 265.193(i))</p>		
	<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>		

PESM INSPECTION CHECKLIST— HAZARDOUS WASTE: PERMITTED FACILITIES

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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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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<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>		
	<p><b>46. State-Specific Requirements.</b> Tank system meets state-specific requirements (State Hazardous Waste Regulations). See WMP for requirements.</p>		
<b>Containment Buildings</b>			
	<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>		
	<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>		
	<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>		
	<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>		
	<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>		
	<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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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<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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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<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.		
<b>Surface Impoundments</b>			
	<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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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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Yes No N/A	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>
	<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)	
	<b>78. Construction or Expansion.</b> Project involves the construction or replacement of portions of a waste pile. Waste pile has: <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> <i>Note: This requirement applies to construction, lateral expansions or replacement of existing units which commenced after January 29, 1992.</i>	

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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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	<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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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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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES	
	<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).		
	<b>93. Inspection.</b> The following inspections have or are being conducted. Documentation is placed in on-site files. 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)) 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)). 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))		
	<b>94. Release.</b> If leak detected, the following has been conducted: (40 CFR 264.573(m) and 265.443(m)) a. <b>Repair.</b> Condition was promptly repaired and any cleanup was conducted. b. <b>Recordkeeping.</b> Condition/release was recorded in operating record. 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. d. <b>Certification.</b> Independent engineering certification was submitted upon completion of repairs and cleanup.		
	<b>95. State-Specific Requirements.</b> Drip pads comply with state-specific requirements. (State Hazardous Waste Regulations)		
<b>Landfills</b>			
	<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 a. Double liners; b. Leak detection; and c. Groundwater monitoring. (40 CFR 264.301, 264.90 - 100 and 265.301)		
	<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)		

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	<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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	<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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	<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>		
<b>Incinerators</b>			
	<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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	<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)		

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	<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> (This section applies to interim status facilities only.)		
	<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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	<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))	

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	<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>	
<b>Land Treatment Units</b>		

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	<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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	<p><b>148. Reactive/Ignitable Wastes.</b> Reactive or ignitable waste are treated to prevent ignition or reaction.</p> <p>a. It is immediately incorporated into the soil so that they no longer meet the definition of ignitability or reactivity; OR</p> <p>b. It is managed to prevent ignition or reaction. (40 CFR 264.281 and 265.281)</p>	
	<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> <p>a. Operations necessary to maximize degradation, transformation, or immobilization of waste and minimize run-on/runoff and wind dispersal will continue through closure.</p> <p>b. Vegetative cover is being established and maintained.</p> <p>c. Unsaturated zone monitoring is being continued.</p> <p>d. Soil pore monitoring is continued for 90 days after last waste application</p> <p>e. Closure has been certified by independent qualified soil scientist or independent registered professional engineer. (40 CFR 264.280 and 265.280)</p>	
	<p><b>153. State-Specific Requirements.</b> Land treatment unit complies with state-specific requirements. (State Hazardous Waste Regulations)</p>	
<b>Miscellaneous Units (Applies to final status units only.)</b>		
	<p><b>154. Design and Operation.</b> Unit is designed and operated in accordance with permit conditions, including but not limited to:</p> <p>a. Prevention of migration of waste constituents in groundwater or subsurface environment;</p> <p>b. Prevention of migration of waste constituents in surface water, wetlands, or soil surface;</p> <p>c. Prevention of migration of waste constituents to air; and</p> <p>d. Procedures regarding monitoring and analysis, inspection, emergency response, spill reporting, and corrective action. (40 CFR 264.600 - 603)</p>	

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

**Training**

	<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>	

**Preparedness and Prevention**

	<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>	

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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)		

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

**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: <ul style="list-style-type: none"> <li>a. Packaged and 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. (40 CFR 262.30 - .32)</li> </ul>	

**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.	

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	<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>	


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<b>Yes No N/A</b>	<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>	

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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--**

**EHS 3-3 ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST - HAZARDOUS WASTE: STORAGE/TREATMENT/DISPOSAL**  
**IN LESS THAN 90 DAYS**

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

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.

<b>General Requirements</b>		
		<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>
<b>Container Storage</b>		
		<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>	
		<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>	
<b>Satellite Accumulation</b>			
		<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>	
		<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 (<i>see #4 through #8 above</i>).</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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		<p><b>18. Stockpiles are designed &amp; maintained appropriately (e.g. placed on poly sheeting, bermed, and <u>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.</u></b></p>	
		<p><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.</b></p>	
<p><b>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))</b></p>			
		<p><b>20. 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>	
		<p><b>a. Integrity Assessment.</b> There is a written assessment reviewed/certified by an independent, registered PE of tank's integrity &amp; document is kept on-site. (40 CFR 265.192(a))</p>	
		<p><b>b. Installation Inspection.</b> There is a written assessment by qualified installation inspector or registered PE that tank is properly installed &amp; document is kept on-site. (40 CFR 265.192(b) - (g))</p>	
		<p><b>21. Marking.</b> Tanks are clearly marked with the words "Hazardous Waste" and accumulation start date is clearly visible. (40 CFR 262.34(a))</p>	
		<p><b>22. 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))</p>	
		<p><b>23. 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.</p>	
		<p><b>a. General Requirement.</b> Containment system is capable of detecting/collecting releases &amp; accumulated liquids until collected material is removed. (40 CFR 265.193(b)(2))</p>	
		<p><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))</p>	

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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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**CONFIDENTIAL**

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

			<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>	
<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><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}</math> m<sup>2</sup>/sec or more)</p>	

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			<p>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.</p>	
			<p>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.</p>	
			<p><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)).</p>	
			<p><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))</p>	
			<p>a. <b>Repair.</b> Condition was promptly repaired and any cleanup was conducted.</p>	
			<p>b. <b>Recordkeeping.</b> Condition/release is recorded in operating record.</p>	
			<p>c. <b>Notification.</b> Within 7 days notify EPA and within 14 working days provide written plan of steps taken to repair/cleanup.</p>	
			<p>d. <b>PE Certification.</b> After repairs performed, provide EPA with PE certification that repairs/cleanup conducted in accordance with written plan.</p>	
			<p><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))</p> <p>(Inspection should include monitoring/leak detection equipment data, containment building and surrounding area for signs of release/deterioration).</p>	
			<p><b>43. Areas With and Without Secondary Containment.</b> If building contains areas with and without secondary containment:</p> <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> <p>(40 CFR 265.1101(d)).</p>	
			<p><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></p>	

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			<p><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))</p>	
			<p><b>46. Recordkeeping.</b> The following records are kept:</p>	
			<p>a. Procedure to ensure that each waste volume remains in the unit for no more than 90 days, <b>OR</b></p>	
			<p>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)).</p>	
			<p><b>47. State-Specific Requirements.</b> Containment building meets state-specific requirements. (<i>See Project Waste Mgmt. Plan for requirements</i>).</p>	

**Training**

			<p><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 &amp; 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.</p>	
			<p><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>It policy because our training includes air shipment module which is more stringent than DOT rail, highway, vessel modes</i>).</p>	
			<p><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))</p>	
			<p><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))</p>	

**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>	

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		<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.)

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

**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>	

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	<p><b>71. Debris. (Note: Contact Project Env. Compliance Specialist for assistance). (40 CFR 268)</b></p> <p>Debris which contains a listed haz. waste (i.e., F, K, P or U codes) or exhibits a characteristic (i.e., D001-D043 codes) has:</p> <ul style="list-style-type: none"> <li>a. Obtained a "contained-in" determination by EPA;</li> <li>b. Has been treated and meets the LDR Debris performance standards and therefore is no longer regulated as hazardous; OR</li> <li>c. Meets the LDR standards and applicable Universal Treatment Standards.</li> </ul> <p>(Residues from treatment of hazardous debris must be managed as a hazardous waste and meet 40 CFR 268 standards prior to land disposal.)</p>	
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--End of Checklist--

EHS 3-3 ATTACHMENT C

TETRA TECH EC, INC.

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. [Note: 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>

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TETRA TECH EC, INC.

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

CONFIDENTIAL

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

		<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>	

<b>Waste Generation/Management/Disposal</b> (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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PESM INSPECTION CHECKLIST— LEAD-BASED PAINT ABATEMENT/ASSESSMENT/SAMPLING

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		<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--

**EHS 3-3 ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT**

**CONFIDENTIAL**

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

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

<b>General Requirements</b>		
		<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>

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**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>	

EHS 3-3 ATTACHMENT C  
 TETRA TECH EC, INC.  
 PESM INSPECTION CHECKLIST - OIL AND HAZARDOUS SUBSTANCES MANAGEMENT

**CONFIDENTIAL**

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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>	

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<b>Yes No N/A</b>	<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> <p>a. Water is inspected for visible signs of contamination prior to release</p> <p>b. Water is removed daily, or as necessary to prevent excessive accumulation</p>	
<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>) <i>For example, oil refineries and terminals.</i></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>	

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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>

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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)	

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<b>Yes No N/A</b>	<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--

ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST— POLYCHLORINATED BIPHENYLS

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 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		
		<p><b>1. 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))</p>
		<p><b>2. 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))</p>
		<p><b>3. 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)</p>
		<p><b>4. Awaiting Analytical.</b> PCB wastes are being stored awaiting analytical regarding PCB concentration.</p>
<p><b>Storage 30 Days or Less</b> (Applies if PCBs are stored at project site for 30 days or less.)  <i>Note: See General Requirements for additional requirements applicable to less than 30-day storage areas.</i></p>		
		<p><b>5. Designated Area.</b> A designated area has been established for accumulation of PCB wastes. (GMP)</p>
		<p><b>6. 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))</p>
		<p><b>7. PCB Article/Type of Wastes.</b> Only the following PCB wastes are stored:</p>
		<p>a. Non-leaking PCB articles/PCB equipment.</p>
		<p>b. Leaking PCB articles/equipment if placed in non-leaking container with sufficient absorbent.</p>
		<p>c. PCB Containers containing non-liquid PCBs (soil/rags/debris).</p>
		<p>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))</p>

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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))	
<b>1-Year Storage Facility</b> <i>(Applies if PCBs are stored at project site for less than 1 year, but greater than 30 days)</i> <i>Note: See General Storage Requirements for additional requirements applicable to greater than 30-days, but less than 1-year storage areas.</i>		
	<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.	
<b>General Storage Requirements</b> <i>(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)</i>		
	<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.	

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<b>Yes No N/A</b>	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>
	<p><b>17. 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)</p>	
	<p><b>18. 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))</p>	
	<p><b>19. 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))</p>	
	<p><b>20. Container Requirements.</b> PCBs are contained in DOT Specification Containers. (49 CFR 172.101, GMP)</p>	
	<p><b>21. 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))</p>	
<b>PCB Stockpile Storage (Applies to soils and other solid PCB wastes stored in stockpiles)</b>		
	<p><b>22. Accumulation Time.</b> Waste tracking log indicates PCB waste stockpiles are stored less than 180 days.</p>	
	<p><b>23. Type of Wastes.</b> Only solid, non-flowing PCB solids may be stored in stockpiles.</p>	
	<p><b>24. 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.</p>	
	<p><b>25. Leachate.</b> No leachate is generated as a result of storage in the stockpile</p>	
	<p><b>26. Liner.</b> Stockpiled waste is placed on a liner that prevents PCBs from migrating into soil or groundwater.</p>	
	<p><b>27. Storm Water Protection.</b> Adequate run-on controls are present to withstand a 25 year storm event. Water ??</p>	
<b>Decontamination</b>		
	<p><b>28. 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)</p>	

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes</b>	<b>No</b>	<b>N/A</b>
REQUIREMENTS		COMMENTS/NOTES
<p><b>29. Staging Area.</b> Decontamination is conducted in engineered staging area where all rinsates/solvents/residues are collected in a sump or other containment system.</p>		
<b>Disposal</b>		
<p><b>30. 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.</p>		
<p><b>PCB Spill Cleanup Policy</b> (<i>Applies if PCB from current or recent spill is being cleaned up (e.g., contaminated soil, concrete pads, buildings, containers, etc.)</i>)</p>		
<p><b>31. 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))</p>		
<p><b>32. 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))</p>		
<p><b>33. 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)</p>		
<p><b>34. 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))</p>		
<p><b>Recordkeeping Note:</b> <i>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.</i></p>		
<p><b>35. 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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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>
	<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>	
<b>Off-Site Transportation/Disposal</b>		
	<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--

ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

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 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.*

<b>General Requirements</b>		
	<b>1. Waste Determination.</b> Waste has been characterized. (State/local regulations, TTEC Environmental Field Procedures)	
	<b>2. Waiting Analytical.</b> Wastes being stored awaiting waste determination.	
<b>Investigation Derived Waste</b>		
	<b>3. 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.	
	Soil cuttings      Treatment residues      Disposable Sampling Equipment	
	Purge water      Deconwater      PPE	
	Other: _____	
	<b>4. 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.)	
	<b>5. 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.	
	<b>6. Containers are being managed in accordance with BMPs. (containers closed, inspected, tracked)</b>	
<b>Special Waste/Solid Waste</b> ( <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> )		
	<b>7. Stockpiles.</b> Waste is being stored in stockpiles in compliance with liner, size, covering, etc. requirements. (State/local regulations)	

ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST— NON-HAZARDOUS IDW/SOLID WASTE

CONFIDENTIAL

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

		<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>	

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

			<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.	


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

				<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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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--

**EHS 3-3 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>

*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>


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Yes No N/A	REQUIREMENTS	COMMENTS/NOTES
	<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>	


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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>	
	<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>	
<b>USTs Installed BEFORE December 22, 1988</b>		
	<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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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>	




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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>	


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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>	


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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>




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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>		
Federal USTs ( <i>This section applies to USTs owned by Federal Agencies and are a result of the Federal Policy Act of 2005</i> )					
			<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>		
			<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>		
			<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>		
			<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>		

--End of Checklist--

**EHS 3-3 ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**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>


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	<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>	


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Yes	No	N/A	REQUIREMENTS					COMMENTS/NOTES		
			<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, manufacturers, 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>							


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	<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. (40 CFR 403.5)</i></p>	


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<b>Yes</b>	<b>No</b>	<b>N/A</b>	<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). <i>[40 CFR 122.21(j)(6)(iii)(B)]</i></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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<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>REQUIREMENTS</b>		<b>COMMENTS/NOTES</b>
			<b>23. State/Local-Specific Requirements.</b> Discharge complies with state/local agency permit and regulatory requirements. (State regulations)		
<b>Discharge to Private Treatment Works</b> ( <i>Applies if wastewater is discharged to treatment system owned by a private party.</i> )					
			<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.		
			<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)		
<b>Discharge to Ground/Groundwater</b>					
			<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>		
			<b>a. Effluent Limits.</b> Based upon review of monitoring reports and permit conditions verify that permit discharge limits are being met.		
			<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.		
			<b>c. 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.		
			<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	REQUIREMENTS
			COMMENTS/NOTES
			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	<b>REQUIREMENTS</b>	<b>COMMENTS/NOTES</b>

**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 TSDF 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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	<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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			<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)	
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<b>Discharge to Underground Injection Wells</b> <i>(Applies if project discharges wastewater to UIC or injection gallery.)</i>				
			<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>	
			<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)	
			<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)	
			<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>	
			<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>	


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	<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>		


**ATTACHMENT C**  
**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— WASTEWATER/STORMWATER DISCHARGES/UIC**

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>
			<p><b>50. Class I Hazardous Waste Injection Well.</b> Project discharges hazardous waste into a Class I injection well that meets the following criteria:</p> <ul style="list-style-type: none"> <li>a. Waste is <u>not</u> prohibited from discharge or a waiver has been obtained under 40 CFR 148.1 and 148.10-.17.</li> <li>b. Siting under 40 CFR 146.61.</li> <li>c. Manifesting, notification, identification, maintenance of operating records, reporting, personnel training, certification of closure in accordance with 40 CFR 264 requirements.</li> <li>d. Corrective action requirements, if applicable, under 40 CFR 146.64.</li> <li>e. Construction requirements under 40 CFR 146.65 and .66.</li> <li>f. Operating requirements under 40 CFR 146.67.</li> <li>g. Continuous recording devices for monitoring compliance in accordance with 40 CFR 146.67.</li> <li>h. Testing and monitoring requirements under 40 CFR 146.68.</li> <li>i. Reporting requirements under 40 CFR 146.69.</li> <li>j. Well closure plan/post-well closure plan in accordance with 40 CFR 146.71 and .72.</li> <li>k. Land disposal restrictions in accordance with 40 CFR 148 and 268.</li> </ul>		

-- End of Checklist--

**EHS 3-3 ATTACHMENT C  
TETRA TECH EC, INC.  
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>

**EHS 3-3 ATTACHMENT C  
TETRA TECH EC, INC.  
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>	

**EHS 3-3 ATTACHMENT C  
TETRA TECH EC, INC.  
PESM INSPECTION CHECKLIST— WETLANDS/STREAMS/FLOODPLAINS**

**CONFIDENTIAL**

Project:		Inspector:	Date:
Yes	No	N/A	REQUIREMENTS
			COMMENTS/NOTES
			<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>
<b>Floodplain/Flood Control</b> ( <i>Applies when project will potentially impact floodplains or is located in a flood control area</i> )			
			<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--

**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION**  
**FOR DEPARTMENT OF ENERGY PROJECTS**

*CONFIDENTIAL*

<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<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: 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))
		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)


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<b>Yes No N/A</b>	<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>	

**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION**  
**FOR DEPARTMENT OF ENERGY PROJECTS**

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

	<p>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))</p>	
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**Access Control to Radiological Areas** (*Applies if a radioactive material license exists.*)

	<p>1. Is there a means for personnel entry control using one or more of the following:</p> <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>	
	<p>2. 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>3. 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>	

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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<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))	

**TETRA TECH EC, INC.**  
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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<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>	

**TETRA TECH EC, INC.**  
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<b>Project:</b>	<b>Inspector:</b>	<b>Date:</b>
<b>Yes No N/A</b>	<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.)*

			<p>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))</p>	
			<p>2. Is this training completed before being permitted unescorted access and before receiving occupational dose? (835.901(b)(1-2))</p>	
			<p>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))</p>	
			<p>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:</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>	

**Design and Control** *(Applies if a radioactive material license exists.)*

			<p>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))</p>	
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**TETRA TECH EC, INC.**  
**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>

			<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>	


**TETRA TECH EC, INC.**  
**PESM INSPECTION CHECKLIST— RADIOACTIVE MATERIAL/RADIATION**  
**FOR DEPARTMENT OF ENERGY PROJECTS**

*CONFIDENTIAL*

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

			<p>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:</p> <p>a. Removable surface contamination levels are below the removable surface contamination values specified; and (835.11019(c)(1))</p> <p>b. The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contamination status? (835.1101(c)(2))</p>	
			<p>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))</p>	
			<p>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:</p> <p>a. The area is routinely monitored; (835.1102(c)(1))</p> <p>b. The area is conspicuously marked to warn individuals of the contaminated status? (835.1102(c)(2))</p>	
			<p>6. Are individuals exiting contamination, high contamination, or airborne radioactivity areas be monitored, as appropriate, for surface contamination? (835.1102(d))</p>	
			<p>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))</p>	

**-- End of Checklist --**

**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.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
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<b>Category:</b>	Company Procedures	<b>Original Issue Date:</b>	02/01/95
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<b>Keyword Index:</b>	Monitoring, Training, Field Activities/Science, Operational Control	<b>Document Type:</b>	Procedure
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6.0 REFERENCES

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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**

Click the icon below to [launch or download](#).



EHS 6-1 Attachment A.doc

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.

**EHS 6-1 ATTACHMENT B**  
**CONFINED SPACE ENTRY PERMIT**

Click the icon below to [launch or download](#).



EHS 6-1 Attachment B rev 3.doc

**Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.**

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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 Before Confined Space   After Confined Space	Comments/Problems with Service

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**

TEST(S) TO BE TAKEN	Permissible Entry Level	Time(s)
PERCENT OF OXYGEN	19.5% to 22.0%	_____
LOWER FLAMMABLE LIMIT	Under 10 %	_____
		_____
		_____
		_____
		_____

REMARKS: \_\_\_\_\_

**EHS 6-1 ATTACHMENT B  
CONFINED SPACE ENTRY PERMIT**

GAS TESTER NAME & CHECK #	INSTRUMENT(S) USED	MODEL &/OR TYPE	SERIAL &/OR UNIT #
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SUPERVISOR AUTHORIZATION—ALL CONDITIONS SATISFIED: \_\_\_\_\_ DEPT/PHONE \_\_\_\_\_

PRINT NAME: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_ FUNCTION (i.e., entrant, attendant, or supervisor)

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SPECIAL REQUIREMENTS:

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**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 Date:</b>	02/01/95
<b>Sub-Category:</b>	Departmental/Discipline	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
<b>Keyword Index:</b>	EHS Compliance/Waste Management, Field Activities/Science, Operational Control, Training, Monitoring	<b>Document Type:</b>	Procedure
		<b>Document Owner:</b>	Skip Parry

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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 PESM and project manager. When the excavation is open, utilities shall be supported and protected from damage. Clearance and support methods shall be documented on the daily inspection checklist.
- Where structural ramps are used for egress they shall be installed in accordance with 29 CFR 1926.651(c)(1).
- Stairways, ladders, or ramps shall be provided as means of egress in all trenches 4 feet or more in depth. Travel distance shall be no more than 25 feet between means of exit.
- Employees exposed to vehicular traffic shall wear traffic vests.
- No employee shall be permitted under loads being lifted or under loads being unloaded from vehicles.
- When vehicles and machinery are operating adjacent to excavations warning systems such as stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling on employees.

- Excavated and loose materials should be kept at least 3 feet from the edge of excavations, but at a minimum of 2 feet from the edge of the excavation in accordance with OSHA requirements.
- Walkways or bridges with standard railing shall be provided at points employees are to cross over excavations or trenches.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

#### **5.4 Hazardous Atmospheres**

Where atmospheres containing less than 19.5 percent oxygen or other types of hazardous atmospheres may exist the following requirements shall be implemented.

- Atmospheric testing shall be done prior to employees entering excavations 4 feet or greater in depth.
- Testing methods shall be listed on the daily inspection checklist and results documented daily in field logs.
- Control measures such as ventilation and personal protective equipment (PPE) shall be used to control employee exposure to hazardous atmospheres below published exposure limits.
- Ventilation shall be used to control flammable and combustible vapors to below 10 percent of their lower explosive limit.
- Testing shall be repeated as often as necessary to ensure safe levels of airborne contaminants.
- Emergency equipment shall be provided and attended when the potential for a hazardous atmosphere exists. This equipment shall include but not be limited to emergency breathing apparatus, harnesses, lifelines, and basket stretchers. Required equipment will be listed on the daily inspection checklist and reviewed daily.

### **5.5 Protection From Water Hazards**

When water has collected or is collected in excavations and trenches the following requirements shall be applied.

- Employees shall not work in excavations in which water has, or is, accumulating without the use of additional protection such as special support systems or water removal.
- Water removal shall be monitored by a competent person.
- Barriers such as ditches and dikes shall be used to divert runoff from excavations and trenches.
- Trenches shall be reinspected prior to re-entry after water accumulation due to heavy rainfall or seepage.

### **5.6 Stability of Adjacent Structures**

When excavating or trenching near an adjacent structure the following practices shall be implemented.

- Support systems such as shoring, bracing, or underpinning shall be provided where the stability of buildings, walls, or other structures is endangered by excavation.
- Excavation bases or footings of foundations shall be prohibited unless support systems are used, the excavation is in stable rock, a professional engineer has determined the structure is sufficiently removed from the site as to not pose a hazard, or the PE determines that the excavation shall not pose a hazard to employees due to the structure.
- Support systems shall be used when it is necessary to undermine sidewalks, pavements, and appurtenant structures.
- Surcharge load sources and adjacent encumbrances shall be listed with their evaluation date on the daily inspection checklist.

### **5.7 Daily Inspections**

Inspections shall be performed daily on all excavations, adjacent areas, and protective systems before personnel enter the trench. The checklist provided in Attachment A or equivalent shall be used.

### **5.8 Soil Classification**

To perform soil classification, the competent person shall use a thumb test, pocket penetrometer, or shear vane to determine the unconfined compressive strength of the soils being excavated. In soils with properties that change (i.e., one soil type mixed with another within a given area) several tests may be necessary. When different soil types are present the overall classification shall be that of the type with the lowest unconfined compressive strength. Classifications shall result in a soil rating of Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR 1926.652, Appendix A. Soil classifications shall be listed on the daily inspection checklist. The soils analysis checklist provided in Attachment B or equivalent shall be used for soil classifications.

### **5.9 Sloping and Benching**

All sloping and benching shall be done in accordance with 29 CFR 1926.652, Appendix B. Selection of the

sloping method and evaluation of surface surcharge loads shall be made by a competent person familiar with the requirements contained therein. Sloping and benching methods and specifications shall be listed on the daily inspection checklist.

#### **5.10 Protective Systems**

Protective systems are required on all excavations over 5 feet in depth or in excavations less than 5 feet when examination of the ground by a competent person reveals conditions that may result in cave-ins.

Selection and installation of protective systems shall be done in accordance with 29 CFR 1926.652, Appendices C & D, or manufacturers data for shoring and shielding systems. Selection of a protective system shall be made based upon soil classification and job requirements by a competent person. Protective systems and specifications shall be listed on the daily inspection checklist.

#### **5.11 Training**

Competent persons shall have an adequate combination of experience and training to classify soil types and select protective systems as outlined in 29 CFR 1926.652. Training and experience pertaining to qualification as a competent person shall be documented and include the following:

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

Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

### **6.0 REFERENCES**

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

**Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.**

**EHS 6-3 ATTACHMENT B  
SOILS ANALYSIS CHECKLIST**

**Click the icon below to launch or download.**



EHS 6-3 Attachment B.doc

**Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.**

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**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 determined percentage of granular and cohesive materials). Compare results to soil textural classification chart to determine soil type.

Test performed  Yes  No

Type A (clay, silty clay, sandy clay, clay loam, and in some cases silty clay, loam and sandy clay loam)

Type B [angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and in some cases, silty clay loam and sandy clay loam

Type C (granular soil including gravel, sand and loamy sand)

% granular  % cohesive  % silt

**NOTE:** *Type A -- no soil is Type "A" if soil is fissured; subject to vibration; previously disturbed; layered dipping into the excavation on a slope of 4H:1V.*

**SOIL CLASSIFICATION**

Type A

Type B

Type C

**SELECTION OF PROTECTIVE SYSTEM**

Sloping, Specify angle:

Timber Shoring

Aluminum Hydraulic Shoring

**NOTE:** *Although OSHA will accept the above tests in most cases, some states will not. Check your state safety requirements for trenching regulations.*

**Purpose:** The purpose of this program is to establish a method to protect personnel from injury (e.g. burns, shocks, asphyxiation) and to prevent fires as a result of welding and hot work.

<b>Status:</b>	Complete	<b>Approved By:</b>	John DeFeis
<b>Version Date - Type:</b>	01/06/2009 - New	<b>Title:</b>	Welding/Hot Work
<b>Category:</b>	Company Procedures	<b>Original Issue Date:</b>	02/01/95
<b>Sub-Category:</b>	Departmental/Discipline	<b>Sections:</b>	ESQ - Environmental Health & Safety Programs
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		<b>Document Owner:</b>	Skip Parry

- 1.0 PURPOSE
- 2.0 SCOPE
- 3.0 MINIMUM REQUIREMENTS
- 4.0 GUIDANCE
- 5.0 REFERENCES
- 6.0 ATTACHMENTS

## 1.0 PURPOSE

The purpose of this procedure is to establish a method to protect personnel from injury (e.g. burns, shocks, asphyxiation) and to prevent fires as a result of welding and hot work.

## 2.0 SCOPE

This document applies to all welding, cutting, grinding or other spark-producing or open flame activities on Tetra Tech EC, Inc. (TtEC) project sites, including but not limited to brazing, cutting, welding, grinding, soldering, pipe thawing, and thermite welding (cadwelds).

## 3.0 MINIMUM REQUIREMENTS

### 3.1 Responsibilities

### 3.1.1 Environmental, Health and Safety Personnel

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for this procedure.

The Environmental and Safety Supervisor (ESS) is responsible for providing oversight of hot work and welding activities.

The Project Environmental Safety Manager (PESM) is responsible for providing consultation to the Project, including appropriate protective equipment and worker monitoring.

### 3.1.2 Permit Authorizing Individual (PAI)

The PAI is designated by in writing by management. The PAI(s) will have the experience and training to understand the risks and mitigation methods of hot work.

For Task Specific areas, the PAI:

- Inspects for flammable materials, hazardous processes and other fire hazards that are, or likely to be present in the work location.

- Ensures the protection of combustibles from ignition by moving the work to a location that is free from combustibles, moving the combustibles away, or covering combustibles with a fire resistant covering.

- Verifies that fire protection and extinguishing equipment are available at the hot work site.

- Determines when Fire Watches are required and verifies that a fire watch is at the Task Specific site.

- Identifies the PPE that is required for the Hot Work Operator (consults with the ESS and PESM as necessary).

- Completes and issues the Hot Work Permits for work in Task-Specific Areas (Attachment A).

*(Note: Task-Specific Hot Work Area is for hot work that is performed outside of a Designated Area and for a specific task that is made fire safe by removing or protecting combustibles from ignition sources. Hot Work Permits are required for Task Specific hot work and are valid for one shift only. Fire watches are typically required).*

For Designated Areas, the PAI:

- Provides regular inspection of Designated Areas

- Verifies that unnecessary combustible, flammable materials have not been brought into the Designated Areas (Attachment B - Hot Work Precautions Checklist may be used).

*(Note: A Designated (Hot Work) Area is a permanent, specific location designed or approved for hot work operations to be performed regularly (e.g., a maintenance shop or a detached defined outside location that is of noncombustible or fire-resistant construction), that is essentially free of combustible and flammable contents, and is suitably separated from adjacent areas. The Designated Area must be maintained free of combustibles as this area allows hot work at any time. A fire watch or a hot work permit is not typically required. The PAI is responsible for daily inspections when the area is in use).*

### 3.1.3 Hot Work Operator

Hot Work Operators are responsible for:

- The safe operation of equipment in accordance with the manufacturer's instructions.

- Wear/use the proper PPE.

- Awareness of the hazards of hot work and emergency procedures in the event of a fire.

- Having the PAI approval before starting hot work operations.

Ceasing work if unsafe conditions develop and notifying the PAI.

#### **3.1.4 Fire Watch**

Individuals assigned to observe and protect the Hot Work Operator and property. The Fire Watch is responsible for:

Fire safe actions have been completed in the area prior to the start of hot work (combustibles/flammables removed, openings in wall/floor covered, areas below are free of combustible materials). 10 ABC or larger fire extinguisher immediately available and maintained throughout the performance of work.

Suspending the work if unsafe conditions develop.

Quenching or Extinguishing incipient fires and summoning assistance in case of fire

### **3.2 Hot Work Operations**

#### **3.2.1 Hot Work and Flame/Spark Producing Equipment**

The PAI shall examine the Task Specific Area where the work is to be performed and shall ensure that:

Sprinkles, if provided, are in service and will not be taken out of service until this work has been completed.

Within 35 feet of the hot work

Combustible lint, dust, vapors, liquids, or unpurged tanks or equipment previously containing such materials are removed or protected with fire resistant covers.

All floor and wall openings within 35 feet of the hot work will be tightly covered or protected with fire-resistant covers (Note: Some processes such as air carbon arc cutting and plasma cutting may cause sparks to travel in excess of 35 feet requiring the area to be expanded).

The work will be confined to the area or equipment specified in the permit.

Floors and surroundings have been swept clean, with combustible floors and construction formwork (if any) dampened.

A suitable fire extinguisher is available at the hot work site. (an additional water bucket, sprayer, or damp sand may be used for quenching, cooling or covering hot slag or smoldering material)

Proper personal protective equipment (PPE) is identified in the hot work permit and is being worn by persons performing or observing the work.

One or more fire watch persons have been assigned to watch for sparks in the area, as well as on floors above and below, and the fire watch stays in the area for a minimum of 30 minutes after the end of the hot work activity.

Arrangements have been made for a patrol of the area, including floors above and below, during any lunch or rest period. Task Specific Hot work permits are good for one shift only.

All containers (drums, tanks, piping) are considered unsafe for welding, cutting or heating until it has been made safe, or declared safe by a qualified person.

The Hot Work Permit included as Attachment A or an equivalent form has been completed.

#### **3.2.2 Ventilation, Gases & Vapors**

The PAI will consult with the ESS and PESM to determine the appropriate PPE and the need for monitoring the area and worker(s) when certain metals or other significant toxics are known or suspected. Table 3.2.2-1 identifies the ventilation and respiratory protection that are required. When respiratory protection is to be used, the PESM will assist in the selection of the equipment and ensuring that the elements of a respiratory

protection program are in place. Refer to EHS 5-2 and the project planning documents (Health and Safety Plan, IH Monitoring Plan or AHA).

**Table 3.2.2-1 Work Categories and Ventilation/Respiratory Protection (OSHA-based)**

Hot Work Type	Type of Ventilation or Respiratory Protection Required*	Comments & Notes
<p><b><u>In Any Enclosed Space</u></b></p> <ul style="list-style-type: none"> <li>- Zinc-Bearing, Chrome-bearing base or filler metals, or materials coated with chrome bearing materials</li> <li>- Lead based materials, Cadmium bearing filler materials or cadmium coated materials</li> <li>- Zinc-bearing base or filler metals or coatings</li> <li>- Mercury bearing coatings</li> </ul>	<p>General Ventilation and Local exhaust required, sampling demonstrates otherwise <b>OR</b> workers protected by supplied air respirators</p>	<p>Respiratory Protection (supplied air) required when safe limits are not achieved. PESH involvement required</p>
<p><b><u>Confined Spaces</u></b></p> <ul style="list-style-type: none"> <li>- Any hot work</li> </ul>	<p>General Ventilation required.</p>	<p>Respiratory Protection (supplied air) required when safe limits are not achieved. PESH involvement required</p>
<p><b><u>In Any Location</u></b> Beryllium Containing base or filler metals</p>	<p>General Ventilation and local exhaust required and workers protected by supplied air respirators.</p>	
<p><b><u>In Any Location</u></b> GMAC welding on Stainless Steels</p>	<p>Local Exhaust <b>OR</b> supplied air respirators</p>	
<p><b><u>Open Areas (outside) Involving</u></b></p> <ul style="list-style-type: none"> <li>- Zinc-Bearing, Chrome-bearing base or filler metals, or materials coated with chrome bearing materials</li> <li>- Lead based materials,</li> <li>- Cadmium bearing filler materials or cadmium coated materials</li> <li>- Zinc-bearing base or filler metals or coatings</li> <li>- Mercury bearing coatings</li> </ul>	<p>Workers protected by filter type respirators</p>	
<p><b><u>General Welding, Cutting &amp; Heating</u></b> (not involving metals shown above)</p>	<p>Ventilation not required unless 29 CFR 1926, Subpart D limits are exceeded</p>	<p>Sampling may be required to verify TLV in 29 CFR 1926, Subpart D not exceeded – respiratory protection required if exceeded.</p>

\* Any other employees exposed to the same atmosphere will be protected in the same manner as the welder or cutter.

The hot work on surfaces with protective coatings will be evaluated for flammability and if flammable, stripped or removed at least 4 inches from the area of heat application, or the employees involved in the hot work area will be protected by a respirator.

**3.2.3 Personal Protective Equipment**

Workers and observers in hot work areas will have eye protection (safety glasses with side shields or ventilated goggles), face shields, safety toed boots, and hearing protection. Welding operators will have welding helmets with the appropriate shade lenses (auto-darkening preferred) (#11- #13 for SMAW welding, #3 - #5 for cutting). Dependent on the processes and materials, welding helmets with powered air purification systems may be appropriate. Clothing will be fire resistant. Dependent on the process, leather (or equivalent) apron, capes, sleeves, or chaps may be appropriate. If full face respirators are required, they will be equipped with protective lenses. Insulated leather welding gloves (appropriate to the process) will be worn during welding, cutting and heating activities.

Welders and others exposed to Inert-gas metal arc welding must have all skin completely covered to prevent burns and other damage by ultraviolet rays.

Designated Hot Work Areas will be posted with the PPE requirements.

### **3.2.4 Hot Work in Confined Spaces**

Any Hot Work within a confined space is a high hazard activity and requires a consultation and approval of the PESM. Job Specific Controls for the work will be developed.

When hot work is being performed in a confined space, welding machines and gas cylinders shall be left outside. Heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement. In addition to a hot work permit, all the requirements of EHS 6-1, Confined Space Entry, shall be followed, including the completion of a confined space entry permit.

### **3.2.5 Welding on Systems that Contain or Have Contained Flammable Liquids**

Welding or Hot Work on systems that have, or have contained flammable liquids is a high hazard activity that requires consultation and approval from the PESM before any work is begun.. Job specific controls will be developed.

The following precautions shall be taken for hot work on systems that contain or contained flammable liquids.

The part of the system being worked on must be isolated from other parts of the system containing flammable liquids or vapors. Isolation may be accomplished by plugging (i.e., using approved procedures and equipment), blanking, or removing from the system. Other approaches must be reviewed by the PESM.

The isolated system must be purged, ventilated, or cleaned before welding, cutting, or brazing may be performed.

Before purging, written calculations must be done to determine the time required to purge a certain size system with a given flow rate of an inert gas.

After ventilation or cleaning a system, a lower explosive limit (LEL) reading must be taken at the area to be worked to ensure that there are no residual flammable vapors before welding or other hot work is conducted. A reading of 10% of the LEL is considered acceptable.

When a part of a system (i.e., a pipe) is worked in place, protection must be accomplished by a combination of blanking-off and purging or blanking-off and cleaning.

### **3.2.6 Recordkeeping**

Completed Hot Work Permits shall be returned to the PAI and shall be maintained as part of the project file. When hot work was performed on containers that contained flammable materials, information on the purging and measurements will be retained with the hot work permit.

### **3.2.7 Training**

All persons involved in welding/hot work activities shall receive training on the requirements of this procedure. Training records shall be maintained in accordance with EHS 1-9, Recordkeeping.

## **4.0 GUIDANCE**

The following guidance information is not mandatory unless imposed by a client or project documents.

### **4.1 Definitions**

**Designated (Hot Work) Area** – A permanent, specific location designed or approved for hot work operations

to be performed regularly (e.g., a maintenance shop or a detached defined outside location that is of noncombustible or fire-resistant construction), that is essentially free of combustible and flammable contents, and is suitably separated from adjacent areas. The Designated Area must be maintained free of combustibles as this area allows hot work at any time. A fire watch is not typically required.

**Fire Watch** – One or more dedicated individuals that observe (direct line of sight) during hot work activities and for a defined period afterwards to protect the Hot Work Operator from injury and to insure that no possibility of fire exists. Fire Watch individuals may have other duties; however the additional duties shall not distract them from their fire watch duties.

**Hot Work** – Hot Work is any temporary or permanent operation involving open flames or producing heat and/or sparks (cutting welding and heating). This includes but is not limited to: brazing, cutting, soldering, grinding, and welding. Hot work can also apply to the use of open flame or other temporary heating devices.

**Hot Work Operator** – An individual who performs hot work who is trained in NFPA 51 B, ANSI Z49.1, requirements, in the use of equipment, and in hot work permit controls,

**Local Exhaust Ventilation** – Local Exhaust Ventilation will consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. The system will be of sufficient capacity and arranged so as to remove fumes and smoke at the source and keep the concentration of them in breathing zone within safe limits.

**Mechanical Ventilation** – Mechanical ventilation consists of either general mechanical ventilation systems or local exhaust systems. General area mechanical ventilation is not generally satisfactory for health hazard control; however it may be helpful when used in addition to Local Exhaust system.

**Natural Ventilation** – Natural Ventilation is acceptable for welding, cutting and related processes where necessary precautions are taken to keep the operators breathing zone away from smoke, Fumes and gases and where sampling of the atmosphere shows that the concentration of contaminates are below the allowable limits (OSHA and in some cases ACGIH recommendations). It includes avoiding fumes and gases by positioning of the work, the head, or by ventilation that captures or directs the fumes away from the face of the operator.

**Permit Authorizing Individual (PAI)** – An individual that has the experience and training to evaluate an activity for hazards designated by management.

**Soldering/Brazing** – Methods of joining metal by use of a filler metal. Soldering is defined as using filler with a liquidus not exceeding 840 degrees F. Brazing is performed at 840 degrees or greater, but both are below the melting temperature of the base metals.

**Task-Specific Hot Work Area** – Hot work that is performed outside of a Designated Area and for a specific task that is made fire safe by removing or protecting combustibles from ignition sources. Hot Work Permits are required for Task Specific hot work and are valid for one shift only. Fire watches are typically required.

**Thermite (Exothermic) Welding** - A process using finely powdered aluminum and iron oxide with other alloys (manganese, carbon, nickel, vanadium, chrome and others) to generate high heats and liquefy metals in a crucible. The liquid metal (iron, copper, etc) is then flowed into place with a form around the joint. Examples of materials typically joined include: copper grounding, railroad rails, reinforcing steel. Preheating of materials to 1000 degrees F is accomplished by use of a gas torch.

## 4.2 Background

The minimum requirements of this procedure are derived from OSHA 29 CFR 1926, 350 (Subpart J- Welding and Cutting). ANSI Z49.1 and NFPA 51B are often cited contractually. The additional requirements of these standards are contained in Section 4 Guidance. When these standards are imposed, the optional items in guidance become mandatory. When a Hot Work Permit is required, Attachment C (Hot Work Permit Example Form (NFPA 51B Compliant) should be used in these cases.

Hot Work performed in radiological areas or on radiologically contaminated materials will be controlled by the radiological work permits and this procedure.

### 4.3 Training

Personnel performing hot work under ANSI Z49.1 and/or NFPA 51B will receive training on the content of those standards, along with this procedure.

### 4.4 Postings

Proper postings for noise, fumes, electrical shock are to be in place (posted at entrances or on equipment or consumables containers). If the equipment or consumable do not already contain precautionary information labels, the appropriate warning postings should be made, (Refer to the Figure 1 thru 4 in ANSI Z49.1 for content).

### 4.5 Hazard Analysis & PPE

An Activity Hazard Analysis will be conducted specifically for the welding, cutting or heating operation that will be performed. All required respiratory, eye, face, noise, head, foot, and skin protection equipment will be selected and shown on the AHA. Suitable fire extinguishing equipment of sufficient capacity will be provided in the immediate vicinity of hot work operations and maintained in a state of constant readiness. Material Safety Data Sheets (MSDS) should be available and reviewed as a part of the AHA process.

### 4.6 Fumes & Ventilation

Fumes and gases from hot work cannot be simply classified. The composition and quantity of fumes and gases are dependent upon the metal being worked, the process and consumables being used, coatings on the work, such as paint, galvanizing, or plating, and contaminants in the atmosphere. In welding and cutting, the composition of the fumes is usually different from the composition of the electrode or consumables. The determination of adequate ventilation is to sample the atmosphere that the workers are exposed to in accordance with the project Industrial Hygiene Plan.

ANSI Z49.1 and USACOE EM-385-1-1 includes materials of toxic significance and requires additional levels of ventilation, air monitoring or respiratory protection as shown in Table 4.6-1.

**Table 4.6-1 Categories and Ventilation/Respiratory Protection (EM 385-1-1 & ANSI Z-49.1)\***

Hot Work Type <sup>1</sup>	Type of Ventilation or Respiratory Protection Required*
<p><b><u>In Any Enclosed Space</u></b>                      Antimony, Arsenic, Barium, Cadmium, Chromium, Chromium VI<sup>2</sup>, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, and Vanadium</p>	Local exhaust ventilation
<p><b><u>Confined Spaces- Hot work Involving</u></b>                      - Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium IV<sup>2</sup>, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, and Vanadium</p>	Local exhaust ventilation vented outside the confined space <b>and</b> personnel respiratory protection required.
<p><b><u>Confined Spaces – Hot Work Involving:</u></b>                      - Fluorine gases                      - Zinc compounds</p>	Local exhaust ventilation vented outside the confined space OR personnel respiratory protection required.
<p><b><u>Open Areas (Outside) involving</u></b>                      Antimony, Arsenic, Barium, Cadmium, Chromium, Chromium IV<sup>2</sup>, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, and Vanadium</p>	Respiratory Protection required as well as engineering controls based on results of worker exposure assessment and exposure determination.
<p><b><u>Open Areas (Outside) Involving</u></b></p>	Sampling to be performed to determine the need for

- Fluorine gases
- Zinc compounds

respiratory protection or local exhaust.

**General Welding, Cutting & Heating**

- Oxygen cutting using iron powder or chemical flux
- Gas Shielded Arc Cutting
- Plasma Cutting

Local mechanical ventilation or other means to remove fumes generated.

*\* Any other employees exposed to the same atmosphere will be protected in the same manner as the welder or cutter.*

<sup>1</sup> Workers may be exposed to hazardous concentrations of Chromium (IV) while welding, cutting or performing hot work on stainless steel, high chrome alloys or chrome-coated metal, or during the application and removal of chromate-containing paints and other surface coatings.

<sup>2</sup> When gas metal arch welding is performed on stainless steel, chrome alloy steel or chrome plated steel, personnel shall be protected by means of a local exhaust capable of maintaining exposures within permitted limits, or by other work and engineering controls, such as the use of argon-rich (>75% argon) shielding gas for use in gas metal arch welding (GMAW) or flux cored arc welding (FCAW). Whenever engineering and work controls are not sufficient reduce employee exposures, they will be supplemented by use of respiratory protection.

Where concentrations of airborne fume contaminants are to be determined by sampling of the atmosphere, the sampling will be conducted inside the welding helmet in the welding operators breathing zone.

**4.7 Daily Inspections**

Hot work operators and fire watches will inspect their welding, cutting and heating equipment and personal protective equipment daily prior to use. The PAI will inspect Designated and Task Specific Hot Work Areas on a regular basis. Attachment B (Hot Work Precautions Checklist) is provided to assist in these inspections.

**4.8 Thermite Welding**

Thermite welding work will be controlled with a hot work permit when performed within 35 feet of any combustible materials. A fire watch will be maintained during the preheating and thermite welding for 30 minutes after the weld is completed. In areas without combustibles, the PAI may authorize thermite work as a Designated Area. Thermite powders and igniters will be stored separately and away from the work.

**4.9 Soldering/Brazing**

Soldering using flame heating devices and brazing will be controlled in accordance with ANSI Z49.1 for personnel protection. A fire watch will be maintained during and for 30 minutes after the completion of the soldering or brazing activity. Solder and brazing filler materials may contain lead, silver, tin, cadmium, and other metals.

**5.0 REFERENCES**

**Please Describe Your Reference Here**

1. OSHA 29 CFR 1926, Subpart J- Welding & Cutting
2. OSHA 29 CFR 1926, Subpart F - Fire Protection & Prevention
3. 29 CFR 1926, 1126 (Subpart Z)
4. EHS 1-9, Recordkeeping
5. EHS 6-1, Confined Space Entry
6. ANSI Z49.1 Safety in Welding, Cutting and Allied Processes (2005)
  
7. EHS 5-2, Respiratory Protection
8. NFPA 51B Standard for Fire Prevention During Welding, Cutting and Other Hot Work (2003)
9. USACOE EM-385-1-1 (2008) Section 10 Welding & Cutting (note requires AWS Z49.1
  
10. DOE Work Safety & Health Rule 10 CFR 851
11. American Conference of Governmental Industrial Hygienists TLV and BEIs
12. Cooper Tube Handbook

**Place Your Link In This Column**

<http://www.OSHA.gov/>  
<http://www.OSHA.gov/>  
<http://www.OSHA.gov/>

[http://www.aws.org/w/a/survey/standardsurvey\\_start=z49\\_reqpdf](http://www.aws.org/w/a/survey/standardsurvey_start=z49_reqpdf)

Via Engineering Links

<http://www.usace.army.mil/publications/eng-man-85-1-1/toc.htm>  
<http://www.wipp.energy.gov/proc/pdf/851%20R>

<http://tubebook.copper.org/publications>

**6.0 ATTACHMENTS**

**ep Please Provide a Description of the Attachment**

- A. Hot Work Permit Example Form
  
- B. Hot Work Precautions Checklist
  
- C. Hot Work Permit Example Form (NFPA 51B Compliant)

**Place Your Attachments Here**



EHS 6-5 Attachment A - HW Permit 12-9-08.doc



EHS 6-5 Attachment B HW Precautions Checklist 12-9-08.doc



EHS 6-5 Attachment C - HW PERMIT NFPA Compliant-12-9-08.doc

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Proprietary Information



HOT WORK PERMIT

- Task Specific Area Permit
- Designated Area Permit

Permit No. \_\_\_\_\_

Site Name: _____
Site Location: _____

Permit Issue Date: \_\_\_\_\_ Permit Expiration Date: \_\_\_\_\_

Describe work to be performed, location where activity will be performed, and the processes to be used:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SAFETY ZONE** for work established by (check all that apply)

- Cones
- Caution Tape
- Natural Barrier
- Welding Screen
- Building
- Other, explain:

\_\_\_\_\_

\_\_\_\_\_

**SAFETY REQUIREMENTS** (check YES or NO)

- Fire Extinguisher properly rated     YES     NO      Fire watch present     YES     NO
- Combustibles covered within 35 ft     YES     NO      Work area clean       YES     NO
- Cables, hose lines, regulators, cylinders, electric sources checked       YES     NO

**SAFETY EQUIPMENT** (check all that apply)  respirator     welders mask     burning goggles

face shield,  local exhaust ventilation, and:

\_\_\_\_\_

Are **SPECIAL FIRE PROTECTION** procedures being implemented? (If yes, describe): \_\_\_\_\_

\_\_\_\_\_

**Refer to the Industrial Hygiene Plan for any air monitoring requirements.**

PAI Name: \_\_\_\_\_ Signature/ Date/Time \_\_\_\_\_

Hot Work Operator \_\_\_\_\_ Signature/Date/Time \_\_\_\_\_

Air Monitor Name \_\_\_\_\_ Signature/Date/Time \_\_\_\_\_

Fire Watch Name \_\_\_\_\_ Signature/Date/Time \_\_\_\_\_

**Attachment B - Hot Work Precautions Checklist**

**Hot Work Precautions Checklist**

<u>Yes</u>	<u>NO</u>	<u>NA</u>	<u>General</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Before initiating Hot Work, ensure that precautions are in place and an appropriate fire extinguisher is readily available.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are available sprinklers, hose streams and extinguishers in service and operable?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is Hot Work Equipment in good repair?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If area is protected by smoke detectors, are they bypassed, covered or removed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is a confined space permit required?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there adequate ventilation to remove smoke or vapor from the work area?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is a lockout/Tagout required?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are noncombustible screens or shields in place to protect other persons in the vicinity from the direct rays of arc welding or cutting, sparks, slag or splatter?
			<b><u>Within 35 feet of the Work</u></b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have flammable liquids, dust, lint and oil deposits been removed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have sources of explosive atmospheres in the areas been eliminated?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have the floors been swept clean?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have combustible floors been wet down, covered with damp sand, or fire resistant sheets?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have other combustibles been removed where possible or otherwise protected with fire-resistant materials or metal shields?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all wall, floor, duct, or tank openings covered or blocked?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are fire resistant tarps suspended beneath work?
			<b><u>Work on Walls or Ceilings/Enclosed Equipment</u></b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is construction noncombustible and without combustible covering or insulation?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have Combustibles on other side of walls been moved?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there a danger from the conduction of heat into another area?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is enclosed equipment cleaned of all combustibles
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have containers been purged of flammable liquids/vapors?
			<b><u>Fire Watch/Hot Work Area Monitoring</u></b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is a fire watch to be provided during and for 30 minutes after work is completed, including any breaks?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the fire watch supplied with suitable extinguishers?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the Fire Watch trained in the use of the extinguishers and in sounding fire alarm?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are Fire Watches available for adjoining areas, areas below or above?

**Attachment C Hot Work Permit (NFPA Compliant)**

 <b>TETRA TECH EC, INC.</b>	<h2 style="margin: 0;">Hot Work Permit</h2>
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**BEFORE INITIATING HOT WORK, ENSURE PRECAUTIONS ARE IN PLACE!  
MAKE SURE AN APPROPRIATE FIRE EXTINGUISHER IS READILY AVAILABLE!**

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing, and thermite welding.

<p align="center"><b>INSTRUCTIONS</b></p> <ul style="list-style-type: none"> <li>• Verify precautions checked at right are in place, or do not proceed with the work.</li> <li>• Complete and retain a copy of this permit (provide original to the PAI when the permit is closed).</li> </ul>	<p><b>Required Precautions Checklist</b> (Check appropriate box)</p> <p>YES NO NA</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Available sprinklers, hose streams, or extinguishers are in service and operable.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Hot work equipment in good repair.</p>
<p>WORK TYPE:</p> <p><input type="checkbox"/> Cutting      <input type="checkbox"/> Welding      <input type="checkbox"/> Other</p>	<p><b>Requirements within 35 feet of hot work</b></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Flammable liquids, dust, lint, and oil deposits removed?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Explosive atmosphere in area eliminated.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Floors swept clean.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Combustible floors wet down, covered with damp sand or fire-resistant sheets.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Remove other combustibles where possible. Otherwise protect with fire-resistant tarpaulins or metal shields.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> All wall and floor openings covered.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire-resistant tarpaulins suspended beneath work.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Vegetation removed or wet down.</p>
<p>DATE: _____ PERMIT NO.: _____</p>	<p><b>Work on walls or ceilings/enclosed equipment</b></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Construction is noncombustible and without combustible covering or insulation.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Combustibles on other side of walls moved away.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Danger exists by conduction of heat into another area.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Enclosed equipment cleaned of all combustibles.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Containers purged of flammable liquids/vapors.</p>
<p>LOCATION: _____</p>	<p><b>Fire watch/hot work area monitoring</b></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire watch is supplied with suitable extinguishers.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire watch is trained in use of this equipment and in sounding alarm.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire watch may be required for adjoining areas, above and below.</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Fire Watch waived (reason) _____</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Notify the Health and Safety representative after hot work is complete.</p>
<p>NATURE OF JOB: _____</p>	<p><b>REPORT EMERGENCIES BY DIALING 911 ON ANY SITE, COMPANY, OR CELL PHONE</b></p>
<p>NAME OF PERSON DOING HOT WORK: _____</p>	<p>I verify that I conducted an inspection 30 minutes following completion of hot work and the area was in a fire safe condition.</p> <p>NAME: _____</p> <p>SIGNATURE: _____</p>
<p>COMPANY NAME: _____</p>	<p><b>Required Personal Protective Equipment (PPE):</b></p> <p>_____</p>
<p>I verify the above location has been examined and the precautions checked on the Required Precautions Checklist have been taken to prevent fire.</p> <p>RESPONSIBLE SUPERVISOR:</p> <p>NAME (Printed) _____</p> <p>SIGNATURE: _____</p>	<p><b>Permit Authorizing Individual:</b></p> <p>NAME: _____</p> <p>I verify that the location was inspected and determined to be fire safe and that the precautions checked on the Required Precautions Checklist are in place. Permission is authorized to start work.</p> <p>SIGNATURE: _____</p> <p align="center"><b>THIS PERMIT IS GOOD FOR ONE DAY OR UNTIL EXPIRATION DATE AS NOTED</b></p>
<p>START TIME: _____ FINISH TIME: _____</p>	<p>Fire Watch Completed: _____ DATE: _____ TIME: _____ AM/PM</p>
<p>ASSIGNED FIRE WATCH:</p> <p>NAME: _____</p> <p>SIGNATURE: _____</p>	<p>_____</p>

**APPENDIX D**  
**CONTRACTOR SIGNIFICANT INCIDENT REPORT (CSIR)**

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- Initial Report
- Follow-up Report
- Final Report

## Contractor Significant Incident Report (CSIR)

1. General Information		
Contracting Activity/ROICC Office:		
<b>Accident Classification:</b>		
<input type="checkbox"/> Injury <input type="checkbox"/> Fatality <input type="checkbox"/> Environment <input type="checkbox"/> Procedural Issues <input type="checkbox"/> Lessons Learned <input type="checkbox"/> Illness <input type="checkbox"/> Property Damage <input type="checkbox"/> Other _____		
<b>Involving:</b>		
<input type="checkbox"/> Confined Space <input type="checkbox"/> Equip/Mrt Ver/Mat Handling (Heavy Construction Equip.) <input type="checkbox"/> Hazardous Material <input type="checkbox"/> Crane and Rigging <input type="checkbox"/> Equip/Mrt Ver/Mat Handling (Material Handling) <input type="checkbox"/> Trenching/Excavation <input type="checkbox"/> Diving <input type="checkbox"/> Equip/Mrt Ver/Mat Handling (Man-Lift/Elevated Platform) <input type="checkbox"/> Waterfront/Marine Operations <input type="checkbox"/> Demolition/Renovation <input type="checkbox"/> Fall from Ladder <input type="checkbox"/> Fall from Scaffold <input type="checkbox"/> Other _____ <input type="checkbox"/> Electrical <input type="checkbox"/> Fall from Roof <input type="checkbox"/> Fire		
2. Personal Information		
Name (Last, First, MI):	Age:	Sex:
Job Title/Description:	Employed By:	
Supervisor Name (Last, First, MI) & Title:	Was the person trained to perform this activity/task? <input type="checkbox"/> Yes <input type="checkbox"/> No	
What type of training was received (OJT, classroom, etc)?	Date of the most recent formal training and topics discussed?	
3. Witness Information		
Witness #1: Name (Last, First, MI):	Job Title/Description:	
Employed By:	Supervisor Name (Last, First, MI):	
Witness #2: Name (Last, First, MI):	Job Title/Description:	
Employed By:	Supervisor Name (Last, First, MI):	
<b>Additional Witnesses:</b> <i>(List any additional witnesses on a separate sheet and attach.)</i>		
<input type="checkbox"/> Yes <input type="checkbox"/> No		

4. Contract Information		
<b>Type of Contract:</b> <input type="checkbox"/> A/E <input type="checkbox"/> BOS <input type="checkbox"/> CLEAN <input type="checkbox"/> Construction <input type="checkbox"/> Design Build <input type="checkbox"/> FSCC <input type="checkbox"/> FSSC <input type="checkbox"/> JOC <input type="checkbox"/> RAC <input type="checkbox"/> Service <input type="checkbox"/> Other _____		
<b>Contract Number &amp; Title:</b>		<b>Industrial Group &amp; Industrial Type:</b>
<b>Prime Contractor Name/Address/Phone &amp; Fax No:</b>		<b>Sub Contractor Name/Address/Phone &amp; FAX No:</b>
<b>Safety Manager (Last, First, MI):</b>		<b>Safety Manager (Last, First, MI):</b>
<b>Insurance Carrier:</b>		<b>Insurance Carrier:</b>
5. Accident Description		
<b>Date of Accident:</b>	<b>Time of Accident:</b>	<b>Exact Location of Accident:</b>
Describe the accident in detail in your words: <i>(Use the back of page if you need additional space)</i>		
<b>Direct Cause(s) of Accident:</b>		

<b>Indirect Cause(s) of Accident:</b>	
<b>Action(s) taken to prevent re-occurrence or provide on-going corrective actions:</b>	
<b>Corrective Action Beginning Date:</b>	<b>Anticipated Completion Date:</b>
<b>Personal Protective Equipment:</b> <input type="checkbox"/> Available and used <input type="checkbox"/> Available and not used <input type="checkbox"/> Not Required <input type="checkbox"/> Not related to Mishap <input type="checkbox"/> Wrong PPE for job  <i>List PPE Used:</i>	
<b>Type of Construction Equipment (Make, Model, Serial #, VIN#) Involved:</b>	
<b>Was Hazardous Material Spilled/Released?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <i>Please List Hazardous Material(s) Involved:</i>	
<b>Who provided first aid or cleanup of mishap site?</b>	
<b>Any blood-borne pathogen exposure, other than EMTs?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No  <i>Who?</i>	
<b>List OSHA and EM-385-1-1 standards that were violated:</b>	
<b>Was site secured and witness statements taken immediately?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No  <i>By Whom?</i>	

6. Injury Illness/Fatality Information		
<b>Severity of Injury/Illness:</b>		
<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
<b>Estimated Days Lost:</b>	<b>Estimated Days Hospitalized:</b>	<b>Estimated Days Restricted Duty:</b>
<b>List Primary Body Part Affected:</b>	<b>List Other Body Part(s) Affected:</b>	
<b>Nature of Injury/Illness for Primary Body Part (Examples: Amputation, Burn, Hernia):</b>		
<b>Type of Accident (Examples: Fall same level, Lifting, Bitten, Exerted):</b>		
<b>Source of Accident (Examples: Crane, Carbon Monoxide, Ladder, Welding Equipment):</b>		
7. Causal Factors ( <i>Explain answers on supplementary sheet</i> )		
• Design – Design of facility, workplace, or equipment was a factor?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Inspection/Maintenance – Inspection & Maintenance procedures were a factor?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Persons Physical Condition – In your opinion, the physical condition of the person was a factor?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Operation Procedures – Operating procedures were a factor?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Job Practices – One or more job safety/health practices not being followed when the accident occurred contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Human Factors – One or more human factors, such as a person's size or strength contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Environmental Factors – Heat, cold, dust, sun, glare, etc., contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Chemical and Physical Agent Factors – Exposure to chemical agents, such as dust, fumes, mist, vapors, or physical agents such as noise, radiation, etc., contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Office Factors – Office setting such as lifting office furniture, carrying, stooping, contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Support Factors – Inappropriate tools/resources were provided to perform the task?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• PPE – Improper selection, use or maintenance of PPE contributed to the accident?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Drugs/Alcohol – In your opinion, were drugs or alcohol a factor?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Job Hazard Analysis – The lack of an adequate (IAW-EM-385-1-1 Sec 01.A) activity hazard analysis was a contributing factor.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Job Hazard Analysis – JHA was not site specific and/or did not address the type of work/operations performed when the mishap occurred.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Management – A lack of adequate supervision contributed to the accident.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Management – Inadequate information was provided at pre con meeting.	<input type="checkbox"/> Yes	<input type="checkbox"/> No

<b>8. OSHA Information</b>			
<b>Date OSHA was Notified:</b>	<b>Date(s) of Investigation:</b>	<b>Date of citation: (Attach Copy)</b>	<b>Dollar amount of Penalties:</b>
<b>9. Report Preparer</b>			
<b>Name (Last, First, MI):</b>		<b>Date of Report:</b>	
<b>Title:</b>		<b>Signature:</b>	
<b>Employer:</b>			
<b>Phone #:</b>			

# CONTRACTOR SIGNIFICANT INCIDENT REPORT (CSIR) INSTRUCTIONS

## Complete Sections Appropriate to Incident (Rev. 06/02).

**NOTE: THE ATTACHED CSIR FORM IS TO BE USED BY CONTRACTORS TO RECORD THE RESULTS OF THEIR ACCIDENT/INCIDENTS INVESTIGATIONS AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER WITHIN THE REQUIRED TIMEFRAMES.**

**GENERAL.** Complete a separate report for each person who was injured in the accident. A report needs to be completed for all OSHA recordable accidents, property damage in excess of \$2000.00 (This amount is for record purposes only. GOV is not required to enter property damage reports into FAIR database if it is less than \$10,000.00.), WHE accidents, or near miss/high visibility mishaps. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es), non-applicable sections shall be marked "N/A". If additional space is needed, provide the information on a separate sheet of paper and attach to the completed form.

Mark the report:

**INITIAL** – If this form is being used as initial notification of a Fatality or High Visibility Mishap. The initial form is due within 4 hours of a serious accident. A form marked 'Follow-up' or 'Final' is required within 5 days.

**FOLLOW-UP** – If you are providing additional information on a report previously submitted.

**FINAL** – If you are providing a completed report and expect no changes.

## SECTION 1 – GENERAL INFORMATION

**CONTRACTING ACTIVITY/ROICC OFFICE** - Enter the name and address of the Contracting Office administering the contract under which the mishap took place (e.g. ROICC MCBH, ROICC NORFOLK, PWC GUAM, etc.).

**ACCIDENT CLASSIFICATION - INJURY/ILLNESS/FATALITY/PROPERTY DAMAGE/-PROCEDURAL ISSUES/-ENVIRONMENTAL/LESSONS LEARNED/OTHER** – Mark the appropriate block(s) if the incident resulted in any of these conditions.

**INVOLVING** - If the mishap involved any of the conditions listed under "Involving" mark the appropriate box(es). Specific questions associated with each of these conditions are available from the Contracting Officer to assist you in your investigation. When these questions are used they shall be attached as part of this report.

## SECTION 2 - PERSONAL INFORMATION

**NAME** - Enter last name, first name, middle initial of person involved.

**AGE** - Enter age.

**SEX** - Enter M for Male and F for Female.

**JOB TITLE/DESCRIPTION** - Enter the job title/description assigned to the injured person (e.g. carpenter, laborer, surveyor, etc.).

**EMPLOYED BY** - Enter employment company name of the person involved.

**SUPERVISOR'S NAME & TITLE** - Enter name and title of the immediate supervisor.

**WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?** - For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

**TYPE OF TRAINING** - Indicate the specific type of training (classroom or on-the-job) that the injured person received before the accident happened.

**DATE OF MOST RECENT FORMAL TRAINING/TOPICS DISCUSSED** - Enter the month, day, and year of the last *formal* training completed that covered the activity/task being performed at the time of the accident. List topics that were discussed at the training identified above.

## SECTION 3 - WITNESS INFORMATION

The following applies to Witness #1 and Witness #2:

**WITNESS NAME** - Enter last name, first name, middle initial of the witness.

**JOB DESCRIPTION/TITLE** - Enter the job title/description assigned to the witness (e.g. carpenter, laborer, surveyor, etc.).

**EMPLOYED BY** - Enter the name of the employment company of the witness.

**SUPERVISORS NAME** - Enter name of immediate supervisor of the witness.

**ADDITIONAL WITNESSES** - Provide same information, as above, for each witnesses. Use additional pages if necessary.

## SECTION 4 - CONTRACTOR INFORMATION

**TYPE OF CONTRACT** - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

**CONTRACT NUMBER/TITLE** - Enter complete contract number and title of prime contract (e.g. N62477-85-C-0100, 184 Pearl City Hsg. Revitalization).

**CONSTRUCTION INDUSTRIAL GROUP AND INDUSTRIAL TYPE** – This is the type of construction that will be done at this project.

1. First, you must choose the Industrial Group. You have 4 choices to choose from: (**NOTE!** Review of the Industrial Types below and knowing what the projects scope of work is will assist you in deciding what the Industrial Group should be.)

- a. Buildings
- b. Heavy Industrial
- c. Infrastructure
- d. Light Industrial

2. Once you have chosen the Industrial Group, you now select the Industrial Type. You have multiple choices under each Group, chose the one you feel fits the project most closely because on most projects there won't be an exact match:

- a. Buildings:
  - (1) Communications Ctr.
  - (2) Dormitory/Hotel
  - (3) High-rise Office
  - (4) Hospital
  - (5) Housing
  - (6) Laboratory
  - (7) Low-rise Office
  - (8) Maintenance Facility
  - (9) Parking Garage
  - (10) Physical Fitness Ctr.
  - (11) Restaurant/Nightclub
  - (12) School
  - (13) Warehouse
- b. Heavy Industrial:
  - (1) Chemical Mfg.
  - (2) Electrical (Generating)
  - (3) Environmental
  - (4) Metals Refining/Processing
  - (5) Mining
  - (6) Natural Gas Processing
  - (7) Oil Exploration/Production
  - (8) Oil Refining
  - (9) Pulp and Paper
- c. Infrastructure:
  - (1) Airport
  - (2) Electrical Distribution
  - (3) Flood Control
  - (4) Highway
  - (5) Marine Facilities
  - (6) Navigation
  - (7) Rail
  - (8) Tunneling
  - (9) Water/Wastewater
- d. Light Industrial:
  - (1) Automotive Assembly/Mfg.
  - (2) Consumer Products Mfg.
  - (3) Foods
  - (4) Microelectronics Mfg.
  - (5) Office Products Mfg.
  - (6) Pharmaceuticals Mfg.

**CONTRACTOR'S NAME/ADDRESS/PHONE NUMBER**

- (1) PRIME - Enter the exact name (title of firm), address, phone and fax numbers of the prime contractor.
- (2) SUBCONTRACTOR - Enter the exact name, address, phone and fax numbers of any subcontractor involved in the accident.

**SAFETY MANAGER'S NAME**

- (1) PRIME - Enter the name of the prime contractor safety manager.
- (2) SUBCONTRACTOR - Enter the name of the subcontractors safety manager.

**INSURANCE CARRIER**

- (1) PRIME - Enter the exact name/title of the prime's insurance company. Policy number not required.
- (2) SUBCONTRACTOR - Enter the exact name of the subcontractor's insurance company. Policy number not required.

**SECTION 5 - ACCIDENT DESCRIPTION**

**DATE OF ACCIDENT** - Enter the month, day, and year of accident.

**TIME OF ACCIDENT** - Enter the local time of accident in military time. Example: 14:30 hrs (not 2:30 p.m.).

**EXACT LOCATION OF ACCIDENT** - Enter facts needed to locate the accident scene (installation/project name, building/room number, street, direction and distance from closest landmark, etc.).

**DESCRIBE THE ACCIDENT IN DETAIL.** Fully describe the accident in the space provided. If property damage involved, give estimated dollar amount of damage and/or repair costs involved. If additional space is needed continue on a separate sheet and attach to this report. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Ensure questions below regarding direct cause(s), indirect cause(s), and actions taken are answered. **NOTE!** Review questions in Section 7 below before completing.

**DIRECT CAUSE(S)** - The direct cause is that single factor which most directly lead to the accident. See examples below.

**INDIRECT CAUSE(S)** - Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:

- 1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

*Direct cause:* Failure to provide fall protection at elevation

*Indirect causes:* Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)

*Direct cause:* Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.

*Indirect cause:* Failure of employee to pay attention to driving (defensive driving).

**ACTION(S) TAKEN TO PREVENT RE-OCCURRENCE OR PROVIDE ON-GOING CORRECTIVE ACTIONS.** Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on back or additional sheets of paper if necessary to fully explain and attach to the complete report form.

**CORRECTIVE ACTION DATES -**

(1) Beginning - Enter the date when the corrective action(s) identified above will begin.

(2) Anticipated Completion - Enter the date when the corrective action(s) identified above will be completed.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)** - Mark appropriate box(es) and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)

**TYPE OF CONTRACTOR EQUIPMENT** - Enter the Serial Number, Model Number and specific type of equipment involved in the mishap (e.g. dump truck (off highway), crane (rubber tire), pump truck (concrete), etc.).

**WAS HAZARDOUS MATERIAL SPILLED/RELEASED?** - Mark appropriate block and list name(s) of any reportable quantities of hazardous materials spilled/released during the mishap.

**WHO PROVIDED FIRST AID OR CLEAN-UP OF MISHAP SITE?** - List name(s) of individual(s) and employer, if known.

**ANY BLOOD-BORNE PATHOGEN EXPOSURE, OTHER THAN EMT?** - Mark appropriate block and list name(s) of individual(s) and employer, if known.

**LIST OSHA AND/OR EM 385-1-1 STANDARDS THAT WERE VIOLATED.** - Self explanatory.

**WAS SITE SECURED AND WITNESS STATEMENT TAKEN IMMEDIATELY?** - Mark appropriate block and list by whom.

**SECTION 6 - INJURY/ILLNESS/FATALITY INFORMATION**

**SEVERITY OF INJURY/ILLNESS** – Mark appropriate box.

**ESTIMATED DAYS LOST** - Enter the estimated number of workdays the person will lose from work. Update when final data is known.

**ESTIMATED DAYS HOSPITALIZED** - Enter the estimated number of workdays the person will be hospitalized. Update when final data is known.

**ESTIMATED DAYS RESTRICTED DUTY** - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties. Update when final data is known.

**BODY PART(S) AFFECTED** - Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist: abdomen: single eye; jaw : both elbows: second finger: great toe: collar bone: kidney, etc.).

**NATURE OF INJURY/ILLNESS FOR PRIMARY BODY PART** - Enter the most appropriate nature of injury/illness (e.g. amputation, back strain, dislocation, laceration, strain, asbestosis, food poisoning, heart conditions, etc.).

**TYPE AND SOURCE OF INJURY/ILLNESS** - Type and Source Codes are used to describe what caused the incident.

(1) TYPE Code stands for an "Action" (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Type Code: Fell different levels".) Select the most appropriate Type of injury from the list below:

**TYPE OF INJURY/ILLNESS**

STRUCK BY/AGAINST	CONTACTED CONTACTED WITH (INJURED PERSON MOVING) CONTACTED BY (OBJECT WAS MOVING)
FELL, SLIPPED, TRIPPED SAME LEVEL/DIFFERENT LEVEL/NO FALL	EXERTED LIFTED, STRAINED BY (SINGLE ACTION) STRESSED BY (REPEATED ACTION)
CAUGHT ON/IN/BETWEEN	EXPOSED INHALED/INGESTED/ABSORBED/EXPOSED TO
PUNCTURED, LACERATED PUNCTURED BY/CUT BY/STUNG BY/BITTEN BY	TRAVELING IN

(2) SOURCE Code stands for an "object or substance." (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Source Code: "Ladder".) Select the most appropriate Source of injury from the list below:

**SOURCE OF INJURY/ILLNESS**

BUILDING OR WORKING AREA WALKING/WORKING AREA STAIRS/STEPS LADDER FURNITURE BOILER/PRESSURE VESSEL EQUIPMENT LAYOUT WINDOWS/DOORS ELECTRICITY	DUST, VAPOR, ETC. DUST (SILICA, COAT, ETC.) FIBERS ASBESTOS GASES CARBON MONOXIDE MIST, STEAM, VAPOR, FUME WELDING FUMES PARTICLES (UNIDENTIFIED)
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ENVIRONMENT CONDITION TEMPERATURE EXTREME (INDOOR) WEATHER (ICE, RAIN, HEAT, ETC.) <b>FIRE, FLAME, SMOTE (NOT TABACCO)</b> NOISE RADIATION LIGHT VENTILATION TOBACCO SMOKE STRESS (EMOTIONAL) CONFINED SPACE	CHEMICAL, PLASTIC, ETC. DRY CHEMICAL - CORROSIVE DRY CHEMICAL - TOXIC DRY CHEMICAL - EXPLOSIVE DRY CHEMICAL - FLAMMABLE LIQUID CHEMICAL - CORROSIVE LIQUID CHEMICAL - TOXIC LIQUID CHEMICAL - EXPLOSIVE LIQUID CHEMICAL - FLAMMABLE PLASTIC WATER MEDICINE
MACHINE OR TOOL HAND TOOL (POWERED: SAW, GRINDER, ETC.) HAND TOOL (NON POWERED) MECHANICAL POWER TRANSMISSION APPARATUS GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK) VIDEO DISPLAY TERMINAL PUMP, COMPRESSOR, AIR PRESSURE TOOL HEATING EQUIPMENT WELDING EQUIPMENT	INANIMATE OBJECT BOX, BARREL, ETC. PAPER METAL ITEM, MINERAL NEEDLE GLASS SCRAP, TRASH, WOOD FOOD CLOTHING, APPAREL, SHOES
MACHINE OR TOOL HAND TOOL (POWERED: SAW, GRINDER, ETC.) HAND TOOL (NON POWERED) MECHANICAL POWER TRANSMISSION APPARATUS GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK) VIDEO DISPLAY TERMINAL PUMP, COMPRESSOR, AIR PRESSURE TOOL HEATING EQUIPMENT WELDING EQUIPMENT	INANIMATE OBJECT BOX, BARREL, ETC. PAPER METAL ITEM, MINERAL NEEDLE GLASS SCRAP, TRASH, WOOD FOOD CLOTHING, APPAREL, SHOES
VEHICLE AS DRIVER OF PRIVATELY OWNED, RENTAL VEH. AS PASSENGER OF PRIVATELY OWNED, RENTAL VEH. DRIVER OF GOVERNMENT VEHICLE PASSENGER OF GOVERNMENT VEHICLE COMMON CARRIER (AIRLINE, BUS, ETC.) AIRCRAFT (NOT COMMERCIAL) BOAT, SHIP, BARGE	ANIMATE OBJECT DOG OTHER ANIMAL PLANT INSECT HUMAN (VIOLENCE) HUMAN (COMMUNICABLE DISEASE) BACTERIA, VIRUS (NOT HUMAN CONTACT)
MATERIAL HANDLING EQUIPMENT EARTHMOVER (TRACTOR, BACKHOE, ETC.) CONVEYOR (FOR MATERIAL AND EQUIPMENT) ELEVATOR, ESCALATOR, PERSONNEL HOIST HOIST, SLING CHAIN, JACK CRANE FORKLIFT HANDTRUCK, DOLLY	PERSONAL PROTECTIVE EQUIPMENT PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES RESPIRATOR, MASK DIVING EQUIPMENT SAFETY BELT, HARNESS PARACHUTE

## SECTION 7 - CAUSAL FACTORS

Review thoroughly. Answer each question by marking the appropriate block. **NOTE!** If any answer is yes, explain in section 5 above.

- (1) **DESIGN** - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
- (2) **INSPECTION/MAINTENANCE** - Did inadequately or improperly maintained equipment, tools, workplace, etc., create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?
- (3) **PERSONS PHYSICAL CONDITION** - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was overexertion a factor?
- (4) **OPERATION PROCEDURES** - Did lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
- (5) **JOB PRACTICES** - Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?
- (6) **HUMAN FACTORS** - Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person: i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach strengths, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?
- (7) **ENVIRONMENTAL FACTORS** - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun temperature changes, wind, tides, floods, currents, terrain; dust, mud, glare, pressure changes, lighting, etc., play a part in the accident?

(8) **CHEMICAL AND PHYSICAL AGENT FACTORS** - Did exposure to chemical agents (either single shift exposure or long-term exposure such as dusts, fibers, (asbestos, etc.), silica, gases (carbon, monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) **OFFICE FACTORS** - Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) **SUPPORT FACTORS** - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized and adequate to provide proper tools, equipment, personnel, site preparation, etc.

(11) **PERSONAL PROTECTIVE EQUIPMENT** - Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) **DRUGS/ALCOHOL** - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

(13) **JOB/ACTIVITY HAZARD ANALYSIS** - Was a written Job/Activity Analysis completed for the task being performed at the time of the accident? If one was made, did it address the hazard adequately or does it need to be updated? If none made, will one be made? These may also need to be addressed in the Corrective Actions Taken section. Mark the appropriate box. If one was made, attach a copy of the analysis to the report.

(14) **MANAGEMENT** - Did the lack of supervisor or management support play a part in the mishap? Mark the appropriate box.

## **SECTION - 8 OSHA INFORMATION - Complete this section if applicable**

### **SECTION 9 - REPORT PREPARER**

**Providing a completed CSIR to the Contracting Officer is the PRIME CONTRACTOR'S RESPONSIBILITY.** Enter the name, date of report, title, employer, phone number and signature of person completing the accident report and provide it to the Contracting Officer, or his representative, responsible for oversight of that contractor activity. **NOTE!** If prepared by other than the Prime Contractor, a person employed by the Prime Contractor must sign that they have reviewed and concur with the report and it's findings (e.g. company owner, project supervisor/foreman, Safety Officer, etc.).

**APPENDIX E**  
**MEDICAL DATA SHEET**

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### Medical Data Sheet

This Medical Data Sheet must be completed by on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project \_\_\_\_\_

Name \_\_\_\_\_ Home Telephone \_\_\_\_\_

Address \_\_\_\_\_

Age \_\_\_\_\_ Height \_\_\_\_\_ Weight \_\_\_\_\_

Person to notify in the event of an emergency:

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

Phone: \_\_\_\_\_

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

Particular Sensitivities: \_\_\_\_\_

Do You Wear Contacts? \_\_\_\_\_

What medications are you presently using?

\_\_\_\_\_  
\_\_\_\_\_

Name, Address, and Phone Number of personal physician:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

---

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

HIPAA 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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## **APPENDIX F**

### **MATERIAL SAFETY DATA SHEETS/SAFETY DATA SHEETS**

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Product or Material Name <sup>1/</sup>	Primary Hazards	Quantity Maintained Onsite	Total Quantity Required (estimated)	Operation(s) material used for	Container Size and Type	Location Stored*
Gasoline, unleaded (supplier TBD)	Flammable Liquid, Vapors	5 gallons	Up to 50 gallons	Refueling and operation of chainsaws	5 gallon UL listed metal fuel containers	Flammable storage locker in designated flammable material storage area if stored onsite
2-cycle oil (supplier TBD)	Petroleum Product, non-flammable	1 quart to 1 gallon	Up to 1 gallon	Mix with gasoline for chainsaw operation	Pint to quart size in manufacturer's container (as purchased)	Maintenance supply area or flammable storage locker away from flammable materials if stored onsite
Motor oil (supplier and type TBD)	Petroleum Product, non-flammable	1 to 5 gallon	Up to 10 gallons	Regular maintenance and operation of heavy equipment	In manufacturer's container (as purchased)	Maintenance supply area or flammable storage locker away from flammable materials if stored onsite

<sup>1/</sup> As materials are identified by TtEC and subcontractors and actual manufacturer's become known, this list will be updated accordingly.

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## **APPENDIX G**

### **UTILITY MAPS**

(To Be Inserted If/When Available)

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**ATTACHMENT 1**  
**LEAD AWARENESS TRAINING**

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# Lead Awareness Training

29 CFR 1910.1025

29 CFR 1926.62



TETRA TECH EC, INC.

# Lead Basics

- ⌚ Excessive exposure to lead can be hazardous to your health
- ⌚ Harmful exposures to lead can be minimized through the use of personal protective equipment and environmental controls.
- ⌚ OSHA has established lead monitoring requirements for those jobs where exposure may exist.
- ⌚ If airborne lead levels are found to be above the action limit, medical monitoring procedures will be implemented.



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# Substance Identification

- ⌚ Lead is a heavy metal which can combine with other substances to form organic and inorganic lead compounds.
- ⌚ Lead is found in paints, inks, lead-acid batteries, radiation shielding, smelter and foundry sites, auto repair facilities and lead/tin solder.
- ⌚ Lead is also found in soil, junkyards, landfills, and at the former sites of industries that produced the above mentioned materials.



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# Operations with Possible Lead Exposure

- Demolition, salvage, or construction materials with lead or coatings
- Abrasive work on materials containing lead paint
- Welding
- Solder work doing electrical repairs
- Clean up or disposal of contaminated material and soil



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# Health Hazard Data



- Ways lead can enter the body
  - inhalation; generally the most important source of occupational lead exposure
  - ingestion
- Lead is not absorbed through skin



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# Chronic Exposure to Lead

- Impairs the reproductive systems of both men and women.
- Poses a risk to developing fetuses which can lead to birth defects, mental retardation, or even death of the infant.
- Disrupts blood forming system resulting in decreased hemoglobin and anemia.
- In higher doses, can effect both the Central and Peripheral Nervous Systems.
- Can damage the kidneys.



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# Symptoms of Chronic Lead Exposure

## Include:

- Loss of appetite
- metallic taste in mouth
- anxiety
- constipation
- nausea
- muscle & joint pain and soreness
- numbness
- Pallor
- insomnia
- weakness
- headache
- nervous irritability
- dizziness
- hyperactivity
- colic
- excessive tiredness



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# Acute Exposure to Lead

- In large enough doses, can kill in a matter of days.
- Acute exposure can lead to encephalopathy characterized by seizures, coma, and possibly death from cardiorespiratory arrest.
- Short term occupational exposures of this magnitude are highly unusual.



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# Blood Lead Levels (PbB)

- Blood lead level (PbB) is the most useful indicator of the amount of lead absorbed by the body.
- PbB is reported in mg or  $\mu\text{g}$  of lead per unit of blood.
- Prevention of adverse health effects requires PbBs to be maintained at or below  $40 \mu\text{g}/100\text{g}$ .



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# Reporting Signs & Symptoms

- Immediately notify your employer if you develop signs or symptoms associated with lead poisoning.
- Notify your employer if you have difficulty breathing while wearing a respirator.
- Medical advice is available to address concerns regarding past or present lead exposure and its effect on your ability to have a healthy child.



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# Permissible Exposure Level (PEL)

- The PEL is  $50 \mu\text{g}/\text{m}^3$  averaged over an 8 hour work day.
- The Action Level is  $30 \mu\text{g}/\text{m}^3$  averaged over an 8 hour work day.



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# Exposure Monitoring

- If Pb is present, air monitoring may be required to determine whether the Action Level is being exceeded. Certain activities called “trigger” events require air monitoring.
- Results of any air monitoring will be shared with the employees in writing.
- If the Action level is exceeded, a monitoring schedule will be set up.



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# Methods of Compliance

- Implement work practice controls to reduce exposure to  $< \text{PEL}$ 
  - ventilation systems
  - isolation of work area
  - proper work practices
  - Dust control
- Develop and institute a written compliance program if exposures are  $> \text{PEL}$



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# Respiratory Protection

To be worn when:

- Exposure is  $>$  PEL
- Employee requests respirator
- Interim protection until exposure is determined



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# Protective Clothing



To be worn when:

- Exposure is  $>$  PEL
- Skin/eye irritation exists
- Interim protection until exposure is determined.



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# Housekeeping

- Maintain clean work area
- DUST CONTROL
- Use HEPA vacuum to clean area



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# Hygiene Facilities & Practices

- Where there is lead:
  - food, smoking not allowed in affected areas
- Where lead is above PEL:
  - separate change areas for clean & dirty laundry provided
  - showers provided if feasible
  - lunchroom facilities provided



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# Medical Surveillance

## Biological Monitoring

- $\geq$  Action level for one day; provide initial biological monitoring
- $\geq$  Action level for 30 days; provide biological monitoring every 2 months for first 6 months and then every 6 months thereafter
- $\geq 40 \mu\text{g}/\text{dl}$ ; every 2 months
- $\geq 50 \mu\text{g}/\text{dl}$  (Medical removal); monthly
- $\leq 40 \mu\text{g}/\text{dl}$ ; not required or discontinued



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# Medical Removal



- $\geq$  Action level and PbB  $> 50 \mu\text{g}/\text{dl}$ ; employee is removed from work area
- $\geq$  Action level and final medical determination results in an increase in the risk of material impairment to health



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# Employee Information & Training

- Hazard Communication Training
- If Action Level is exceeded or the possibility for skin or eye irritation exists additional training will be provided, including:
  - purpose, selection, fitting, use and limitations of respirators
  - engineering controls and work practices associated with the employee's job assignment
  - compliance plan
  - the specific nature of the operations which could result in exposure to lead at or above the action level



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# Signs

- The standard requires that the following warning sign be posted in work areas where the exposure to lead exceeds the PEL:

**WARNING**  
**LEAD WORK AREA**  
**NO SMOKING OR EATING**



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# Record Keeping

- Employers must maintain the employees exposure monitoring record for 30 years
- Medical surveillance records must be maintained for the length of employment plus 30 years
- Medical removal records must be maintained for at least the length of employment



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# Observation of Monitoring

Employees may observe air monitoring for lead and receive copies of the results.



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# Summary

- Lead has the potential to effect many systems of the body adversely.
- Lead exists in many industrial products and can be released during a variety of activities.
- With proper control, lead exposure can be reduced to a safe level.
- Program and procedures are in place to ensure that lead exposures are monitored and individuals are protected.



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**APPENDIX C**  
**PROJECT QUALITY CONTROL 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. WE35**

**FINAL  
CONTRACTOR QUALITY CONTROL PLAN  
REMOVAL ACTION AT AOC 7  
NAVAL WEAPONS STATION, YORKTOWN – CHEATHAM ANNEX  
WILLIAMSBURG, VIRGINIA**

**July 2015**

*Prepared for*



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## ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
AOC	Area of Concern
APP	Accident Prevention Plan
CAX	Cheatham Annex
CIH	Certified Industrial Hygienist
COR	Contracting Officer's Representative
CPR	Contractor Production Report
CQC	Contractor Quality Control
CQCR	Contractor Quality Control Report
CTO	Contract Task Order
DCN	Design Change Notice
DFW	Definable Feature of Work
DN	Deficiency Notice
DON	Department of the Navy
EHS	Environmental Health and Safety
EM	Engineer Manual
FCR	Field Change Request
FEAD	Facilities Engineering and Acquisition Division
MSDS	Material Safety Data Sheet
NAVFAC	Naval Facilities Engineering Command
NCR	Non-Conformance Report
NTCRA	Non-Time Critical Removal Action
PM	Project Manager
PQCM	Project Quality Control Manager
PS	Project Superintendent
QC	Quality Control
QCPM	Quality Control Program Manager
RAC	Remedial Action Contract
RPM	Remedial Project Manager
SHM	Safety and Health Manager
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TBD	To Be Determined
TtEC	Tetra Tech EC, Inc.
UFGS	Unified Facilities Guide Specification
USACE	United States Army Corps of Engineers
WPNSTA	Naval Weapons Station

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## **1.0 INTRODUCTION**

This Contractor Quality Control (CQC) Plan establishes the procedures and methods to be implemented for the specific activities pertaining to the Non-time Critical Removal Action (NTCRA) at Area of Concern (AOC) 7 at Naval Weapons Station (WPNSTA) Yorktown – Cheatham Annex (CAX) located in Williamsburg, Virginia. Tetra Tech EC, Inc. (TtEC) has been contracted by the Department of the Navy (DON) to perform this work under Remedial Action Contract (RAC) N62470-13-D-8007, Contract Task Order (CTO) WE35. This CQC Plan fulfills the requirements of the TtEC quality control (QC) system requirements.

### **1.1 Background**

CAX is located on the site of the former Penniman Shell Loading Plant, a large powder and shell loading facility operated by the DuPont Company during World War I, which closed in 1918 and was dismantled shortly thereafter. Between 1923 and 1943, the property was used for farming or remained idle until CAX was commissioned in 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities and to serve as an assembly and overseas shipping point during World War II. The facility is divided into two separate parcels, with the larger parcel situated along the banks of the York River. Almost all of the activities at CAX (administration, training, maintenance, support, and housing) take place in the larger parcel. The smaller parcel is used mainly as a watershed protection area. In 1987, CAX was designated as the Hampton Roads Navy Recreational Complex. In 1998, control of CAX was transferred from Fleet and Industrial Supply Center (FISC) to WPNSTA Yorktown. The current mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel.

AOC-7 is located along a nature trail that runs through a wooded area located behind the CAX warehouse area and south of one of the southern fingers of the Cheatham Pond. AOC-7 was identified in April 2004 when the Navy discovered two small debris disposal areas in this wooded area. One of the debris disposal areas, referred to as the Drum Disposal Area, contained several empty, rusted pails and two empty, rusted 55-gallon drums on the ground surface. The other debris disposal area, referred to as the Can Pit, is an approximately 30-foot by 20-foot pit open to a depth of 4 feet below ground surface (bgs). The Can Pit contained numerous empty, 5-gallon rusted cans labeled “tetrachloroethane” on the ground surface within the pit. A pile of soil, assumed to be the soil excavated to create the Can Pit, is immediately adjacent to the Can Pit. The Drum Disposal Area and Can Pit are 2 separate areas within AOC-7. They are located on opposite ends of AOC-7, roughly 300 feet apart. There are no wetlands or surface water bodies located within AOC-7. The topography generally slopes northeast towards Cheatham Pond, and surface runoff is expected to flow northeast to the Pond as well. A facility and site location map is included as Figure 1.

### **1.2 Purpose**

The purpose of this CQC Plan is to establish specific procedures and methods for field inspections, and provide an effective QC system to ensure the quality of all work performed by TtEC and its

subcontractor personnel during the remedial activities. This plan is applicable to all definable features of work listed in Section 3.0 and will be available at the project field office. All work activities will be conducted in accordance with this PCQC Plan and the Work Plan to which it is appended.

## **2.0 PROJECT ORGANIZATION, RESPONSIBILITY, AND POINTS OF CONTACT**

This section describes the organization and authority of project personnel. The organizational structure, functional responsibilities, levels of authority, and lines of communication within the organization have been established to ensure high-quality work. The project organization chart showing the reporting lines for key personnel is provided in Figure 2-1. The responsibilities of key personnel are described in the following subsections. A listing of the point of contact for the project is provided in Section 2.12.

### **2.1 Remedial Project Manager (RPM)**

The Remedial Project Manager (RPM) has primary responsibility with the DON for day-to-day management of the project activities performed under this Work Plan and for its successful completion. The RPM is responsible for the following:

- Perform project management for the DON.
- Ensure the project scope of work requirements are fulfilled.
- Oversee the project cost and schedule.
- Provide formal technical direction to the TtEC project team, as needed.
- Coordinate with other RPMs for other projects being performed to ensure that proper controls are in place.
- Act as lead in interacting with regulatory agencies.

### **2.2 Facilities Engineering and Acquisition Division (FEAD) Representative**

The Facilities Engineering and Acquisition Division (FEAD) Representative is the DON representative with the primary responsibility for providing on-site QA and safety oversight of contractors. The FEAD representative is responsible for the following:

- Verify that all work has been completed per contract and technical specifications prior to final government acceptance.
- Perform ongoing field inspection to verify that all work is in compliance with both contract and technical specifications.
- Notify the contractor of any work not in compliance.
- Notify the contractor of any work being performed in an unsafe manner.
- Interact with the contractor's Project Quality Control Manager (PQCM) on quality-related issues.
- Review Contractor Daily Reports for completeness and accuracy.
- Attend preparatory phase, initial phase, pre-final, and final acceptance inspections.

- Attend weekly QC meetings.

### **2.3 Project Manager (PM)**

The Project Manager (PM) is the TtEC representative responsible for the direction, execution, and successful completion of project tasks to achieve overall project goals. The PM has responsibility for and the authority to direct all segments of the project including technical, construction, and administrative activities. The PM is responsible for the following:

- Coordinate work activities of subcontractors and TtEC personnel and ensure that all personnel adhere to the administrative and technical requirements of the project.
- Monitor the status and progress of work and ensure that project deliverables are completed on time and within the project budget.
- Monitor the budget and schedule, and notify the client and the Program Manager of any changes that may require administrative actions.
- Ensure adherence to the quality requirements of the contract, project scope of work, and the QC plans.
- Ensure that all work meets the requirements of the work plans, procedures, and technical specifications and complies with applicable codes and regulations.
- Ensure that all work activities are conducted in a safe manner in accordance with the Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP) – Safety and Health Requirements (Engineer Manual [EM]-385-1-1) (USACE, 2008), and all applicable Occupational Safety and Health Administration regulations.
- Ensure that change conditions are properly identified and documented with the appropriate approvals.
- Serve as the primary contact with the DON and TtEC for actions and information related to the work and make sure to include appropriate TtEC lead and experts in decision-making.
- Coordinate satisfactory resolution and completion of evaluation and acceptance for Nonconformance Reports (NCRs).
- Attend required meetings, including the preconstruction conference, weekly QC meetings, pre- and post-construction site inspections, and other scheduled and unscheduled meetings.

### **2.4 Safety and Health Manager (SHM)**

The SHM is the TtEC representative responsible for implementing and overseeing the Contract Health and Safety Program and for developing, implementing, and approving all APPs/SSHPs. Any changes to the established Contract Health and Safety Program or APP/SSHP must be at the direction and approval of the SHM, with concurrence of the DON Administrative Contracting Officer. The SHM or designee will not necessarily be on-site during all remedial activities but will be readily available for consultation when required.

The SHM or designee is a Certified Industrial Hygienist (CIH) who is certified by the American Board of Industrial Hygiene. The SHM supervises and directs the activities of the Site Safety and Health Officer (SSHO). The SHM has the authority to stop unsafe operations, remove unqualified

personnel from the work area, and approve changes to the APP/SHSP. The SHM is responsible for the following:

- Oversee all aspects of the APP/SHSP from development to implementation.
- Advise the SSHO on all related health and safety matters.
- Review site-specific plans for completeness and compliance.
- Review other site documents as they affect health and safety (e.g., Activity Hazard Analyses [AHAs] and sampling plans).
- Review and evaluate all monitoring results.
- Establish and monitor all related health and safety procedures through site safety inspections and audits.
- Ensure that TtEC employees receive required environmental health and safety (EHS) regulatory training.
- Fulfill specific responsibilities for project EHS personnel that are identified within each EHS procedure.
- Function as a technical resource for all environmental compliance, safety, loss control, and industrial hygiene issues.

## **2.5 Quality Control Program Manager (QCPM)**

The Quality Control Program Manager (QCPM) is the TtEC representative responsible for the oversight of program QC, including field activities and data acquisition. The QCPM is responsible for the following:

- Coordinate and resolve quality concerns.
- Provide quality-related direction and ensure the training of the POCM and others performing quality-related functions.
- Suspend project activities if quality standards are not maintained.
- Interact with the DON on quality-related issues.
- Review audit and surveillance reports.
- Implement the DON technical directives related to quality.

## **2.6 Project Superintendent (PS)**

The Project Superintendent (PS) is a TtEC representative who reports to the PM and is responsible for coordinating, directing, implementing, and supervising site construction activities. The PS or designated representative will be on-site at all times during field activities. The PS is responsible for the following:

- Implement field activities in accordance with the Work Plan.
- Direct support personnel and subcontractors.
- Administer site access and communication.
- Maintain the work site, facilities, vehicles, and equipment.

- Coordinate work activities and ensure all personnel adhere to the administrative and technical requirements of the project.
- Prepare status reports and estimate future scheduling needs.
- Prepare daily Contractor Production Reports (CPRs).
- Monitor the status and progress of field activities and ensure that project deliverables are completed on time and within the project budget.
- Ensure work activities in the field are conducted in a safe manner in accordance with the APP/SSHP.
- Investigate with the SSHO all incidents, accidents, injuries, illnesses, and near misses.

## **2.7 Project Quality Control Manager (PQCM)**

The PQCM is the TtEC representative responsible for overall management of project QC and reports to the QCPM. The PQCM has the authority to stop work on site-related issues affecting the quality of the work performed and for directing the correction of all nonconforming work. The PQCM or designated representative will be on-site at all times during field activities. The PQCM is responsible for the following:

- Provide and maintain an effective QC system for all site activities.
- Monitor QC activities to ensure conformance with authorized policies, procedures, contract specifications, required standards, and methods of quality construction.
- Prepare the daily Contractor Quality Control Reports (CQCRs).
- Coordinate and perform the three phases of inspection (preparatory, initial, and follow-up) for all definable features of work (DFWs).
- Responsible for issuance, maintenance, and enforcement of NCRs and other quality actions.
- Ensure that on-site and off-site inspections, testing, and sampling are performed in accordance with the plans, procedures, specifications, and applicable codes.
- Ensure that all required tests and inspections are performed and documented.
- Conduct required QC meetings, including the coordination and mutual understanding meeting, site survey visit, and other scheduled meetings.
- Coordinate and maintain submittal register, photograph log sheet, request for information, and NCR log and other required logs or registers.
- Review and maintain records of approved submittals, Design Change Notices (DCNs), and Field Change Requests (FCRs) for construction activities.
- Inspect material delivery handling and storage in accordance with technical specifications.
- Review and approve submittals and shop drawings and/or forward submittals as information only or for approval.
- Review project plans and procedures for quality issues.
- Confirm the removal or rework of material, equipment, or work activity that is not in compliance with plans and specifications.
- A copy of the Delegation of Authority Letter is provided in Appendix A and a copy of the PQCM resume is provided in Appendix B.

## **2.8 Site Safety and Health Officer (SSHO)**

The SSHO is the TtEC representative who reports directly to the SHM and ensures all elements of the APP/SSHPs are implemented and enforced on-site. The SSHO has full authority to issue stop work orders or evacuation orders when work operations or noncompliance(s) may threaten the health and safety of site workers or the public. The SSHO is responsible for the following:

- Ensure that all personnel understand the requirements of the TtEC EHS program and procedures through training and communication.
- Investigate with the PS all incidents, accidents, injuries, illnesses, and near misses.
- Ensure project personnel are trained in the hazards of substances used on the project, maintain Material Safety Data Sheets (MSDSs) and make them accessible to project personnel, and perform inspections and oversight to ensure the Waste Management Plan is being followed.
- Ensure tailgate safety meetings are conducted daily prior to start of work and are documented.
- Ensure project safety equipment is inspected and in good working order as required by the EHS program.
- Coordinate site health and safety requirements with the PS and PM.
- Ensure that all health and safety monitoring equipment and personal protective equipment are maintained and direct site-monitoring activities.
- Coordinate daily field activities with the PS.
- Coordinate site safety and emergency response duties and verify site communications system with site personnel.
- Report incidents to the FEAD Representative as required by EM 385-1-1 (USACE, 2008).
- Report immediately to the PM, RPM, and FEAD Representative any fatal injury, persons admitted to a hospital, or damage to government property.
- Ensure all personnel have the required training and medical clearance prior to entering the exclusion zone at the site; inform the PS of any site personnel with medical restrictions.
- Determine and post routes to medical facilities and telephone numbers for emergency transportation to medical facilities.
- Serve as the Project Hazard Communication Coordinator.
- Maintain training records and medical certifications for all on-site personnel, including subcontractors.
- Initiate revisions or changes to the APP/SSHP to support changing site conditions.
- Maintain site control procedures.
- Maintain current records of certification for first aid and cardiopulmonary resuscitation training for field personnel.
- Attend meetings, including the preconstruction conference, weekly QC meetings, pre- and post-construction site inspections, and other project meetings.

## 2.9 Subcontractors and Vendors

Qualified subcontractors may be selected to provide various construction services for this project. The subcontractor is required to provide labor, material, and equipment necessary to conduct construction activities as directed by the PM. Subcontractors and vendors will be required to conform to TtEC’s quality requirements of all approved procedures, technical specifications, and contract provisions.

The subcontractor is responsible for field inspection of their construction and operating activities. TtEC personnel will monitor, oversee, and make on-site observations and inspections of work in progress to determine whether the subcontractor’s work is proceeding in accordance with TtEC’s quality requirements.

Subcontractor personnel are responsible for maintaining a daily log of the project activities they perform and for providing information needed to complete the Daily CQC Report. All inspection records, including inspection reports, deficiency reports, and re-inspections of corrective actions, will be documented.

## 2.10 Points of Contact

The following is a list of the key project, DON, and regulatory contacts:

Name and Title	Contact Information
Navy COR, Zane Perry	(757) 322-4777
Remedial Project Manager/Navy Technical Representative, Scott Park	(757) 341-0481
TtEC Project Manager, Mark Pisarcik	(757) 518-8491 (office phone) (757) 544-2085 (cellular phone)
TtEC Quality Control Program Manager, Greg Joyce	(360) 598-8117 (office phone) (360) 780-0371 (cellular phone)
TtEC Safety and Health Manager, Roger Margotto, CIH	(619) 471-3503 (office phone) (619) 988-0520 (cellular phone)
TtEC Project Environmental Manager, TBD	TBD
TtEC Project Superintendent, TBD	TBD
TtEC Project Quality Control Manager, TBD	TBD
TtEC Site Safety and Health Officer, TBD	TBD
Facility Fire Department	(757) 887-4911
FEAD Representative, George Colley	(757) 636-7215
National Response Center	(800) 424-8802
Virginia Department of Environmental Quality Tidewater Region Office	(757) 518-2000 (business hours) (800) 468-8892 (24-hour)

*Abbreviations and Acronyms:*

COR – Contracting Officer’s Representative

TBD – To Be Determined

### **3.0 DEFINABLE FEATURES OF WORK**

A DFW is defined as an activity or task separate and distinct from other activities that requires separate control activities. The DFW establishes the control measures required to verify both the quality of work performed and compliance with specified requirements, which include inspecting materials and workmanship before, during, and after each DFW. Preparatory and Initial inspections will be performed on all DFWs, with the exception of mobilization and demobilization. Activities that will be covered by the PQCM during the inspections are listed in Table 3-1.

The following DFWs have been identified for the project:

- Mobilization and Site Setup.
- Sampling.
- Excavation.
- Transportation and Disposal.
- Site Restoration.
- Demobilization.

### **4.0 SUBMITTALS**

This section describes the review and approval process of submittals. TtEC will institute and maintain a submittal register (Appendix C) to track submittals from issuance to approval. A list of required submittals will be developed at the initiation of project activities and revised as necessary. Submittals will be scheduled, reviewed, certified, and managed in accordance with the procedures defined in this section.

Standard Unified Facilities Guide Specification (UFGS) submittal titles are as follow:

- SD-01 Preconstruction Submittals
- SD-02 Shop Drawings
- SD-03 Product Data
- SD-04 Samples
- SD-06 Test Reports
- SD-07 Certificates
- SD-08 Manufacturer's Instructions
- SD-11 Closeout Submittals

Descriptions of the submittals listed above are provided in Section 1.1.2 of the UFGS Section 013300 (NAVFAC 2010).

#### **4.1 Review of Submittals**

Submittals will be reviewed to ensure completeness, accuracy, and contract compliance. Submittal of a certification will be inspected and approved by the PQCM for conformance to the project specifications or certification criteria. All items will be checked and approved by the PQCM or

designated representative. Any submittals requiring modifications or changes will be returned to the originating organization for correction and then resubmitted for review and approval prior to acceptance. Approved submittals will be stamped, signed or initialed, and dated. During the preparatory phase of the QC inspections, the PQCM or designated representative will ensure that all materials and equipment have been tested and approved. No field activities will be performed without the required approval of applicable submittals.

#### **4.2 Submittal Process**

Required submittals will be provided to project personnel as determined by the distribution schedule. Each submittal will be assigned a unique document control number.

A transmittal form will accompany each submittal. Each transmittal will be identified with:

- Contract and CTO number
- Name and address of the submitting organization
- Date of submittal
- Description of item being submitted, including reference to specification section (if applicable)
- Approval of submitting organization indicating conformance to the requirements

The PQCM will update the submittal register regularly.

#### **4.3 Review and Processing of Submittals that Do Not Require DON Approval**

Material submitted for review by the PQCM will indicate whether or not it conforms to established requirements. The PQCM will inform the submitter of the results of the review. The submittal log will be updated to indicate the status.

Conforming submittals will be transmitted to project and DON personnel as determined by the distribution schedule. A transmittal form will accompany all items sent to the DON and will list each item transmitted, the date it was reviewed by the PQCM, and its review status.

Nonconforming submittals will be returned to the submitter for correction, resolution of comments, and resubmittal.

#### **4.4 Review and Processing of Submittals that Require DON Approval**

Submittals reviewed by the PQCM will be transmitted to the DON in accordance with the project distribution schedule for further review and approval. All items sent to the DON will use a transmittal form that will indicate each item transmitted, the date reviewed by the PQCM, and its review status. Upon completion of review, the FEAD representative will either return the transmittal form to the PQCM for further action or accept the submittal as complete.

The PQCM will advise the submitter of the results of the review in writing and include any comments. The submittal log will be updated to indicate status.

Nonconforming submittals may be returned to the submitter for correction, resolution of comments, and resubmittal, if required.

#### **4.5 Revised Submittals**

Revised submittals will be logged, reviewed, and processed in a manner identical to the initial submittal.

### **5.0 TESTING**

The PQCM or designated representative will verify the performance of all tests specified or required by the Work Plan to ensure that control measures are adequate to provide a product conforming to contract specifications. General requirements for testing procedures to be implemented for this project are included in the Work Plan. The type, number, and frequency of required tests are specified in the Testing Plan and Log (Appendix C). These tests include both operational and acceptance testing as appropriate.

#### **5.1 Documentation**

All test results, both passing and failing, will be documented as a summary report in the Daily CQCR on the last day of each month. Paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. The test reports will be available for review by the FEAD Representative and transmitted with the Project After Action Report.

#### **5.2 Laboratory Services**

An independent testing laboratory will provide laboratory services, as needed. The laboratory will be selected and qualified in accordance with recognized industry and applicable project requirements.

#### **5.3 Testing Plan and Log**

The Testing Plan and Log (Appendix C) lists tests required by the project specifications and drawings. Testing will be conducted to verify that control measures are adequate to provide a product conforming to contract specifications. General requirements for testing procedures to be implemented for this project are included in the Work Plan.

### **6.0 QUALITY CONTROL MEETINGS**

#### **6.1 Coordination and Mutual Understanding Meeting**

Prior to the start of site work, a coordination and mutual understanding meeting will be held to discuss the QC Program requirements. DON personnel attending the meeting will include the RPM, and the FEAD Representative. The purpose of this meeting is to develop a mutual understanding of the QC details, including forms to be used, administration of on-site and off-site

work, coordination of the field activities, production, and the PQCM duties with the FEAD Representative. At a minimum, the TtEC personnel required to attend the meeting will include the PM, PS, and PQCM. Minutes of the meeting shall be prepared by the PQCM and signed by the PM and the DON's RPM and/or FEAD Representative or designated representative. The meeting may be held in conjunction with the preconstruction meeting.

## **6.2 QC Meetings**

After the start of field activities, the PQCM will conduct QC meetings at a frequency of once per week or as required by the FEAD Representative. The meetings will be held at the project site and will be attended by the FEAD Representative, PS, SSHO, and PQCM. The PQCM will notify the FEAD Representative at least 48 hours in advance of each meeting. The following will be covered at each meeting:

- Review the minutes of the previous meeting.
- Review the schedule:
  - Work or testing accomplished since last meeting
  - Rework items identified since last meeting
  - Rework items completed since last meeting
- Review the status of submittals:
  - Submittals reviewed and approved since last meeting
  - Submittals required in the near future
- Review the work to be accomplished in the following 2 weeks, documentation required, and schedule for the three phases of control and testing:
  - Establish completion date for rework items
  - Required preparatory phase inspections
  - Required initial phase inspections
  - Required follow-up phase inspections
  - Required testing
  - Status of off-site work or testing
  - Required documentation
  - Identification of deficient conditions
- Resolve QC and production problems.
- Address items that may require revisions to the PCQC Plan.

## **7.0 INSPECTIONS**

This section discusses the inspection process for the DFWs that will ensure compliance with the contract. The DFWs for this project are identified in Section 3.0 and listed in Table 3-1.

The PCQC Plan includes implementing the following three control phases for all aspects of the work specified:

- Preparatory phase
- Initial phase
- Follow-up phase

## 7.1 Preparatory Phase Inspection

The PQCM will conduct preparatory phase inspections prior to starting the DFWs listed in Table 3-1 with the exception of mobilization and demobilization. These inspections shall include the following:

- Review the Work Plan and Standard Operating Procedures.
- Ensure that all required procurement forms for supplies and services are approved.
- Ensure that provisions have been made to provide the required QC inspection.
- Ensure that all personnel have the required training and certifications needed to perform the work.
- Examine the work area to ensure that all required preliminary work has been completed and is in compliance with the approved Work Plan.
- Examine the required materials and equipment to ensure that they are properly delivered to the site, conform to specifications, and are properly stored.
- Review the appropriate AHAs to ensure that safety requirements are met.
- Discuss procedures for performing the work, including potential repetitive deficiencies.
- Document workmanship standards for the particular phase of work.
- Ensure that the PCQC Plan for the work to be performed has been accepted by the DON.

The PQCM will conduct frequent internal inspections of mobilization and demobilization, which will include the items listed on Table 3-1. The PQCM is not required to notify the DON or the PM prior to these inspections.

The PM, DON RPM, and FEAD Representative will be notified at least 2 working days in advance of each preparatory phase activity. This phase will include a meeting conducted by the PQCM and attended by the PS and any personnel involved in performing the DFW.

The issues discussed during the preparatory phase meetings will be documented on the Preparatory Inspection Checklist (**Appendix C**). The PQCM will explain the acceptable level of workmanship required to personnel performing work activities.

## 7.2 Initial Phase Inspection

An initial inspection will be performed at the beginning of a DFW and will include the following:

- Check preliminary work to ensure that it is in compliance with contract requirements.
- Review the Inspection Checklist documenting results of the preparatory meeting.
- Verify full contract compliance, including required control inspections.

- Establish the required level of workmanship, testing, and inspection to ensure that work meets minimum acceptable standards.
- Resolve all differences.
- Check safety requirements to include compliance with and upgrading of the APP/SSHP and AHAs.

The PM, DON RPM, and FEAD Representative will be notified in advance of each initial phase activity. The PQCM will document initial inspections for each item using the Initial Inspection Checklist (Appendix C) and attach it to the Daily CQC Report. The location of the initial phase inspection and documentation will be identified for future reference and comparison with follow-up inspections.

The initial phase inspection will be reviewed each time a new crew arrives on-site or when features of the work change.

### **7.3 Follow-Up Phase Inspection**

During the completion of a particular work feature, follow-up inspections will be conducted to ensure compliance with contract requirements. The frequency of the follow-up inspections will depend on the extent of the work being performed. Each follow-up inspection will be documented on the Daily CQC Report. A Follow-up Inspection Checklist (Appendix C) will be generated for any deficient conditions identified during the Initial Inspection and attached to the Daily CQC Report when all items are resolved. A final follow-up check will be conducted on any completed work phase prior to the commencement of a subsequent phase.

### **7.4 Receipt Inspections**

The PQCM will conduct inspections of materials prior to their use and installation. These inspections will be documented on a receipt inspection form and maintained on-site. Any material(s) that does not meet design specifications will be rejected and returned to the vendor. Nonconforming material will be segregated and marked accordingly, to prevent inadvertent use. The PQCM will record on the Daily CQC Report that a material inspection was performed.

### **7.5 Additional Inspections**

The PQCM may conduct additional inspections on the same DFWs under the following circumstances:

- If the quality of ongoing work is unacceptable as determined by the PQCM, PM, PS, DON RPM, or FEAD Representative
- If the quality of the work is suspected of being below the established criteria of acceptance
- If work on a DFW is resumed after a substantial period of inactivity
- If other problems develop

## **7.6 Completion Inspection**

Completion inspections will be performed as summarized in this section.

### **7.6.1 Construction Quality Control Completion Inspections**

The PQCM will conduct a detailed inspection prior to the pre-final inspection, when all of the work or an increment of work is deemed to be substantially complete. The work will be inspected for conformance to plans and specifications, workmanship, and completeness. The PQCM will prepare an itemized list of work that does not conform to plans and specifications, inferior workmanship, or incomplete work. The list will also include outstanding administrative items, such as record (as-built) drawings. The list will be included in the QC documentation and submitted to the PM following the inspection and will specify an estimated date for correction of each deficiency. The completion inspection will be documented on the Completion Inspection Checklist (Appendix C) and attached to the Daily CQC Report.

### **7.6.2 Pre-final Inspection**

The PM or designated representative will conduct the pre-final inspection. The DON RPM, FEAD Representative, PQCM, PS, and other primary management representative(s), as applicable, will attend. The PM will schedule the pre-final inspection when notified by the PQCM that the work is ready for inspection. The PQCM is required to verify at this time that all specific items previously identified as being unacceptable, along with all remaining project work, will be complete and acceptable by the date scheduled for the pre-final inspection. At this inspection, the FEAD REPRESENTATIVE will develop a list of incomplete and/or unacceptable work performed under the contract and will provide this list to TtEC.

### **7.6.3 Final Acceptance Inspection**

The PM will schedule the final acceptance inspection based on notification from the PQCM of readiness. The DON RPM, PS, FEAD Representative, PQCM, and other primary management representative(s), as applicable, will attend. Notification will be provided prior to the planned final acceptance inspection date and must include verification that all specific items previously identified as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

## **7.7 Inspection Documentation**

The PQCM is responsible for maintaining the inspection records. Inspection records will be legible and clearly provide all information necessary to verify that the items or activities inspected conform to the specified requirements. In the case of nonconforming conditions, the PQCM will provide evidence that the conditions were brought into conformance or otherwise accepted by the FEAD Representative. All inspection records will be made available to the DON.

## **8.0 DOCUMENTATION**

Preparation, review, approval, and issuance of documents affecting quality will be controlled to the extent necessary to ensure compliance to specified requirements. Project documents that will be controlled, if issued, include the following:

- Meeting minutes, conference notes, and confirmation notes
- Submittal Register
- Inspection documentation
- Contractor Production Report
- Daily CQC Report
- Material inspection and shipping logs
- NCRs
- NCR log
- FCRs
- Rework Items list
- Photograph log
- Field logbooks

### **8.1 Daily Contractor Quality Control Report**

The PQCM is responsible for maintenance of current records of QC operation, activities, inspections, and tests performed, including the work of subcontractors and suppliers. The records will include factual evidence that required QC activities and tests were performed. The Daily CQC Report will be completed to document site activities covered by the PCQC Plan and will include:

- Records of inspection and /or testing performed
- Identification and location of each DFW and its current phase (preparatory, initial, follow-up) of completion
- Results of inspections and/or testing
- Location and description of deficiencies
- Deficiencies corrected as of the date of the report
- Rework items
- Deviations from plans, difficulties, and resolution
- Test and/or control activities performed with results and references to specifications and/or plan requirements, including the control phase (preparatory, initial, and follow-up) and deficiencies (along with corrective action)
- Material received, with statement as to its acceptability and storage
- Submittals reviewed with contract reference, reviewer, and action taken
- Off-site surveillance activities, including actions taken
- PQCM signature

The records will describe both conforming and nonconforming features and include a statement that equipment and materials incorporated in the work and workmanship comply with the contract.

The Daily CQC Report attached to the Contractor Production Report will be furnished to the FEAD Representative by 10:00 a.m. on the first work day following the date covered by the report, or as agreed to by the FEAD Representative. The report need not be submitted for days in which no work is performed. At a minimum, one report will be prepared and submitted for every 7 days of no work and on the last day of a no-work period. All calendar days will be accounted for throughout the life of the contract. The first report following a day of no work will summarize work for that day only.

The Daily CQC Report will be signed and dated by the PQCM and other appropriate personnel, including subcontractors responsible for completion of activities. The report will include copies of test reports.

## **8.2 Contractor Production Report**

The Contractor Production Report will be prepared for each day work is performed and will be attached to the Daily CQC Report prepared for the same day. The Contractor Production Report will be prepared, signed, and dated by the PS or designated representative, and will contain the following information:

- Contractor and subcontractor(s) and their area of responsibility
- Trades working on the project that day and number of personnel
- Operating equipment, with hours worked, idle, or down for repair
- Work performed that day, including location, description, weather conditions, and who did the work
- Any delays encountered
- Site visitors and the purpose of the visit
- Job safety evaluations stating what was checked, results, and instructions or corrective actions
- A list of instructions given and/or received and conflicts in plans and/or specifications
- Contractor's verification statement

## **8.3 Logbooks**

The PQCM will maintain a logbook to document QC activities. The information in the logbook is intended to serve as a phone log and memory aide in the preparation of the Contractor Daily Quality Control Report and in addressing follow-up questions that may arise.

## **8.4 Photographs and Photo Logs**

The PQCM will maintain photographs and a photo log to document site activities. Each photograph will have a date and time stamp on it or the photograph will show a sign board documenting the date and time clearly and legibly in the photograph. The photo log will identify each photograph by date, time, location, and activity.

## **8.5 Conference Notes and Confirmation Notes**

In addition to other required documentation, the PQCM is responsible for taking notes and preparing the reports of all conferences. Conference notes will be typed and the original report furnished to the DON within 5 days of the date of the conference for concurrence and subsequent distribution to all attendees. At a minimum, this report will include the following:

- Date and place the conference was held
- List of attendees, including name, organization, and telephone number
- Comments made during the conference and decisions affecting criteria changes
- Conference notes that augment the written comments

The PM is also responsible for providing a record of all discussions, verbal directions, telephone conversations, and so forth in which TtEC personnel or their representatives participate on matters relating to this contract and work. These records, titled Confirmation Notices, will be numbered sequentially and will fully identify participating personnel, subject discussed, and any conclusions reached. The PM or designated representative will forward a reproducible copy of the confirmation notices to the DON RPM and FEAD Representative within 5 working days.

## **9.0 CHANGE MANAGEMENT**

This section describes the DCN and FCR, the two main vehicles to document project changes.

### **9.1 Design Change Notices (DCN)**

The following sections detail the identification, preparation, and review and approval process for Design Change Notices.

#### **9.1.1 Identification**

Any member of the Project Team may identify the need for a change to the design specifications or drawings. The Project Team member will notify the PCQM, who will evaluate the request and initiate a DCN, if determined necessary.

#### **9.1.2 Preparation**

The PQCM will generate a DCN form (Appendix C) and submit it to the Design Engineer for review and disposition. The DCN will identify the specification requirements, the proposed change, and the reason for the change.

#### **9.1.3 Review and Approval**

The PM, PS, and QCPM will review and approve the DCN. It is the responsibility of the PM to notify the DON for approval of the DCN prior to making any changes identified on the DCN.

#### 9.1.4 Implementation of Approved DCNs

The PS is responsible for the implementation of approved DCNs.

#### 9.1.5 Records

Each approved DCN will be sequentially numbered as follows:

DCN-CTO X-YY,  
Where:

X is the task order number and YY is the DCN number, beginning with 01.

A DCN log shall be maintained by the PQCM that provides the DCN number, date of DCN, and brief description of contents.

Each DCN will be copied to all the management signatories, the PS, PQCM, SSHO, and other personnel as deemed appropriate by the PM.

Copies of the approved DCN should be posted or otherwise included in daily site briefings as appropriate to ensure that all site personnel are aware of the changes to the task order program. Copies of DCN will be issued to all holders of controlled copies. The DCNs will be required to be maintained with the controlled copy of the document that has been changed.

## **9.2 Field Change Request**

Site personnel will document changes to the approved plans (except the design specifications and drawings) in the field through the FCR form (Appendix C). At a minimum, the following information will be documented in the FCR form:

- Project name
- CTO number
- FCR number
- Documents to which a change is requested (including revision number if applicable)
- Description of the item or condition for which the change is requested
- Reason for the change
- Recommended disposition
- Cost and schedule implication of the change, if any
- Approval of disciplines
- Approval of the PM, PS, PQCM, SHM, and QCPM and concurrence from the RPM or FEAD Representative

## **10.0 NONCONFORMANCE**

All deficiencies or nonconforming conditions discovered during inspections or other QC functions will be noted on either a Deficiency Notice (DN) or a Nonconformance Report (NCR), as appropriate.

A DN is used to document the failure to develop, document, or implement effectively any applicable element of approved plans or to follow established procedures. A deficiency could lead to a nonconformance.

An NCR is used to document a nonconforming condition that renders the quality of an item, process, or product that has been defined in the specifications or drawings as unacceptable or indeterminate.

Copies of these forms are provided in Appendix C along with the logs used for tracking these documents. All deficiencies and nonconforming conditions will be resolved prior to completion of the project and in the timeliest manner possible. The DN will be used for all conditions that do not affect the final work product. An NCR will be used when a condition may affect the final work product and requires disposition by the Design Engineer of Record.

The PQCM will be notified of all deficiencies and nonconforming conditions identified during the course of the field activities to ensure that each of these occurrences is documented, reported, and tracked; and that corrective actions are taken and follow-up verification is conducted.

The PQCM will also document deficiencies and nonconforming conditions in the Contractor Daily Quality Control Report, noting the items found to be deficient or nonconforming; the date; time, and location; the person who identified the deficiency or nonconformance; and the status of the item to which the deficiency or nonconformance applies.

The PQCM will update the status of the deficiency when it changes. Before the work activities of the day begin, the PQCM will note the deficiencies or nonconforming conditions that require follow-up verification that day. New or changed status will be entered into the file at the end of each day. The Contractor Daily Quality Control Report will document completion of the corrective action for each deficiency or nonconformance for that day. Nonconforming conditions or deficiencies that require rework for resolution will be noted on the Rework Items List included in Appendix C. Rework Items List will be included with the Contractor Daily Quality Control Report on the last day of the month that work is performed.

### **10.1 Root Cause Analysis**

The DN and the NCR forms both include space to enter information regarding the cause of the problem and the proposed resolution. The determination of the root cause of a deficiency or nonconformance is an integral part of the QC process. Root-cause analysis will be made by the PQCM in conjunction with other appropriate site personnel such as the Project Superintendent and the SSHO. Criteria considered in the analysis will include:

- staff qualifications and training
- adequacy of procedures and methods
- adequacy of equipment
- adequacy of QC measures

Input will be obtained, as necessary, from field staff and technical advisors in order to identify the factors that led to the problem.

## **10.2 Corrective Action**

Following the root cause analysis, the PQCM will evaluate potential solutions (corrective actions) to determine which remedy is most effective in correcting the problem. This process will include all appropriate staff. Potential remedies considered will include:

- supplemental staff training
- changes of equipment or modification of equipment currently in use
- acquisition of supplemental equipment
- implementation of new procedures or modification of existing procedures
- changes in QC procedures

Final approval of all remedies will be the responsibility of the PM.

Successful implementation of corrective action will be documented by the PQCM in the appropriate areas of the DN or NCR. This documentation will be supported by changes to the inspection procedures or schedule as warranted (i.e., the PQCM will not certify that corrective action has been taken until inspection of the actions and the resulting changes in the program are complete).

## **10.3 Condition Requiring Stop Work**

If corrective actions are insufficient, resolution cannot be reached, or results of prior work are indeterminate, work may be stopped. The PQCM will direct the PM to suspend work associated with the nonconformance until corrective action is complete. The PQCM will notify the QCPM immediately after stopping work. If there is a disagreement between the PQCM and the PM, the difference will be brought to the attention of the QCPM until resolution is achieved.

The conditions of the suspension of work will be described in detail on the CQC daily report and on the Rework Items List, if corrective action is not completed by the end of the working day Work will not continue until the directed by the individual who authorized it.

## **11.0 QUALITY MANAGEMENT**

In addition to the required QC field inspections, the TtEC Quality Management System requires a quality management overview of the site QA/QC Program implementation. The PQCM will

perform regular internal QC checks on the site implementation of the QA/QC Program. Reports of any deficiencies will be provided to the PM for corrective action.

Inspections will be performed and checked for the following:

- Conformance with Work Plan and associated plans
- Thoroughness of performance
- Identification and completeness of documentation generated during performance

## **12.0 REFERENCES**

NAVFAC (Naval Facilities Engineering Command) 2006. Unified Facilities Guide Specifications (UFGS) 01330, Submittal Procedures. April 2006.

USACE (United States Army Corps of Engineers) 2008. Safety and Health Requirements. Engineer Manual (EM) 385-1-1. September 2008 Consolidated. August 2011.

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## **TABLES**

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ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOW-UP	DONE
Sampling	<ul style="list-style-type: none"> <li>• Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>• Verify Work Plan and supporting documents have been submitted and approved.</li> <li>• Review schedule and sequence of work for setup activities.</li> <li>• Review project plans including Sampling and Analysis Plan.</li> <li>• Ensure Virginia Miss Utility has been called and third party locate is scheduled.</li> <li>• Ensure off-site laboratory services have been procured.</li> </ul>		<ul style="list-style-type: none"> <li>• Verify that qualified SSHO is present at active work areas.</li> <li>• Ensure pre-excavation confirmation sample locations staked as shown in work plan drawings.</li> <li>• Verify potential backfill sources have been identified.</li> <li>• Ensure Sampling and Analysis Plan requirements are being met with regard to sample collection, labeling, and packaging.</li> </ul>		<ul style="list-style-type: none"> <li>• Continue initial inspections.</li> <li>• Ensure representative samples of potential fill are collected for each type of material from each source.</li> <li>• Ensure representative samples of soil/debris to be excavated and disposed are collected from each excavation area.</li> <li>• Ensure samples are collected from all pre-excavation sample locations and that analysis protocol is being followed by the laboratory. Verify that site activities are being photographed.</li> </ul>	
Mobilization and Site Setup	<ul style="list-style-type: none"> <li>• Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>• Review schedule and sequence of work for setup activities.</li> <li>• Review project plans.</li> <li>• Ensure areas of excavation are identified.</li> <li>• Ensure Virginia Miss Utility has been called and third party locate is scheduled.</li> <li>• Verify that the area has been walked/visually inspected for items that could interfere with clearing (utilities, rebar, etc.).</li> <li>• Review APP and AHA.</li> </ul>		<ul style="list-style-type: none"> <li>• Verify that qualified SSHO is present at active work areas.</li> <li>• Verify that pre-existing conditions at the site are photographed.</li> <li>• Ensure Virginia Miss Utility and third party locators have marked the site.</li> <li>• Ensure E&amp;S Controls are installed per VESCH standards and WP / SWPPP requirements. Verify that existing conditions photographs are taken and clearing activity is photographed.</li> </ul>		<ul style="list-style-type: none"> <li>• Continue initial inspections.</li> <li>• Verify that site activities are being photographed.</li> <li>• Verify above ground/underground utilities have been marked.</li> <li>• Inspect E&amp;S Controls and ensure they are maintained and in place until soil disturbance activities are completed.</li> <li>• Ensure initial conditions survey is completed.</li> <li>• Ensure access road is installed as described in the RAWP.</li> <li>• Verify that site activities are being photographed.</li> </ul>	
Excavation	<ul style="list-style-type: none"> <li>• Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>• Ensure Virginia Miss Utility has been called and third party locate is scheduled.</li> <li>• Review schedule and sequence of work for excavation activities.</li> <li>• Ensure excavation areas staked out by surveyor.</li> <li>• Ensure containment area has been constructed.</li> </ul>		<ul style="list-style-type: none"> <li>• Verify that qualified SSHO is present at active work areas.</li> <li>• Ensure Virginia Miss Utility and third party locators have marked the site.</li> <li>• Ensure excavation extends to the surveyor's staked points.</li> <li>• Ensure that excavated soil/debris is properly transported to containment</li> </ul>		<ul style="list-style-type: none"> <li>• Continue initial inspections.</li> <li>• Verify that all visible debris has been removed from Can Pit.</li> <li>• Verify that soil within staked area of Drum Disposal Area has been removed to 6-inch depth.</li> <li>• Ensure post-excavation survey is completed.</li> <li>• Verify that site activities are being photographed.</li> </ul>	

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOW-UP	DONE
	<ul style="list-style-type: none"> <li>Review APP and applicable AHA.</li> </ul>		<ul style="list-style-type: none"> <li>area.</li> <li>Verify that site activities are being photographed.</li> </ul>			
Transportation and Disposal	<ul style="list-style-type: none"> <li>Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>Review Waste Management Plan.</li> <li>Verify waste characterization samples have been collected and sample results received.</li> <li>Verify waste profiles have been submitted and approved including OSR approval.</li> <li>Review schedule and sequence of work for disposal activities.</li> <li>Review APP and applicable AHA.</li> </ul>		<ul style="list-style-type: none"> <li>Verify that qualified SSHO is present at active work areas.</li> <li>Ensure manifests are completed and signed.</li> <li>Ensure haul vehicles are road worthy and drivers have appropriate license and registration.</li> <li>Verify that site activities are being photographed.</li> </ul>		<ul style="list-style-type: none"> <li>Continue initial inspections.</li> <li>Verify that completed waste manifests or bills of lading are received from the disposal facility.</li> </ul>	
Site Restoration	<ul style="list-style-type: none"> <li>Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>Verify source of fill material has been approved by the Navy.</li> <li>Review schedule and sequence of work for restoration activities.</li> <li>Review APP and applicable AHA.</li> </ul>		<ul style="list-style-type: none"> <li>Verify that qualified SSHO is present at active work areas.</li> <li>Ensure only backfill material from the approved source is used.</li> <li>Ensure backfill placed in (bucket) compacted lifts.</li> <li>Verify that site activities are being photographed.</li> </ul>		<ul style="list-style-type: none"> <li>Continue initial inspections.</li> <li>Verify disturbed areas brought back to original grade and seed/straw are placed.</li> <li>Verify temporary E&amp;S controls are removed.</li> <li>Ensure pre-final and final inspections are performed.</li> <li>Verify that site activities are being photographed.</li> <li>Ensure final site survey is completed.</li> </ul>	
Demobilization	<ul style="list-style-type: none"> <li>Verify that RPM and FEAD have been notified of preparatory meeting.</li> <li>Review schedule and sequence of work for demobilization activities.</li> <li>Review APP and applicable AHA.</li> </ul>		<ul style="list-style-type: none"> <li>Verify that qualified SSHO is present at active work areas.</li> <li>Verify that final conditions at the site are photographed.</li> </ul>		<ul style="list-style-type: none"> <li>Continue initial inspections.</li> <li>Verify that all personnel, equipment, materials, and temporary facilities are removed from the site.</li> <li>Verify that site activities are being photographed.</li> </ul>	

**Abbreviations and Acronyms:**

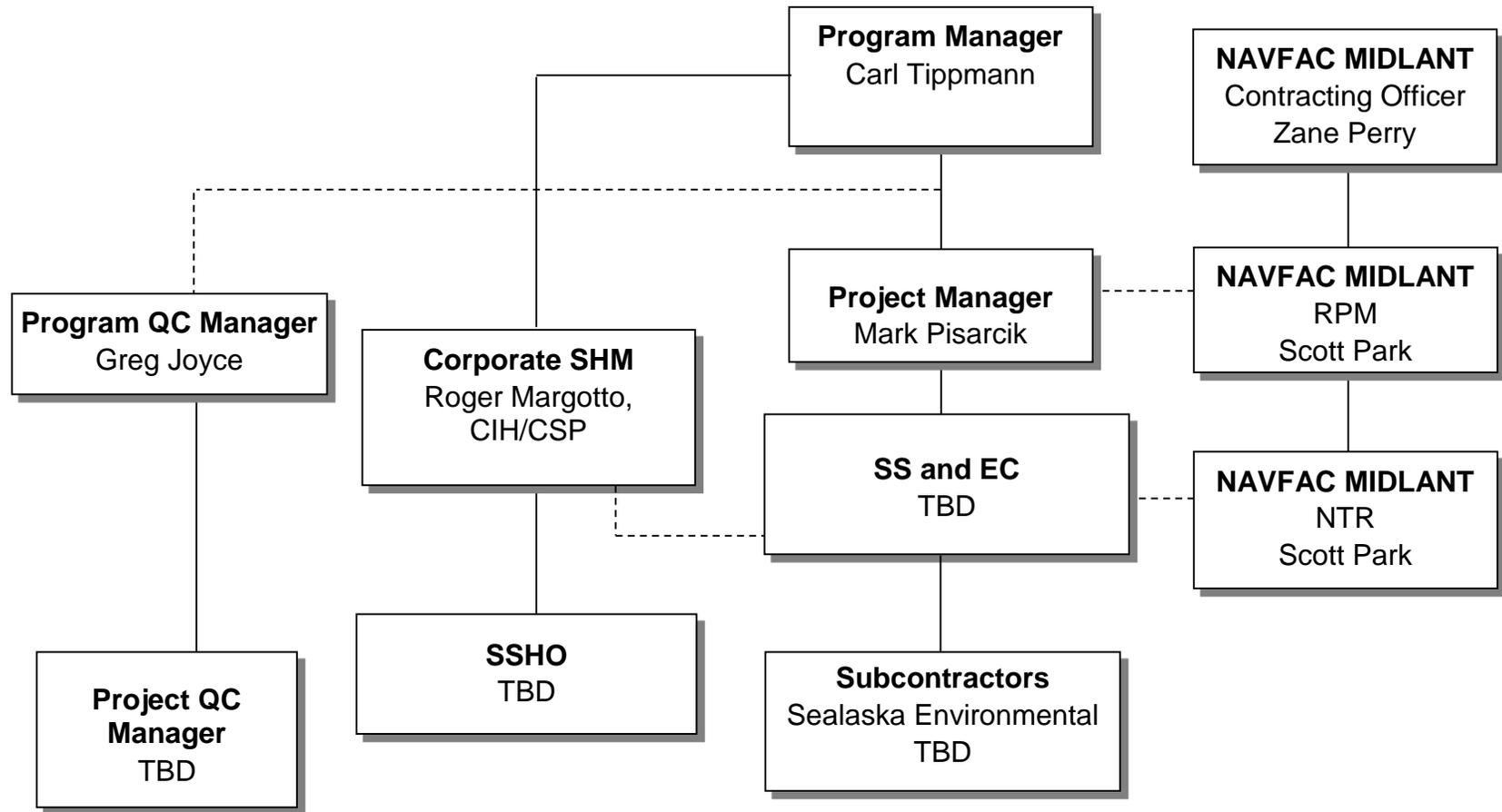
AHA – Activity Hazard Analysis  
 APP – Accident Prevention Plan  
 E&S – Erosion and Sediment  
 FEAD – Facility Engineering and Acquisition Division  
 OSR – Off-Site Rule

RPM – Remedial Project Manager  
 RAWP – Removal Action Work Plan  
 SSHO – Site Safety and Health Officer  
 SWPPP – Stormwater Pollution Prevention Plan  
 VESCH – Virginia Erosion and Sediment Control Handbook

## **FIGURES**

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Figure 2 - 1 Organizational Chart



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**APPENDIX A**

**DELEGATION OF AUTHORITY LETTER**  
(to be included upon mobilization)

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## **APPENDIX B**

### **RESUMES**

(to be submitted upon request)

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**APPENDIX C**  
**QUALITY CONTROL FORMS**

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**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**DEFICIENCY NOTICE**

TASK ORDER # \_\_\_\_\_ DN # \_\_\_\_\_ DATE \_\_\_\_\_  
LOCATION: \_\_\_\_\_ ROICC / RPM \_\_\_\_\_

**1. Plan, Procedure, Specificaion, or Drawing (Clearly state the requiremet)**

\_\_\_\_\_

**2. Description of Deficiency**

\_\_\_\_\_

QC verification of corrective action required: Yes \_\_\_\_\_ No \_\_\_\_\_

Prepared by: \_\_\_\_\_ Approved by: \_\_\_\_\_

**3. Corrective Action**

\_\_\_\_\_

\_\_\_\_\_  
Organization Signature Date

**4.** Corrective action verified by: \_\_\_\_\_ Date \_\_\_\_\_

Comments:

\_\_\_\_\_

\_\_\_\_\_  
Program Quality Control Manager Date

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**DESIGN CHANGE NOTICE (DCN)**

TASK ORDER # _____	DCN # _____	DATE _____
LOCATION _____	ROICC / RPM _____	

**1. Document to be changed. Identify revision, date, section, drawing, etc.**

**2. Description of Change (Items involved, submit sketch, if applicable):** *(Use continuation sheet if necessary)*

Engineering "HOLD" placed on all activities in area defined herein pending receipt of formally revised document(s) and / or DCN.  
 Released for construction basis of modifications prescribed by this DCN.

**3. Reason for Change** *(Attach additional information if needed)*

<b>4. Originator</b> (Print name and sign)	Title	Date
Reviewed by: (Print name and sign)	Title	Date
Task Order Manager (Print name and sign)	Date	Program Quality Manager (Print name and sign)
		Date

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**DESIGN CLARIFICATION REQUEST**

TASK ORDER # \_\_\_\_\_ DC# \_\_\_\_\_ DATE \_\_\_\_\_

Submitted to: \_\_\_\_\_

1. Document reference. Identify revision, date, section, drawing, etc.

2. Clearly state requirement or describe drawing as shown. (Attach additional info if needed)

3. Information requested or proposed change. (Attach additional information if needed)

4. Response

Does response require an FCR or DCN      YES       NO   
  
FCR       DCN

<b>Task Order Manager (Print name and sign)</b>	<b>Date</b>

**TETRA TECH FW, INCORPORATED**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**  
**FIELD CHANGE REQUEST LOG**

Task Order # :	Task Order Manager:	ROICC / RPM:
----------------	---------------------	--------------

FCR No.	DESCRIPTION OF CHANGE	DATE INITIATED	STATUS

**TETRA TECH FW, INCORPORATED**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**  
**FIELD CHANGE REQUEST LOG**

Task Order # :	Task Order Manager:	ROICC / RPM:
----------------	---------------------	--------------

FCR No.	DESCRIPTION OF CHANGE	DATE INITIATED	STATUS

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**FIELD CHANGE REQUEST (FCR)**

TASK ORDER # \_\_\_\_\_ FCR # \_\_\_\_\_ DATE \_\_\_\_\_  
 LOCATION: \_\_\_\_\_ ROICC / RPM \_\_\_\_\_

**1. Document to be changed. Identify revision, date, section, drawing, etc.**

**2. Description of existing requirement and proposed change (Attach sheet if necessary)**

**3. Reason for Change (Attach sheet if necessary)**

<b>4. Originator: (print name and sign)</b>		<b>Title</b>	<b>Date</b>
<b>Reviewed by: (print name and sign)</b>		<b>Title</b>	<b>Date</b>
<b>Site Superintendent (Print name and sign)</b>	<b>Date</b>	<b>Task Order Manager (Print name and sign)</b>	<b>Date</b>
<b>TtEC Program QC Manager (Print Name and Sign)</b>	<b>Date</b>	<b>ROICC Acknowledgement (Print name and sign)</b>	<b>Date</b>

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Preparatory Inspection Checklist**

Task Order No.: \_\_\_\_\_  
Definable Feature: \_\_\_\_\_  
NAVFAC SW notification \_\_\_\_\_

Date: \_\_\_\_\_  
Spec Section: \_\_\_\_\_  
48 Hours in Advance Yes \_\_\_\_\_ No \_\_\_\_\_

**I Submittals**

1. Review submittals and/or submittal register. Have all applicable submittals been approved?  
Yes \_\_\_\_\_ No \_\_\_\_\_

If No, what items have not been submitted?  
Comments

2. Are all materials on hand? Yes \_\_\_\_\_ No \_\_\_\_\_

If No, what items are missing?  
Comments

3. Check approved submittals against delivered materials. (This should be done as materials arrives.)  
Comments

**II Material Storage**

Are materials stored properly? Yes \_\_\_\_\_ No \_\_\_\_\_

If No, what actions is taken?

**III Specifications**

1. Review each paragraph of Specification

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Preparatory Inspection Checklist**

2. Discuss procedure for accomplishing the work.

3. Clarify any differences.

**IV Preliminary Work and Permits**

Ensure preliminary work is correct and permits are on file.

Yes \_\_\_\_\_

No \_\_\_\_\_

If No, what action is taken?

**V Testing**

1. Identify test to be performed, frequency, and by whom.

2. When required?

3. Where required?

4. Review testing plan.

5. Has test facilities been approved?

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Preparatory Inspection Checklist**

VI Safety

1. Review applicable portion of the Task Order Site Health and Safety Plan.

Comments

2. Activity Hazard Analysis approved?

Yes \_\_\_\_\_

No \_\_\_\_\_

VIII Navy comments during meeting.

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Preparatory Inspection Checklist**

I. Personnel Present:

	Name	Position	Company / Government
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

(List additional personnel on reverse side)

\_\_\_\_\_  
Site CQC Representative

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Initial Phase Inspection Checklist**

Task Order No.: \_\_\_\_\_  
 Definable Feature: \_\_\_\_\_

Date: \_\_\_\_\_  
 Spec Section: \_\_\_\_\_

**I. Personnel Present:**

	Name	Position	Company / Government
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____

(List additional personnel on reverse side)

**II Identify full compliance with procedures identified at preparatory inspection. Coordinate plans, specifications, and submittals.**

Comments:

**III Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?**

Actions:

**IV Establish Levels of Workmanship**

1. Where is the work located? \_\_\_\_\_
2. Is a sample panel required? Yes \_\_\_\_\_ No \_\_\_\_\_
3. Will the initial work be considered as a sample? Yes \_\_\_\_\_ No \_\_\_\_\_  
 (If yes, maintain in present condition as long as possible.)

**V Resolve any differences.**

Comments:

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**Initial Phase Inspection Checklist**

VI Check Safety

Review job conditions using Site Health and Safety Plan and job hazard analysis.

Comments:

---

Site CQC Representative





TETRA TECH EC, INC.  
 NAVY REMEDIAL ACTION CONTRACT (RAC VI)  
 CONTRACT NO. N62470-13-D-8007

**NONCONFORMANCE REPORT**

TASK ORDER # \_\_\_\_\_ NCR# \_\_\_\_\_ DATE \_\_\_\_\_  
 LOCATION: \_\_\_\_\_ ROICC/RPM \_\_\_\_\_

**1. Plan, Procedure, Specificaion, or Drawing (Clearly state the requiremet)**

**2. Description of Nonconforming Item or Condition**

Did nonconforming condition require suspension of work activities Yes  No   
 If yes, explain requirement to restart work activities: \_\_\_\_\_

\_\_\_\_\_  
 Prepared by: \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**3. Corrective Action**

- use-as-is
- repair
- rework to specificaion
- other - specify: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 Organization \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**NONCONFORMANCE REPORT**

**4. Evaluation of Proposed Disposition**

\_\_\_\_\_  
 Evaluator

\_\_\_\_\_  
 Title

Accept	<input type="checkbox"/>
Accept with comments	<input type="checkbox"/>
Reject	<input type="checkbox"/>
Reject with comments	<input type="checkbox"/>

Comments:

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Evaluator

\_\_\_\_\_  
 Title

Accept	<input type="checkbox"/>
Accept with comments	<input type="checkbox"/>
Reject	<input type="checkbox"/>
Reject with comments	<input type="checkbox"/>

Comments:

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Date

**5. Verification**

Verification required

Yes

No

Verified by:

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Title

\_\_\_\_\_  
 Date

Approved by:

\_\_\_\_\_  
 Program QC Manager

\_\_\_\_\_  
 Date





**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

**QC Inspection Checklist**

Task Order Number: WE35  
 Project NTCRA at AOC 7, WPNSTA Yorktown - CAX

Task Order Manager: Mark Pisarcik  
 Location: Williamsburg, VA

Spec. Section	Paragraph No.	Definable Feature of Work	Sub-Task	Quality Objectives to be Verified	Preparatory Phase Report No.	Date	Initial Phase Report No.	Date	Follow-Up Phase Report No.	Date
WP 3.1		<b>Sampling Activities</b>								
SAP			Pre-Excavation Confirmation Sampling	Ensure pre-excavation confirmation sampling conducted in accordance with the approved SAP						
			Clean Fill Verification Sampling	Ensure clean fill verification sampling completed as outlined in WP section 3.1.2						
			Waste Disposal Characterization Sampling	Ensure waste disposal characterization sampling completed as outlined in WP section 3.2.3 and WMP						
WP 3.2		<b>Mobilization and Site Setup</b>								
			Utility Markout	Verify utility locate has been performed for the work area prior to ground disturbance						
			Initial Site Survey	Ensure surveyor is licensed in the Commonwealth of Virginia						
				Verify excavation extents are staked						
				Verify existing site conditions are captured						
			Clearing	Ensure clearing is completed on access road pathway and around excavation/staging areas						
			E&S Control Installation	Ensure E&S controls are installed as described in SWPPP and in accordance with VESCH standards						
			Access Road Installation	Ensure access road is intalled as described in WP and shown in Site Plan						
WP 3.3		<b>Excavation</b>								
			Can Pit	Ensure initial excavation extents staked by surveyor						
				Ensure side slopes of excavation prevent sloughing and cave ins, if side slope material contains no debris it can be re-used as fill						

**TETRA TECH EC, INC.**  
**NAVY REMEDIAL ACTION CONTRACT (RAC VI)**  
**CONTRACT NO. N62470-13-D-8007**

Spec. Section	Paragraph No.	Definable Feature of Work	Sub-Task	Quality Objectives to be Verified	Preparatory Phase Report No.	Date	Initial Phase Report No.	Date	Follow-Up Phase Report No.	Date
				Ensure excavated material transferred to containment area with no spillage						
				Visually confirm all debris has been removed, notify Navy if debris extends beyond staked extents						
				Verify post-excavation survey is completed						
			Drum Disposal Area	Ensure initial excavation extents staked by surveyor						
				Ensure excavated material transferred to containment area with no spillage						
				Ensure excavation extends to surveyor's staked and is 6-inches deep						
				Verify post-excavation survey is completed						
WP 3.4		<b>Transportation and disposal</b>		Verify waste profile has been accepted by the disposal facility						
				Ensure haul vehicles are road worthy and have proper license, registration, and insurance						
				Ensure waste manifests are completed, certificates of disposal are received, and both are included in the Post-Removal Report						
WP 3.5		<b>Site Restoration</b>		Ensure backfill source is approved and only material from that source is used						
				Ensure fill placed in compacted lifts						
				Ensure all disturbed areas are returned to suitable conditions and seeded/strawed						
				Verify the final site survey is completed						
				Ensure a pre-final and final inspection are conducted						
WP 3.6		<b>Demobilization</b>		Ensure all equipment, materials, and temporary facilities are removed from the site						

## TESTING PLAN AND LOG

CONTRACT NUMBER			PROJECT TITLE AND LOCATION					CONTRACTOR			
NAVFAC MidLant RAC N62470-13-D-8007			NTCRA at AOC 7, WPNSTA Yorktown - CAX, Williamsburg, VA					Tetra Tech EC, Inc			
SPECIFICATION SECTION AND PARAGRAPH NUMBER	SCHEDULE ACTIVITY ID	TEST REQUIRED	ACCREDITED/ APPROVED LAB		SAMPLED BY	TESTED BY	LOCATION OF TEST		DATE COMPLETED	DATE FORWARDED TO CONTR. OFF.	REMARKS
			YES	NO			ON SITE	OFF SITE			
WP 3.1.1 and SAP		<b>Pre-Excavation Confirmation Sampling</b>									Collect discreet samples from the locations shown in the WP drawings and analyze at an approved laboratory for parameters shown in WP Table 3-1. Compare results to PRGs to determine if additional analysis is required.
WP 3.1.2		<b>Clean Fill Verification Sampling</b>									Collect one representative sample per type of material from each source and analyze at an approved laboratory for TAL Metals, TCL VOC/SVOC, Pesticide/Herbicide, PCBs, and TPH DRO/GRO. Results must be submitted to the Navy for approval prior to receiving material on site.
WP 3.1.3		<b>Waste Characterization Sampling</b>									Collect one representative sample from each excavation area and analyze at an approved laboratory for Full TCLP, R/C/I, PCBs, and TPH DRO/GRO. Results are used to determine suitable disposal facility/method.

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**APPENDIX D**  
**SAMPLING AND ANALYSIS PLAN**

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**SAP Worksheet #1 – Title and Approval Page**

**APPENDIX D**

**FINAL**

**SAMPLING AND ANALYSIS PLAN  
(Field Sampling Plan and Quality Assurance Project Plan)**

**July 2015**

**REMOVAL ACTION AT AOC-7  
NAVAL WEAPONS STATION YORKTOWN – CHEATHAM ANNEX  
WILLIAMSBURG, VIRGINIA**

**Prepared for:**

Department of the Navy  
Naval Facilities Engineering Command, Atlantic  
9742 Maryland Avenue  
Norfolk, VA 23511-3095

**Prepared by:**

Tetra Tech EC, Inc.  
5250 Challedon Drive  
Virginia Beach, Virginia 23462

**Prepared under:**

Contract No. N62470-13-D-8007  
DCN: 44659-WE35-15-0245  
CTO No. WE35

Review Signature:



\_\_\_\_\_  
Greg Joyce  
TtEC Quality Control Program Manager

July 24, 2015

Date

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## **EXECUTIVE SUMMARY**

Tetra Tech EC, Inc. (TtEC) has prepared this Sampling and Analysis Plan (SAP) to provide guidance on sampling, analysis, and quality control (QC) in support of Non-Time Critical Removal Action (NTCRA) at Area of Concern (AOC)-7 at Naval Weapons Station (WPNSTA) Yorktown – Cheatham Annex (CAX) located in Williamsburg, Virginia for the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Atlantic under a Remedial Action Contract, N62470-13-D-8007, Contract Task Order (CTO) WE35. The quality assurance (QA)/QC elements in this SAP were prepared in accordance with the U.S. Environmental Protection Agency (EPA) Uniform Federal Policy for Quality Assurance Project Plans (EPA 2005) and Requirements for Quality Assurance Project Plans, EPA QA/R-5, QAMS (EPA 2006a) to ensure that all data collected are precise, accurate, representative, complete, and comparable to meet their intended use.

The NTCRA at AOC-7 will include removal action activities for the Drum Disposal Area Hot Spot and Can Pit per the revised Statement of Work, dated September 22, 2014, and as described in the Engineering Evaluation/Cost Analysis (EE/CA) (CH2M HILL 2014b) and Action Memorandum (CH2M HILL 2014a). This SAP is an appendix to the Removal Action Work Plan (RAWP) and presents the sampling and analysis activities associated with this project.

The NTCRA will be performed in accordance with the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA), as amended, the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

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## **FIGURES**

Figure 1      Location Map

Figure 4      Pre-Excavation Sample Locations

## **APPENDICES**

Attachment 1      Laboratory DoD ELAP Accreditation

## Abbreviations and Acronyms

%D	percent difference
%R	percent recovery
µg/kg	micrograms per kilogram
A	Analytical
AOC	Area of Concern
Bgs	below ground surface
CA	corrective action
CAS	Chemical Abstracts Service
CAX	Cheatham Annex
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
COPC	constituents of potential concern
CSO	Caretaker Site Office
CTO	Contract Task Order
CCV	Continuing Calibration Verification
DL	Detection Limit
DoD	Department of Defense
DQA	data quality assessment
DQO	Data Quality Objective
EDD	electronic data deliverable
EE/CA	Engineering Evaluation/Cost Analysis
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
FIS	Fleet and Industrial Supply Center
g	gram
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatograph/Mass Spectrometer
ICAL	initial calibration
ICP	inductively coupled plasma
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
mL	milliliter
MS/MSD	matrix spike/ matrix spike duplicate
N/A	not applicable
NAVFAC	Naval Facilities Engineering Command
NAVY	United States Department of the Navy

## Abbreviations and Acronyms (Continued)

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEDD	Navy Electronic Data Deliverable
NTCRA	Non-Time Critical Removal Action
NIRIS	Naval Installation Restoration Information Solution
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCBs	polychlorinated biphenyls
PDF	portable document format
PDS	post-digestion spike
PM	Project Manager
PQCM	Project Quality Control Manager
PRG	preliminary remediation goal
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCPM	Quality Control Program Manager
QSM	Quality Systems Manual
R	Rejected
RAWP	Removal Action Work Plan
RPD	relative percent difference
RPM	Remedial Project Manager
RSD	relative standard deviation
S	Sampling
S&A	Sampling and Analytical
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SDG	sample delivery group
SI	Site Investigation
SIM	selective ion monitoring
SOP	Standard Operating Procedure
SVOCs	semivolatile organic compounds
TBD	to be determined
TtEC	Tetra Tech EC, Inc.
UFP	Uniform Federal Policy
µg/kg	micrograms per kilogram
VOA	volatile organic analysis
VOCs	Volatile Organic Compounds
WPNSTA	Naval Weapons Station
Y/N	yes/no

## SAP Worksheet #2 – SAP Identifying Information

**Site Name/Number:** Removal Action at AOC-7  
**Contractor Name:** Tetra Tech EC, Inc. (TtEC)  
**Contract Number:** N62470-13-D-8007  
**Contract Title:** Remedial Action Contract VI

1. This SAP was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Project Plans (EPA 2005) and (EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (EPA 2002).
2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).
3. This SAP is a project-specific SAP.
4. List dates of scoping sessions that were held.

Scoping Session	Date
Kick-off meeting with the Navy	November 3, 2014

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
None	

6. List organizational partners (stakeholders) and connection with lead organization: EPA Region III Office of Superfund Federal Facilities and Virginia Department of Environmental Quality Tidewater Region Office.
7. Lead organization: Navy
8. If any required SAP elements or required information is not applicable to the project or is provided elsewhere, then note the omitted SAP elements and provide an explanation for its exclusion below:
  - SAP Worksheet #8 (Special Personnel Training Requirements Table) is not applicable for this project as there are no special training requirements associated with sampling.
  - SAP Worksheet #13 (Secondary Data Criteria and Limitations Table) is not applicable for this project as secondary data evaluation is not required.
  - SAP Worksheet #21 (Project Sampling Standard Operating Procedure (SOP) References Table) is not applicable for this project since SOPs are not used and instead procedures are detailed in SAP Worksheet #14.
  - SAP Worksheet #22 (Field Equipment Calibration, Maintenance, Testing, and Inspection Table) is not applicable for this project since field equipment is not required.

## SAP Worksheet #2 – SAP Identifying Information (Continued)

SAP elements and required information that are not applicable to the project are noted below. An explanation is provided above and in the appropriate SAP worksheet(s), as necessary.

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
<b>A. Project Management</b>		
<i>Documentation</i>		
1	Title and Approval Page	
2	SAP Identifying Information	
3	Distribution List	
4	Project Personnel Sign-Off Sheet	
<i>Project Organization</i>		
5	Project Organizational Chart	
6	Communication Pathways	
7	Personnel Responsibilities and Qualifications Table	
8	Special Personnel Training Requirements Table	Not applicable
<i>Project Planning/Problem Definition</i>		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	
10	Problem Definition, Site History, and Background	
11	Site-Specific Project Quality Objectives	
12	Measurement Performance Criteria Table for Samples	
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	Not applicable
14	Summary of Project Tasks	
15	Reference Limits and Evaluation Table	
16	Project Schedule/Timeline Table	
<b>B. Measurement Data Acquisition</b>		
<i>Sampling Tasks</i>		
17	Sampling Design and Rationale	
18	Sampling Locations and Methods/ SOP Requirements Table Sampling Location Map(s)	
19	Analytical Methods/SOP Requirements Table	
20	Field Quality Control Sample Summary Table	
21	Project Sampling SOP References Table	Not applicable
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	Not applicable
<i>Analytical Tasks</i>		
23	Analytical SOPs Analytical SOP References Table	
24	Analytical Instrument Calibration Table	

**SAP Worksheet #2 – SAP Identifying Information (Continued)**

<b>UFP-QAPP Worksheet #</b>	<b>Required Information</b>	<b>Crosswalk to Related Information</b>
<b>25</b>	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	
<i>Sample Collection</i>		
<b>26</b>	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	
<b>27</b>	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	
<i>Quality Control Samples</i>		
<b>28</b>	QC Samples Table Screening/Confirmatory Analysis Decision Tree	
<i>Data Management Tasks</i>		
<b>29</b>	Project Documents and Records Table	
<b>30</b>	Analytical Services Table Analytical and Data Management SOPs	
<b>C. Assessment Oversight</b>		
<b>31</b>	Planned Project Assessments Table Audit Checklists	
<b>32</b>	Assessment Findings and Corrective Action Responses Table	
<b>33</b>	QA Management Reports Table	
<b>D. Data Review</b>		
<b>34</b>	Verification (Step I) Process Table	
<b>35</b>	Validation (Steps IIa and IIb) Process Table	
<b>36</b>	Validation (Steps IIa and IIb) Summary Table	
<b>37</b>	Usability Assessment	

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### SAP Worksheet #3 – Distribution List

The following distribution list represents the recipients of the final version of this SAP.

<b>Name of SAP Recipients</b>	<b>Title/Role</b>	<b>Organization</b>	<b>Telephone Number</b>	<b>Mailing and E-mail Address</b>
Mr. Scott Park	Remedial Project Manager (RPM)	NAVFAC MIDLANT	(757) 341-0481	Building N-26, Room 3300 9742 Maryland Ave. Norfolk, VA 23511-3095 scott.park@navy.mil
Mr. Jerry Hoover	Project Manager (PM)	EPA Region III Office of Superfund Federal Facilities	(215) 814-2077	1650 Arch Street Philadelphia, PA 19103-2029 hoover.gerald@epamail.epa.gov
Mr. Wade Smith	PM	Commonwealth of Virginia Department of Environmental Quality Office of Remediation Programs	(804) 698-4125	629 East Main Street Richmond, VA 23219 [Mailing address: P.O. Box 1105, Richmond VA 23218] wade.smith@deq.virginia.gov
Mr. Mark Pisarcik	PM	TtEC	(757) 518-8491 x136 (757) 544-2085 (cell)	5250 Challedon Drive Virginia Beach, Virginia 23462 mark.pisarcik@tetrattech.com
Mr. Greg Joyce	Quality Control Program Manager (QCPM)	TtEC	(360) 780-0371	1230 Columbia Street, Suite 750 San Diego, California 92101 greg.joyce@tetrattech.com
To be determined (TBD)	Project Quality Control Manager (PQCM)	TtEC	TBD	TBD
Ms. Lisa Bienkowski	Program Chemist	TtEC	(949) 809-5028	17885 Von Karman Avenue, Suite 500 Irvine, California 92614 lisa.bienkowski@tetrattech.com
Ms. Sabina Sudoko	Project Chemist	TtEC	(949) 809-5022	17885 Von Karman Avenue, Suite 500 Irvine, California 92614 sabina.sudoko@tetrattech.com

### SAP Worksheet #3 – Distribution List (Continued)

<b>Name of SAP Recipients</b>	<b>Title/Role</b>	<b>Organization</b>	<b>Telephone Number</b>	<b>Mailing and E-mail Address</b>
Ms. Andrea Colby	Laboratory Project Manager	Accutest Florida	(386) 615-8479	4405 Vineland Road Suite C-15 Orlando, FL 32811 andreas@accutest.com

### SAP Worksheet #4 – Project Personnel Sign-Off Sheet

The key personnel listed below will read the final version of this SAP. Their signature and date will be filled in below and included in the project file.

Name	Organization/Title/Role	Signature/E-mail Receipt	SAP Section Reviewed	Date SAP Read
Mr. Mark Pisarcik	TtEC/PM		Entire document	
TBD	TtEC/PQCM		Entire document	
Ms. Sabina Sudoko	TtEC/Project Chemist		Entire document	
Ms. Andrea Colby	Accutest Florida/Laboratory Project Manager		Entire document	
TBD <sup>a</sup>	TtEC/Field Crews		Entire document	

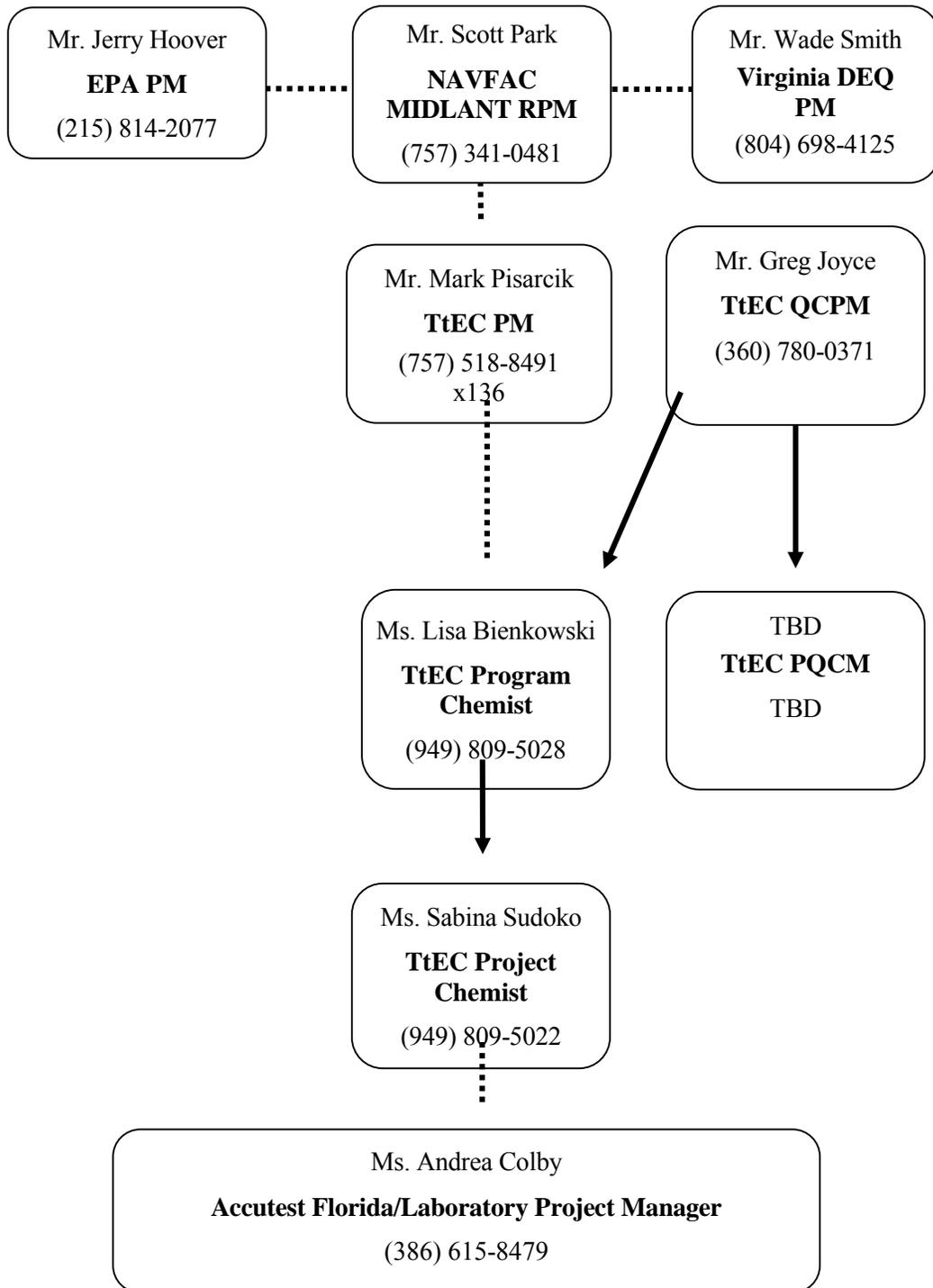
**Notes:**

<sup>a</sup> Field crews include multiple persons and vary from project to project. Therefore, persons identified by the project quality control manager (PQCM) will read the SAP and sign this worksheet as required.

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### SAP Worksheet #5 – Project Organizational Chart

Lines of Authority ————— Lines of Communication



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## SAP Worksheet #6 – Communication Pathways

<b>Communication Drivers</b>	<b>Responsible Affiliation</b>	<b>Name</b>	<b>Phone Number</b>	<b>Procedure</b>
Point of contact for significant changes or corrective actions	NAVFAC MIDLANT RPM	Mr. Scott Park	(757) 341-0481	If significant changes or corrective actions occur during the project, the RPM will notify the regulators involved in this project.
Point of contact for contractor quality issues	TtEC QCPM	Mr. Greg Joyce	(360) 780-0371	The QCPM is responsible for overseeing program quality control QC, including construction and analytical data acquisition. The QCPM has the authority to suspend project activities if quality standards are not maintained.
Project management	TtEC PM	Mr. Mark Pisarcik	(757) 518-8491 x136	If changes are necessary, the PM is responsible for communicating the changes via phone and/or e-mail to the project staff and is authorized to stop work, if necessary.
SAP review	TtEC QCPM	Mr. Greg Joyce	(360) 780-0371	The SAP will be written by the Program Chemist and reviewed by the QCPM prior to submittal to the Navy for review.
Notification of nonusable analytical results	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	If significant problems are identified by the laboratory or the project team that impact the usability of the data (i.e., the data are rejected or data quality objectives are not met), the Program Chemist will notify the PM who will notify the NAVFAC MIDLANT RPM.
Coordination of laboratory supplies for field sampling activities	TtEC Project Chemist	Ms. Sabina Sudoko	(949) 809-5022	The Project Chemist will contact the laboratory to provide all necessary sample containers and appropriate shipping materials (such as coolers and bubble wrap) to be delivered on-site prior to commencement of field sampling activities and throughout the course of the project.

### SAP Worksheet #6 – Communication Pathways (Continued)

<b>Communication Drivers</b>	<b>Responsible Affiliation</b>	<b>Name</b>	<b>Phone Number</b>	<b>Procedure</b>
Reporting laboratory data quality issues or analytical corrective actions	Accutest Florida Project Manager	Ms. Andrea Colby	(615) 345-1115	All data quality issues will be reported in writing to the Project Chemist and Program Chemist within 24 hours. Any corrective actions will be documented and verified by the Program Chemist who will notify in writing the QCPM and PM. The PM will notify the NAVFAC MIDLANT RPM.
Field corrective actions	TtEC PQCM	TBD	TBD	All field corrective actions will be documented in writing by the PQCM who will notify in writing the QCPM and PM. The PM will notify the NAVFAC MIDLANT RPM.
Release of analytical results	TtEC Project Chemist	Ms. Sabina Sudoko	(949) 809-5022	The Project Chemist will review analytical results to verify that the requirements in this SAP have been met prior to releasing the data to the project team for evaluation.
SAP procedure revision during field activities	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	The Program Chemist (or designee) will prepare a Field Change Request for any changes in sampling or analytical procedures that occur due to conditions in the field.
SAP addendums	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	Significant changes to the SAP such as additional scope of work that is not covered in this SAP may require that the Program Chemist prepare an addendum to this SAP.

**SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table**

Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Scott Park	RPM	NAVFAC MIDLANT	<ul style="list-style-type: none"> <li>• Performing project management for the Navy</li> <li>• Ensuring that the project scope of work requirements are fulfilled</li> <li>• Overseeing the project cost and schedule</li> <li>• Providing formal technical direction to the TtEC project team, as needed</li> <li>• Acting as lead interface with agencies</li> </ul>
Mr. Mark Pisarcik	PM	TtEC	<ul style="list-style-type: none"> <li>• Coordinating work activities of subcontractors and TtEC personnel, and ensuring that all personnel adhere to the administrative and technical requirements of the project</li> <li>• Monitoring and reporting the progress of work, and ensuring that the project deliverables are completed on time and within project budget</li> <li>• Monitoring the budget and schedule, and notifying the NAVFAC MIDLANT RPM of any changes that may require administrative actions</li> <li>• Ensuring adherence to the quality requirements of the contract, project scope of work, and the QC plans</li> <li>• Ensuring that all work meets the requirements of the technical specifications and complies with applicable codes and regulations</li> <li>• Ensuring that all work activities are conducted in a safe manner in accordance with the Site-Specific Safety and Health Plan, United States Army Corps of Engineers’ Safety and Health Requirements (Engineer Manual 385-1-1), and all applicable Occupational Safety and Health Administration regulations</li> <li>• Serving as the primary contact between the Navy and TtEC for actions and information related to the work and including appropriate TtEC technical personnel in the decision-making</li> <li>• Coordinating satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports</li> <li>• Suspending project activities if standards are not maintained</li> </ul>

**SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)**

Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Greg Joyce	QCPM	TtEC	<ul style="list-style-type: none"> <li>• Establishing and maintaining the Quality Program</li> <li>• Overseeing program QC, including construction and analytical data acquisition</li> <li>• Working directly with the PM and the Navy to ensure implementation of the program QC Plans</li> <li>• Acting as a focal point for coordination for quality matters across all projects and resolving quality issues</li> <li>• Suspending project activities if quality standards are not maintained</li> <li>• Interfacing with the Navy on quality-related items</li> <li>• Conducting field QC audits to ensure project plans are being followed</li> <li>• Performing reviews of audit and surveillance reports conducted by others</li> <li>• Approving any FCRs and reviewing the SAP and any addendums to the SAP</li> </ul>
Ms. Lisa Bienkowski	Program Chemist	TtEC	<ul style="list-style-type: none"> <li>• Developing the SAP and any addendums to the SAP</li> <li>• Implementing contract requirements for data collection</li> <li>• Supporting projects as the technical lead for data collection and analysis</li> <li>• Evaluating and selecting qualified laboratories</li> <li>• Providing oversight of the laboratories with regards to deliverable requirements and monitoring performance of the laboratories</li> <li>• Overseeing preparation of the Navy Electronic Data Deliverable (NEDD) deliverable for analytical results for upload to the Naval Installation Restoration Information Solution (NIRIS) website</li> <li>• Coordinating submittal of analytical data packages to Navy Administrative Record</li> </ul>

**SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)**

Name	Title/Role	Organizational Affiliation	Responsibilities
Ms. Sabina Sudoko	Project Chemist	TtEC	<ul style="list-style-type: none"> <li>• Tracking samples sent to laboratory to ensure laboratory receipt of samples and proper login of samples for analysis</li> <li>• Tracking receipt of analytical results</li> <li>• Reviewing analytical results against requirements in this SAP prior to distribution to the project team</li> <li>• Coordinating upload of electronic data to database</li> </ul>
Ms. Andrea Colby	Laboratory Project Manager	Accutest Florida	<ul style="list-style-type: none"> <li>• Coordinating with the Project Chemist regarding sample receipt and discrepancies</li> <li>• Ensuring samples are logged in according to the chain-of-custody (COC)</li> <li>• Checking that analytical results are produced in accordance with this SAP and providing those results to the Project Chemist at the expected turnaround time</li> <li>• Ensuring that analytical data packages and electronic deliverable requirements are in accordance with SAP Worksheet #29</li> </ul>

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## **SAP Worksheet #8 – Special Personnel Training Requirements Table**

Special personnel training is not required for this project.

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## SAP Worksheet #9 – Project Scoping Session Participants Sheet

<b>Project Name:</b> Removal Action at AOC-7 <b>Projected Date(s) of Sampling:</b> 2015 <b>Project Manager:</b> Mr. Mark Pisarcik		<b>Site Name:</b> AOC-7 <b>Site Location:</b> Naval Weapons Station Yorktown – Cheatham Annex, Williamsburg, VA		
<b>Date of Session:</b> November 3, 2014 <b>Scoping Session Purpose:</b> Kick-off meeting to discuss scope of project with Navy. The purpose of this meeting was to develop a mutual understanding of the work to be performed and the planning documents to be developed and submitted.				
Name	Title	Affiliation	Phone #	E-mail Address
Mr. Scott Park	RPM	NAVFAC MIDLANT	(757) 341-0481	scott.park@navy.mil
Mr. Mark Pisarcik	PM	TtEC	(757) 518-8491 x136	mark.pisarcik@tetrattech.com
John Dormi	PM	Sealaska	(757) 461-3930	john.dormi@sealaska.com
Jennifer Podbesek	Environmental Manager	Cheatham Annex	(757) 887-4086	jennifer.podbesek@navy.mil
Stephanie Sawyer	PM	CH2MHILL	(757) 671-6273	stephanie.sawyer@ch2m.com

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## **SAP Worksheet #10 – Problem Definition**

The main problem defined for this project is: Based on analytical results from previous investigations, potential unacceptable risk to human health and the environment posed by exposure to metals and hexavalent chromium in surface soil and subsurface debris exist at AOC-7. Therefore, a NTCRA will be conducted for the removal of contaminated soil and debris at the site.

### **Location and Background Information**

CAX is located on the site of the former Penniman Shell Loading Plant, a large powder and shell loading facility operated by the DuPont Company during World War I, which closed in 1918 and was dismantled shortly thereafter. Between 1923 and 1943, the property was used for farming or remained idle until CAX was commissioned in 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities and to serve as an assembly and overseas shipping point during World War II. The facility is divided into two separate parcels, with the larger parcel situated along the banks of the York River. Almost all of the activities at CAX (administration, training, maintenance, support, and housing) take place in the larger parcel. The smaller parcel is used mainly as a watershed protection area. In 1987, CAX was designated as the Hampton Roads Navy Recreational Complex. In 1998, control of CAX was transferred from Fleet and Industrial Supply Center (FISC) to WPNSTA Yorktown. The current mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel.

AOC-7 is located along a nature trail that runs through a wooded area located behind the CAX warehouse area and south of one of the southern fingers of the Cheatham Pond. AOC-7 was identified in April 2004 when the Navy discovered two small debris disposal areas in this wooded area. One of the debris disposal areas, referred to as the Drum Disposal Area, contained several empty, rusted pails and two empty, rusted 55-gallon drums on the ground surface. The other debris disposal area, referred to as the Can Pit, is an approximately 30-foot by 20-foot pit open to a depth of 4 feet below ground surface (bgs). The Can Pit contained numerous empty, 5-gallon rusted cans labeled “tetrachloroethane” on the ground surface within the pit. A pile of soil, assumed to be the soil excavated to create the Can Pit, is immediately adjacent to the Can Pit. The Drum Disposal Area and Can Pit are two separate areas within AOC-7. They are located on opposite ends of AOC-7, roughly 300 feet apart. There are no wetlands or surface water bodies located within AOC-7. The topography generally slopes northeast towards Cheatham Pond, and surface runoff is expected to flow northeast to the Pond as well. A facility and site location map is included as Figure 1.

### **Summary of Previous Activities**

In March and April 2006, a housekeeping effort was performed to remove the surface debris from the Drum Disposal Area and Can Pit. Following the housekeeping removal effort, all recovered surface debris from AOC-7 was transported offsite for proper disposal (Shaw 2006). The Can Pit was encircled with an orange safety fence and left open following the housekeeping removal effort.

A Site Inspection (SI) conducted at AOC-7 in October 2008 identified potential unacceptable risk to human health and the environment posed by exposure to contaminants in surface soil and subsurface debris. No surface debris remains at AOC-7. Some subsurface debris is still present

## **SAP Worksheet #10 – Problem Definition (Continued)**

within the Can Pit. No debris was identified in test pits dug outside of the Can Pit or Drum Disposal Area. The human health and ecological risk screenings conducted as part of the SI concluded there is potential risk to human or ecological receptors. Potential unacceptable human health risks were identified from exposure to inorganics in surface soil at both areas of AOC-7. In addition, the Tier 1 Partnering Team has made an educated assumption that subsurface debris within the Can Pit presents the potential for future impacts to site media, and is, therefore, assumed to pose a potential future risk to human health. An unacceptable carcinogenic risk is also associated with arsenic and chromium (assumed to be in the hexavalent form). Potentially unacceptable ecological risks were identified from exposure to lead and manganese in surface soil within the Can Pit and lead, manganese, and zinc in surface soil at a localized hotspot in surface soil at the Drum Disposal Area.

In 2014, an EE/CA (CH2MHILL 2014b) for a NTCRA at AOC-7 was completed to evaluate removal action alternatives. Following review of the EE/CA and agreement for the selection of EE/CA Alternative 3 by the Tier I Partnering Team, an Action Memorandum (CH2MHILL 2014a) was prepared to document approval of the NTCRA at AOC-7 for addressing surface soil and subsurface debris.

## **SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements**

The Data Quality Objectives (DQOs) specify project objectives, data collection boundaries and limitations, the most appropriate type of data to collect, and the level of acceptable decision error. The quality and quantity of data required to implement environmental removal actions are also defined.

The DQOs, as defined through the seven-step process (EPA 2006b), are as follows:

### **1. State the problem**

The main problem defined for this project is: Based on analytical results from previous investigations, potential unacceptable risk to human health and the environment posed by exposure to metals and hexavalent chromium in surface soil and subsurface debris exist at AOC-7. Therefore, a NTCRA will be conducted for the removal of contaminated soil and debris at the site.

Sampling and analysis at the Can Pit is not required since visual confirmation of encountering native soil will determine successful completion of that excavation. Therefore, the Can Pit area will not be discussed throughout the remainder of this SAP.

In addition to the remedial activities at AOC-7, this SAP also includes the chemical sampling and analysis requirements associated with importing clean fill material.

### **2. Identify the goal of the study**

- a. Are the 25 foot pre-excavation soil sample results for the Drum Disposal Area Hot Spot below the criteria listed in Worksheet #15?
- b. Are the clean fill soil sample results below the criteria listed in Worksheet #15?

### **3. Identify information inputs**

Analytical results generated during this project for the Drum Disposal Area Hot Spot and clean fill material.

### **4. Define the boundaries of the study**

Temporal boundaries are not applicable to this project.

The surface soil within the Drum Disposal Area Hot Spot will be excavated to a depth of 6 inches bgs. The lateral extent of the excavation area will be determined during the pre-excavation sampling event and will be staked and surveyed prior to beginning excavation. See Figure 4 for pre-excavation sampling locations.

### **5. Develop the analytic approach**

- a. Pre-excavation samples will be collected at eight locations extending radially from previous sample point CAA07-SO03 at 25, 30, and 35 foot distances. The 25 foot samples will be analyzed first. If the 25 foot sample results are below the criteria in SAP Worksheet #15, then that sample location will define the lateral boundary for the excavation. If the 25

## **SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements (Continued)**

foot sample results are above the criteria listed in SAP Worksheet #15, then the Navy will be notified of scope growth since the Navy RFP SOW estimated a 25 foot radius for excavation and disposal and the additional 30 and 35 foot samples will be analyzed at the Navy discretion.

- b. If the clean fill soil sample results are below the criteria listed in Worksheet #15, then the results will be presented to the Tier I Partnering Team for review prior to use. Otherwise, an additional source will be identified and sampled.

### **6. Specify performance or acceptance criteria**

Field crews will review this SAP prior to collection of samples and sign off on SAP Worksheet #4. Sampling and analytical performance or acceptance criteria are specified in SAP Worksheets #12, 15, and 28.

### **7. Develop the plan for obtaining data**

Pre-excavation soil samples will be collected from 0-6 inches bgs at 25, 30, and 35 foot distances extending radially from previous sample point CAA07-SO03. Eight discrete samples will be collected at each distance, one in each of the cardinal and intermediate directions (i.e. north, northeast, east, southeast, etc.) as shown on Figure 4.

For clean fill material, one composite soil sample will be collected per source.

**SAP Worksheet #12 – Measurement Performance Criteria Table for Samples**

**PRE-EXCAVATION SOIL SAMPLES**

<b>QC Sample</b>	<b>Analytical Group</b>	<b>Frequency</b>	<b>Data Quality Indicators</b>	<b>Measurement Performance Criteria</b>	<b>QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&amp;A)</b>
Field Duplicate	Metals Hexavalent chromium	1 per 10 samples	Precision	Relative percent difference (RPD) ≤30% when detected concentrations > limit of quantitation	S&A
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Metals Hexavalent chromium	1 per 20 samples	Precision/ Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	S&A

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## **SAP Worksheet #13 – Secondary Data Criteria and Limitations Table**

This worksheet not applicable to this project as described in Worksheet #2.

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## **SAP Worksheet #14 – Summary of Project Tasks**

### **PROJECT TASKS**

A summary of activities performed by TtEC for this project include the following:

- Preparatory activities and meetings
- Sampling activities
- Mobilization and site preparations
- Excavation of soil and debris
- Transportation and disposal of waste
- Backfill
- Site restoration and demobilization.

### **SAMPLE COLLECTION PROCEDURES**

Prior to performing pre-excavation soil sampling, the sample locations will be marked. Personnel will don a new pair of disposable nitrile gloves before collecting samples at each location. A new, disposable plastic scoop or equivalent will be used to collect a soil grab sample from 0 to 6 inches bgs to place into a four ounce glass jar for each sample location. The jar will be filled completely with no headspace.

Backfill samples (from an off-site source) will also be collected using a disposable scoop or equivalent. A five-point composite soil sample will be collected for all of the analyses listed in the Sample Details Table (Worksheet #18, 19, 20, and 30) except for the VOCs and TPH-GRO which will be collected from the first location of the five-point composite (since volatile analyses should not be composited). For VOC and TPH-GRO analysis, soil will be collected using a 5 gram Terra Core sampler or equivalent to dispense a 5 gram aliquot into containers listed in Worksheet #19. Soil for the rest of the analyses will be collected by taking two scoops from each of the five points and placing that soil into a gallon size ziplock bag to mix thoroughly. Then soil from that bag will be transferred into two eight ounce glass jars to fill jars completely with no headspace.

All samples will be labeled and packaged in accordance with Worksheet #27.

### **DATA MANAGEMENT PROCEDURES**

Field surveying data, logbooks, and COC records will be maintained in the TtEC project file. The field crews will e-mail a copy of the COC records to the TtEC Project Chemist the day any samples are collected and shipped to the laboratory.

Accutest Florida will e-mail analytical results within the turnaround time to the Project Chemist. This submittal will include analytical results and basic QC results (method blanks, laboratory control sample (LCS), and laboratory duplicate as applicable). The Project Chemist will review prior to distribution to the project team. Following this submittal, the laboratory will submit deliverables as described in Worksheet #29.

## **SAP Worksheet #14 – Summary of Project Tasks (Continued)**

Survey data will be recorded by on-site personnel for all samples locations. Horizontal control information for upload into the database will be captured in the State Plane Coordinate System in feet and vertical control standards will be in mean sea level. The analytical results and survey data will be submitted to the NIRIS website as applicable for this project.

**SAP Worksheet #15 – Reference Limits and Evaluation Table**

**Matrix:** Soil

**Analytical Group:** Metals (Pre-excavation samples)

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Arsenic	7440-38-2	6	PRG	0.1	0.1	0.25	0.5
Lead	7439-92-1	120	PRG	0.05	0.05	0.2	1
Manganese	7439-96-5	340	PRG	0.025	0.025	0.05	0.75
Zinc	7440-66-6	120	PRG	0.15	0.15	0.25	1

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Hexavalent Chromium (Pre-excavation and clean fill samples)

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Hexavalent chromium	18540-29-9	120	PRG	2	2	1.5	0.86

### SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

**Matrix:** Soil

Analytical Group: VOCs (Clean fill samples)

Analyte	CAS Number	Project Action Limit micrograms per kilogram (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
1,1,1-Trichloroethane	71-55-6	640,000	a	5	5	2	1.3
1,1,2,2-Tetrachloroethane	79-34-5	600	a	5	5	2	1.1
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	76-13-1	910,000	a	5	5	3.5	1.5
1,1,2-Trichloroethane	79-00-5	150	a	5	5	2	1.3
1,1-Dichloroethane	75-34-3	3,600	a	5	5	2	1
1,1-Dichloroethene	75-35-4	23,000	a	5	5	2	1.3
1,2-Dibromoethane (EDB)	106-93-4	36	a	5	5	2	1
1,2-Dibromo-3-chloropropane	96-12-8	5.3	a	5	5	3.5	1.4
1,2-Dichlorobenzene	95-50-1	180,000	a	5	5	2	1
1,2-Dichloroethane	107-06-2	460	a	5	5	2	1
1,2-Dichloropropane	78-87-5	1,000	a	5	5	2	1
1,2,3-Trichlorobenzene	87-61-6	4,900	a	5	5	2	1
1,2,4-Trichlorobenzene	120-82-1	5,800	a	5	5	2	1
1,4-Dichlorobenzene	106-46-7	2,600	a	5	5	2	1
1,4-Dioxane	123-91-1	5,300	a	200	200	100	59
2-Butanone	78-93-3	2,700,000	a	25	25	10	8.5
2-Hexanone	591-78-6	20,000	a	25	25	15	8.2
4-Methyl-2-pentanone	108-10-1	530,000	a	25	25	10	5.4
Acetone	67-64-1	6,100,000	a	50	50	25	15

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit micrograms per kilogram (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Benzene	71-43-2	1,200	<sup>a</sup>	5	5	2	1
Bromochloromethane	74-97-5	15,000	<sup>a</sup>	5	5	2	1
Bromodichloromethane	75-27-4	290	<sup>a</sup>	5	5	2	1
Bromoform	75-25-2	67,000	<sup>a</sup>	5	5	2	1
Bromomethane (methyl bromide)	74-83-9	680	<sup>a</sup>	5	5	3.5	2.2
Carbon disulfide	75-15-0	77,000	<sup>a</sup>	5	5	3.5	1.5
Carbon tetrachloride	56-23-5	650	<sup>a</sup>	5	5	2	1
Chlorobenzene	108-90-7	50	<sup>a</sup>	5	5	2	1
Chloroethane	75-00-3	1,400,000	<sup>a</sup>	5	5	3.5	2
Chloroform	67-66-3	320	<sup>a</sup>	5	5	2	1
Chloromethane (methyl chloride)	74-87-3	11,000	<sup>a</sup>	5	5	3.5	2
cis-1,2-Dichloroethene	156-59-2	16,000	<sup>a</sup>	5	5	2	1
cis-1,3-Dichloropropene	10061-01-5	1,800	<sup>a</sup>	5	5	2	1
Cyclohexane	110-82-7	120,000	<sup>a</sup>	5	5	2	1
Dibromochloromethane	124-48-1	730	<sup>a</sup>	5	5	2	1
Dichlorodifluoromethane (Freon-12)	75-71-8	8,700	<sup>a</sup>	5	5	3.5	1.4
Ethylbenzene	100-41-4	50	<sup>a</sup>	5	5	2	1
Isopropylbenzene (cumene)	98-82-8	190,000	<sup>a</sup>	5	5	2	1
Methyl acetate	79-20-9	7,800,000	<sup>a</sup>	25	25	20	9.8
Methyl tert-butyl ether	1634-04-4	47,000	<sup>a</sup>	5	5	2	1.2
Methylene chloride	75-09-2	35,000	<sup>a</sup>	10	10	5	4
Styrene	100-42-5	100	<sup>a</sup>	5	5	2	1

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit micrograms per kilogram (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Tetrachloroethene	127-18-4	8,100	<sup>a</sup>	5	5	2	1.6
Toluene	108-88-3	50	<sup>a</sup>	5	5	2	1
trans-1,2-Dichloroethene	156-60-5	160,000	<sup>a</sup>	5	5	2	1
trans-1,3-Dichloropropene	10061-02-6	1,800	<sup>a</sup>	5	5	2	1
Trichloroethene	79-01-6	410	<sup>a</sup>	5	5	2	1
Trichlorofluoromethane (Freon-11)	75-69-4	73,000	<sup>a</sup>	5	5	3.5	1.8
Vinyl chloride	75-01-4	59	<sup>a</sup>	5	5	2	1.6
m,p-Xylene	N/A	55,000	<sup>a</sup>	10	10	4	1.1
o-Xylene	95-47-6	65,000	<sup>a</sup>	5	5	2	1
Xylenes (reported as total instead of m,p, and o isomers)	1330-20-7	50	<sup>a</sup>	15	15	6	2.1

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** SVOCs (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
1,1'-Biphenyl	92-52-4	4,700	a	170	170	33	19
1,2,4,5-Tetrachlorobenzene	95-94-3	1,800	a	170	170	33	17
2,3,4,6-Tetrachlorophenol	58-90-2	20,000	a	170	170	33	17
2,4,5-Trichlorophenol	95-95-4	4,000	a	170	170	33	17
2,4,6-Trichlorophenol	88-06-2	6,200	a	170	170	33	17
2,4-Dichlorophenol	120-83-2	18,000	a	170	170	33	17
2,4-Dimethylphenol	105-67-9	120,000	a	170	170	67	17
2,4-Dinitrophenol	51-28-5	12,000	a	830	830	500	170
2,4-Dinitrotoluene	121-14-2	1,700	a	170	170	33	17
2,6-Dinitrotoluene	606-20-2	360	a	170	170	33	17
2-Chloronaphthalene	91-58-7	630,000	a	170	170	33	19
2-Chlorophenol	95-57-8	7,000	a	170	170	33	17
2-Methylnaphthalene	91-57-6	23,000	a	170	170	33	17
2-Methylphenol (o-cresol)	95-48-7	310,000	a	170	170	33	17
2-Nitroaniline	88-74-4	61,000	a	170	170	67	21
2-Nitrophenol	88-75-5	7,000	a	170	170	33	17
3,3'-Dichlorobenzidine	91-94-1	1,200	a	170	170	67	17

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
3/4-Methylphenol (m/p-cresol)	108-39-4/106-44-5	310,000	a	170	170	67	33
4-Chloro-3-methylphenol	59-50-7	620,000	a	170	170	33	17
4-Chloroaniline	106-47-8	2,700	a	170	170	33	17
4-Nitroaniline	100-01-6	25,000	a	170	170	67	17
4-Nitrophenol	100-02-7	7,000	a	830	830	330	130
4,6-Dinitro-2-methylphenol	534-52-1	490	a	330	330	130	67
Acetophenone	98-86-2	780,000	a	170	170	33	18
Atrazine	1912-24-9	2,300	a	170	170	33	18
Benzaldehyde	100-52-7	780,000	a	830	830	330	170
Bis(2-Chloroethoxy)methane	111-91-1	18,000	a	170	170	33	17
Bis(2-Chloroethyl)ether	111-44-4	230	a	170	170	33	17
Bis(2-Chloroisopropyl) ether or 2,2'-Oxybis(1-chloropropane)	108-60-1	4,900	a	170	170	33	17
Bis(2-Ethylhexyl)phthalate	117-81-7	38,000	a	330	330	120	33
Butylbenzylphthalate	85-68-7	280,000	a	170	170	67	33
Caprolactam	105-60-2	3,100,000	a	170	170	67	17
Dibenzofuran	132-64-9	7,200	a	170	170	33	17
Diethylphthalate	84-66-2	100,000	a	330	330	120	33
Dimethylphthalate	131-11-3	200,000	a	170	170	67	33
Di-n-butylphthalate	84-74-2	200,000	a	330	330	120	33
Di-n-octylphthalate	117-84-0	62,000	a	170	170	67	33
Hexachlorobenzene	118-74-1	330	a	170	170	33	17

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Hexachlorobutadiene	87-68-3	6,200	<sup>a</sup>	170	170	67	17
Hexachlorocyclopentadiene	77-47-4	10,000	<sup>a</sup>	170	170	67	33
Hexachloroethane	67-72-1	4,300	<sup>a</sup>	170	170	67	17
Isophorone	78-59-1	560,000	<sup>a</sup>	170	170	33	17
Nitrobenzene	98-95-3	5,100	<sup>a</sup>	170	170	33	17
N-nitrosodiphenylamine	86-30-6	20,000	<sup>a</sup>	170	170	67	17
N-nitroso-di-n-propylamine	621-64-7	76	<sup>a</sup>	170 <sup>b</sup>	170	33	17
Pentachlorophenol	87-86-5	990	<sup>a</sup>	830	830	330	130
Phenol	108-95-2	30,000	<sup>a</sup>	170	170	33	17

### SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

**Matrix:** Soil

**Analytical Group:** SVOCs SIM \* (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Acenaphthene	83-32-9	20,000	a	33	33	17	13
Acenaphthylene	208-96-8	350,000	a	33	33	17	13
Anthracene	120-12-7	100	a	33	33	17	8.3
Benzo(a)anthracene	56-55-3	150	a	6.7	6.7	3.3	1.7
Benzo(a)pyrene	50-32-8	15	a	6.7	6.7	3.3	1.7
Benzo(b)fluoranthene	205-99-2	150	a	6.7	6.7	3.3	1.7
Benzo(k)fluoranthene	207-08-9	1,500	a	6.7	6.7	3.3	1.7
Chrysene	218-01-9	15,000	a	6.7	6.7	3.3	1.7
Dibenzo(a,h)anthracene	53-70-3	15	a	6.7	6.7	3.3	1.7
Fluoranthene	206-44-0	100	a	33	33	17	8.3
Fluorene	86-73-7	30,000	a	33	33	17	13
Indeno(1,2,3-cd)pyrene	193-39-5	150	a	6.7	6.7	3.3	1.7
Naphthalene	91-20-3	100	a	33	33	17	13
Phenanthrene	85-01-8	100	a	33	33	17	8.3
Pyrene	129-00-0	100	a	33	33	17	8.3

\*Analytes will be reported using a lesser dilution to achieve LOQs listed above.

### SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

**Matrix:** Soil

Analytical Group: Pesticides (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
4,4'-DDD	72-54-8	210	a	3.3	3.3	0.83	0.67
4,4'-DDE	72-55-9	210	a	3.3	3.3	0.83	0.6
4,4'-DDT	50-29-3	210	a	3.3	3.3	0.83	0.63
alpha-BHC	319-84-6	85	a	1.7	1.7	0.83	0.51
Aldrin	309-00-2	31	a	1.7	1.7	0.83	0.51
alpha-Chlordane	5103-71-9	1,800	a	1.7	1.7	0.83	0.57
gamma-chlordane	5103-74-2	1,800	a	1.7	1.7	0.83	0.58
beta-BHC	319-85-7	300	a	1.7	1.7	0.83	0.52
delta-BHC	319-86-8	300	a	1.7	1.7	0.83	0.57
Dieldrin	60-57-1	33	a	1.7	1.7	0.83	0.62
Endosulfan I	959-98-8	37,000	a	1.7	1.7	0.83	0.46
Endosulfan II	33213-65-9	37,000	a	1.7	1.7	0.83	0.53
Endosulfan sulfate	1031-07-8	37,000	a	3.3	3.3	0.83	0.6
Endrin	72-20-8	1,800	a	3.3	3.3	0.83	0.6
Endrin aldehyde	7421-93-4	1,800	a	3.3	3.3	0.83	0.52
Endrin ketone	53494-70-5	1,800	a	3.3	3.3	0.83	0.59
gamma-BHC (Lindane)	58-89-9	560	a	1.7	1.7	0.83	0.56
Heptachlor	76-44-8	120	a	1.7	1.7	0.83	0.47
Heptachlor epoxide	1024-57-3	59	a	1.7	1.7	0.83	0.58

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Methoxychlor	72-43-5	31,000	<sup>a</sup>	3.3	3.3	1.7	0.63
Toxaphene	8001-35-2	480	<sup>a</sup>	83	83	41	33

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** PCBs (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Aroclor 1016	12674-11-2	400	a	17	17	8.3	6.6
Aroclor 1221	11104-28-2	150	a	17	17	13	8.3
Aroclor 1232	11141-16-5	150	a	17	17	13	8.3
Aroclor 1242	53469-21-9	240	a	17	17	8.3	6.6
Aroclor 1248	12672-29-6	240	a	17	17	8.3	6.6
Aroclor 1254	11097-69-1	110	a	17	17	8.3	6.6
Aroclor 1260	11096-82-5	240	a	17	17	8.3	6.6

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Herbicides (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
2,4,5-T	93-76-5	62,000	a	3.3	3.3	1.7	0.77
2,4,5-TP (Silvex)	93-72-1	49,000	a	3.3	3.3	1.7	0.77
2,4-D	94-75-7	69,000	a	33	33	17	9.9
2,4-DB	94-82-6	49,000	a	33	33	17	8.7
Dalapon	75-99-0	180,000	a	170	170	66	33
Dicamba	1918-00-9	180,000	a	3.3	3.3	1.7	1.4
Dinoseb	88-85-7	6,200	a	83	83	33	17
MCPA	94-74-6	3,100	a	3300	3300	1700	1300
MCPP	93-65-2	6,200	a	3300	3300	1700	1400

### SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

**Matrix:** Soil

**Analytical Group:** Explosives (Clean fill samples)

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
1,3,5-Trinitrobenzene	99-35-4	220,000	a	100	100	50	40
1,3-Dinitrobenzene	99-65-0	620	a	100	100	50	40
2,4,6-Trinitrotoluene	118-96-7	3,600	a	100	100	50	40
2-Amino-4,6-dinitrotoluene	35572-78-2	15,000	a	100	100	50	40
2-Nitrotoluene	88-72-2	3,200	a	100	100	50	40
3-Nitrotoluene	99-08-1	620	a	100	100	50	40
4-Amino-2,6-dinitrotoluene	19406-51-0	15,000	a	100	100	50	40
4-Nitrotoluene	99-99-0	25,000	a	100	100	50	40
HMX	2691-41-0	380,000	a	100	100	50	40
Nitroglycerin	55-63-0	620	a	1000 <sup>b</sup>	1000	500	250
PETN	78-11-5	12,000	a	1000	1000	500	250
RDX	121-82-4	6,000	a	100	100	50	40
Tetryl	479-45-8	12,000	a	100	100	50	40

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** TPH-GRO/DRO/ORO (Clean fill samples)

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
TPH-GRO (C6-C10)	N/A	10 (total TPH)	a	5	5	2.5	2.5
TPH-DRO (C10-C28)	N/A		a	6.3	6.3	5	3.8
TPH-ORO (C28-C40)	N/A		a	6.3	6.3	5	3.8

### SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

**Matrix:** Soil

**Analytical Group:** Metals (Clean fill samples)

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Aluminum	7429-90-5	See Table 1	<sup>a</sup>	1.75	1.75	2.5	10
Antimony	7440-36-0	See Table 1	<sup>a</sup>	0.065	0.065	0.25	1
Arsenic	7440-38-2	See Table 1	<sup>a</sup>	0.1	0.1	0.25	0.5
Barium	7440-39-3	See Table 1	<sup>a</sup>	0.05	0.05	0.1	10
Beryllium	7440-41-7	See Table 1	<sup>a</sup>	0.025	0.025	0.05	0.25
Cadmium	7440-43-9	See Table 1	<sup>a</sup>	0.025	0.025	0.05	0.2
Calcium	7440-70-2	See Table 1	<sup>a</sup>	2.5	2.5	5	250
Chromium	7440-47-3	See Table 1	<sup>a</sup>	0.05	0.05	0.1	0.5
Cobalt	7440-48-4	See Table 1	<sup>a</sup>	0.025	0.025	0.05	2.5
Copper	7440-50-8	See Table 1	<sup>a</sup>	0.05	0.05	0.1	1.25
Iron	7439-89-6	See Table 1	<sup>a</sup>	0.85	0.85	2.5	15
Lead	7439-92-1	See Table 1	<sup>a</sup>	0.05	0.05	0.2	1
Magnesium	7439-95-4	See Table 1	<sup>a</sup>	1.8	1.8	5	250
Manganese	7439-96-5	See Table 1	<sup>a</sup>	0.025	0.025	0.05	0.75
Mercury	7439-97-6	See Table 1	<sup>a</sup>	0.0042	0.0042	0.017	0.042
Nickel	7440-02-0	See Table 1	<sup>a</sup>	0.025	0.025	0.05	2
Potassium	7440-09-7	See Table 1	<sup>a</sup>	10	10	25	500
Selenium	7782-49-2	See Table 1	<sup>a</sup>	0.12	0.12	0.25	1
Silver	7440-22-4	See Table 1	<sup>a</sup>	0.041	0.041	0.1	0.5

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Sodium	7440-23-5	See Table 1	<sup>a</sup>	25	25	100	500
Thallium	7440-28-0	See Table 1	<sup>a</sup>	0.055	0.055	0.25	0.5
Vanadium	7440-62-2	See Table 1	<sup>a</sup>	0.025	0.025	0.05	2.5
Zinc	7440-66-6	See Table 1	<sup>a</sup>	0.15	0.15	0.25	1

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Cyanide (Clean fill samples)

Analyte	CAS Number	Project Action Limit (mg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific limits		
					LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)
Cyanide	57-12-5	See Table 1	<sup>a</sup>	0.12	0.12	0.06	0.06

**Notes:**

Soil analytical results will be reported as dry-weight corrected. Non-detected results will be reported by the laboratory with a “U” qualifier at the LOD. Results between the DL and LOQ will be reported as “J” flagged as estimated.

- <sup>a</sup> The project action limits for clean fill material are from CH2MHILL as agreed upon by the CAX Tier I Partnering Team. For metals, see table 1 that follows for multiple comparison criteria that will be used.
- <sup>b</sup> The project action limit listed is below the project quantitation limit goal or laboratory LOQ but is above the laboratory DL. Since results detected between the DL and LOQ will be reported as estimated with a J flag, the data can still be evaluated against the project action limit.

**SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)**

**Table 1: Clean Fill Criteria for Metals (All units in mg/kg)**

<b>Chemical Name</b>	<b>CLEAN CAX 95% UTL BKG SB</b>	<b>CLEAN CAX 95% UTL BKG SS</b>	<b>Residential Soil RSL</b>	<b>BTAG (EPA Region 3 Eco Protective Backfill Value)</b>	<b>Backfill Screening Criterion*</b>	<b>Backfill Screening Criterion, Including Background</b>
Aluminum	13,000	12,200	7,700	pH < 5.5	7,700	13,000
Antimony	--	11.0	3.1	2.7	2.7	11.0
Arsenic	5.54	6.36	0.67	18	0.67	6.36
Barium	84.5	52.9	1,500	330	330	330
Beryllium	0.52	0.587	16	40	16	16
Cadmium	--	1.50	7	3.6	3.6	3.6
Calcium	2,380	2,290	--	--	--	2,380
Chromium	33.7	18.2	0.3	260	0.3	33.7
Cobalt	5.18	9.93	2.3	13	2.3	9.93
Copper	3.17	4.25	310	70	70	70.0
Cyanide	2.70	--	2.1	5	2.1	2.70
Iron	32,000	19,900	5,500	2,000	2,000	32,000
Lead	8.79	17.4	400	110	110	110
Magnesium	1,120	1,070	--	--	--	1,120
Manganese	176	324	180	220	180	324
Mercury	0.14	0.111	2.3	0.00051	0.00051	0.14
Nickel	17.6	9.52	150	38	38	38.0
Potassium	901	708	--	--	--	901
Selenium	0.64	0.51	39	0.5	0.5	0.64
Silver	1.10	2.10	39	42	39	39.0
Sodium	811	521	--	--	--	811
Thallium	--	--	0.078	1.00	0.078	0.078
Vanadium	48.3	27.9	39	78	39	48.3
Zinc	28	26.5	2,300	120	120	120

\* Backfill Screening Criterion if the background UTL is exceeded

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## **SAP Worksheet #16 – Project Schedule/Timeline Table**

The project schedule is presented in Appendix A of the RAWP.

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## SAP Worksheet #17 – Sampling Design and Rationale

Sampling activities shall include pre-excavation sampling at the Drum Disposal Area Hot Spot, clean fill verification sampling, and waste disposal characterization sampling. Waste characterization sampling is discussed in Section 5 of the RAWP.

It is anticipated that all sampling activities will occur prior to full mobilization such that the Drum Disposal Area is fully delineated, clean fill is approved, and landfill waste acceptance approval is obtained prior to commencing removal activities. Sampling and analysis at the Can Pit is not required since visual confirmation of encountering native soil will determine successful completion of that excavation.

### Pre-Excavation Sampling

Pre-excavation samples will be collected to delineate the horizontal extent of excavation required at the Drum Disposal Area. The vertical extent of the Drum Disposal Area excavation has been delineated to six inches below ground surface. Samples will be analyzed by an off-site laboratory for the constituents of potential concern (COPCs) at AOC-7. The COPCs and their respective preliminary remediation goals (PRGs) are shown below.

COPC	PRG	Reference
Arsenic	6 mg/kg	Maximum Background Soil Concentration
Chromium (hexavalent)	18.3 mg/kg	Maximum Background Soil Concentration
Lead	120 mg/kg	Ecological Soil Screening Concentration
Manganese	340 mg/kg	Maximum Background Soil Concentration
Zinc	120 mg/kg	Ecological Soil Screening Concentration

Pre-excavation soil samples will be collected from 0-6 inches bgs at 25, 30, and 35 foot distances extending radially from previous sample point CAA07-SO03. Eight discrete samples will be collected at each distance, one in each of the cardinal and intermediate directions (i.e. north, northeast, east, southeast, etc.) as shown on Figure 4. All samples will be shipped to an off-site laboratory; however, only the samples at the 25-foot distance will initially be analyzed. If any of the initial samples do not meet the PRGs, the next sample in that direction will be analyzed upon direction from the Navy.

### Clean Fill Verification Sampling

Clean fill verification sampling will be performed prior to importing any backfill materials to the site. One discrete sample will be collected for each type of material (i.e. common fill and topsoil) from each potential source and shipped to an off-site laboratory for analysis. The clean fill verification samples will be analyzed for the parameters indicated in SAP Worksheet #18.

## **SAP Worksheet #17 – Sampling Design and Rationale (Continued)**

Upon receipt of the laboratory analytical report for each clean fill verification sample, a borrow source assessment report will be prepared and submitted to the Tier I Partnering Team for review. The report will include: type of material; proposed use of material; name and address of borrow source; quantity available; physical description and origin of the representative material; and a data summary table comparing the results to the established maximum concentrations agreed upon by the Tier I Partnering Team and provided in SAP Worksheet #15. Borrow material will not be imported to the site until approved by the Tier I Partnering Team.

**SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table**

**PRE-EXCAVATION SOIL SAMPLES**

Sampling Location/ ID Number	Matrix	Depth (inches)	Analytical Group	Number of Samples	Sampling SOP Reference
CAA07-S003-01A CAA07-S003-01B CAA07-S003-01C CAA07-S003-02A CAA07-S003-02B CAA07-S003-02C CAA07-S003-03A CAA07-S003-03B CAA07-S003-03C CAA07-S003-04A CAA07-S003-04B CAA07-S003-04C CAA07-S003-05A CAA07-S003-05B CAA07-S003-05C CAA07-S003-06A CAA07-S003-06B CAA07-S003-06C CAA07-S003-07A CAA07-S003-07B CAA07-S003-07C CAA07-S003-08A CAA07-S003-08B CAA07-S003-08C	Soil	0-6	Metals Hexavalent chromium	One sample per location	SAP Worksheet #14

**SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table (Continued)**

**CLEAN FILL SOIL (OFF-SITE SOURCE)**

Sampling Location/ ID Number	Matrix	Depth (feet)	Analytical Group	Number of Samples	Sampling SOP Reference
BACKFILL-01 and sequential number for additional material sources	Soil	Not applicable	VOCs SVOCs SVOCs SIM Pesticides PCBs Herbicides Explosives TPH-GRO/DRO/ORO Metals Hexavalent chromium Cyanide	One sample per source	SAP Worksheet #14

**SAP Worksheet #19 – Analytical SOP Requirements Table**

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers	Sample Volume	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
<b>PRE-EXCAVATION SOIL SAMPLES</b>						
Soil	Metals	EPA 6010C SOP MET100	One 4 ounce glass jar	2 grams	4 ± 2 °C	180 days
Soil	Hexavalent chromium	EPA 7196A SOP GN171		15 grams	4 ± 2 °C	30 days to prep/7 days to analyze
<b>CLEAN FILL SAMPLES</b>						
Soil	VOCs	EPA 8260B SOP MS005	Two 40-milliliter (mL) VOA vial with deionized water; one 40-mL VOA vial with methanol	5 grams soil per vial	4 ± 2 °C	48 hours to freeze/14 days to analyze
Soil	TPH-GRO	EPA 8015C SOP GC010	Two 40-milliliter (mL) VOA vial with deionized water; one 40-mL VOA vial with methanol	5 grams soil per vial	4 ± 2 °C	48 hours to freeze/14 days to analyze
Soil	SVOCs	EPA 8270D SOP MS006	Two 8 ounce glass jars	30 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	SVOCs SIM	EPA 8270D SIM SOP MS008		30 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	Pesticides	EPA 8081B SOP GC015		30 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	PCBs	EPA 8082A SOP GC014		30 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	Herbicides	EPA 8151A SOP GC031		30 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	Explosives	EPA 8330B SOP GC034		10 grams	4 ± 2 °C	14 days to extract/40 days to analyze
Soil	TPH-DRO/ORO	EPA 8015C SOP GC011		30 grams	4 ± 2 °C	14 days to extract/40 days to analyze

<b>Matrix</b>	<b>Analytical Group</b>	<b>Analytical and Preparation Method/SOP Reference</b>	<b>Containers</b>	<b>Sample Volume</b>	<b>Preservation Requirements (chemical, temperature, light protected)</b>	<b>Maximum Holding Time (preparation/analysis)</b>
Soil	Metals	EPA 6010C SOP MET100 EPA 7471B SOP MET105		2 grams	4 ± 2 °C	180 days
				0.5 grams	4 ± 2 °C	Mercury is 28 days
Soil	Hexavalent chromium	EPA 7196A SOP GN171		15 grams	4 ± 2 °C	30 days to prep/7 days to analyze
Soil	Cyanide	EPA 9012B SOP GN115		1 gram	4 ± 2 °C	14 days to analysis

**SAP Worksheet #20 – Field Quality Control Sample Summary Table**

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/MSDs	No. of Source Blanks	No. of Equipment Blanks	No. of VOA Trip Blanks	Total No. of Samples to Lab
<b>PRE-EXCAVATION SOIL SAMPLES</b>								
Soil	Metals	24	2	2	0	0	0	28
Soil	Hexavalent chromium	24	2	2	0	0	0	28
<b>CLEAN FILL SAMPLES</b>								
Soil	VOCs	1	0	0	0	0	0	1
Soil	SVOCs and SVOCs SIM	1	0	0	0	0	0	1
Soil	SVOCs SIM	1	0	0	0	0	0	1
Soil	Pesticides	1	0	0	0	0	0	1
Soil	PCBs	1	0	0	0	0	0	1
Soil	Herbicides	1	0	0	0	0	0	1
Soil	Explosives	1	0	0	0	0	0	1
Soil	TPH-GRO/DRO/ORO	1	0	0	0	0	0	1
Soil	Metals	1	0	0	0	0	0	1
Soil	Hexavalent chromium	1	0	0	0	0	0	1
Soil	Cyanide	1	0	0	0	0	0	1

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## **SAP Worksheet #21 – Project Sampling SOP References Table**

This worksheet is not applicable to this project as described in Worksheet #2.

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## **SAP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection Table**

This worksheet is not applicable to this project as described in Worksheet #2.

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**SAP Worksheet #23 – Analytical SOP References Table**

<b>Lab SOP Number <sup>a</sup></b>	<b>Title, Revision Date, and/or Number</b>	<b>Definitive or Screening Data</b>	<b>Matrix and Analytical Group</b>	<b>Instrument</b>	<b>Organization Performing Analysis</b>	<b>Modified for Project Work? (Y/N)</b>
SOP MS005	GC/MS Volatiles by SW846 Method 8260B Revision May 2014	Definitive	Soil VOCs	GC/MS	Accutest Florida	N
SOP MS006	GC/MS Semivolatiles by SW846 Method 8270D, Revision May 2014	Definitive	Soil SVOCs	GC/MS	Accutest Florida	N
SOP MS008	GC/MS Semivolatiles SW846 Method 8270D SIM, Revision May 2014	Definitive	Soil SVOCs SIM	GC/MS	Accutest Florida	
SOP GC015	Analysis of Chlorinated Pesticides By Gas Chromatography, Electron Capture Detector SW846 8081B, Revision September 2014	Definitive	Soil Pesticides	GC/ECD	Accutest Florida	N
SOP GC014	Analysis of Polychlorinated Biphenyls by Gas Chromatography, Electron Capture Detector SW846 8082A, Revision September 2014	Definitive	Soil PCBs	GC/ECD	Accutest Florida	N
SOP GC031	Analysis of Chlorinated Herbicides By Gas Chromatography, Electron Capture Detector SW846 8151A, Revision September 2014	Definitive	Soil Herbicides	GC/ECD	Accutest Florida	N
SOP GC034	Analysis of Nitroaromatics, Nitramines, and Nitrate Esters by HPLC Method 8330B, Revision September 2014	Definitive	Soil Explosives	HPLC, UV	Accutest Florida	N
SOP GC010	Analysis of Gasoline Range Organics by Gas Chromatography using Flame Ionization Detector, Revision September 2014	Definitive	Soil TPH-GRO	GC/FID	Accutest Florida	N
SOP GC011	Analysis of Diesel Range Organics by Gas Chromatography using Flame Ionization Detector, Revision September 2014	Definitive	Soil TPH- DRO/ORO	GC/FID	Accutest Florida	N

**SAP Worksheet #23 – Analytical SOP References Table (Continued)**

<b>Lab SOP Number <sup>a</sup></b>	<b>Title, Revision Date, and/or Number</b>	<b>Definitive or Screening Data</b>	<b>Matrix and Analytical Group</b>	<b>Instrument</b>	<b>Organization Performing Analysis</b>	<b>Modified for Project Work? (Y/N)</b>
SOP MET100	Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) Technique, SW846 6010B/EPA 200.7, Revision September 2014	Definitive	Soil Metals	ICP-AES	Accutest Florida	N
SOP MET105	Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique Methods SW846 7471B, Revision August 2013	Definitive	Soil Mercury	Cold vapor analyzer	Accutest Florida	N
SOP GN115	Cyanide, Total, Revision September 2014	Definitive	Soil Total Cyanide	Lachat QuikChem	Accutest Florida	N

**Notes:**

<sup>a</sup> Analytical SOP revision number and date listed are current as of the date this SAP was published.

**SAP Worksheet #24 – Analytical Instrument Calibration Table**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
GC/MS	Initial Calibration (ICAL), minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, instrument change (new column, source cleaning, etc.), when continuing calibration verification (CCV) is out of criteria.	Follow requirements of Table 4 Appendix A, DoD QSM 5.0	Repeat calibration	Accutest Florida Analyst	SOP MS005
GC/MS	Initial Calibration Verification (ICV)	Once after each initial calibration	The percent recovery (%R) must be within 80-120% for all target compounds	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL.	Accutest Florida Analyst	SOP MS005
GC/MS	CCV	Daily, before sample analysis, and every 12 hours of analysis time	The percent recovery (%R) must be within 80-120% for all target compounds	If the %D $\geq$ 20% and sample results are <Project QL, report with qualification. Otherwise, reanalyze all samples analyzed since the last successful CCV. Follow procedures in App. A of DoD QSM 5.0. Repeat ICAL if necessary	Accutest Florida Analyst	SOP MS005

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
GC/MS	ICAL, minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, instrument change (new column, source cleaning, etc.), when continuing calibration verification (CCV) is out of criteria.	Follow requirements of Table 4 Appendix A, DoD QSM 5.0	Repeat calibration	Accutest Florida Analyst	SOP MS006, MS008
GC/MS	ICV	Once after each initial calibration	The percent recovery (%R) must be within 80-120% for all target compounds	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL.	Accutest Florida Analyst	SOP MS006, MS008
GC/MS	CCV	Daily, before sample analysis, and every 12 hours of analysis time, at the end of analytical lbatch	The percent recovery (%R) must be within 80-120% for all target compounds	If the %D $\geq$ 20% and sample results are <Project QL, report with qualification. Otherwise, reanalyze all samples analyzed since the last successful CCV. Follow procedures in App. A of DoD QSM 5.0. Repeat ICAL if necessary	Accutest Florida Analyst	SOP MS006, MS008

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
GC/ECD	ICAL, minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, major instrument change, when CV does not meet criteria	Follow requirements of Table 1 Appendix A, DoD QSM 5.0	Repeat ICAL and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Accutest Florida Analyst	SOP GC014, GC015
GC/ECD	ICV	Immediately following ICAL	All project analytes within $\pm 20\%$ of expected value from the ICAL	Correct problem, rerun ICV. If that fails, repeat ICAL.	Accutest Florida Analyst	SOP GC014, GC015
GC/ECD	CCV	After every 10 samples; If calibration curve previously analyzed, analyze daily before samples.	$\%D \leq 20$ for both the quantitation and confirmation columns	If the $\%D \geq 20\%$ and sample results are $<$ Project QL, report with qualification. Otherwise, reanalyze all samples analyzed since the last successful CCV. Follow procedures in App. A of DoD QSM 5.0. Repeat ICAL if necessary	Accutest Florida Analyst	SOP GC014, GC015

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
GC/ECD for herbicides	ICAL, minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, major instrument change, when CV does not meet criteria	Follow requirements of Table 1 Appendix A, DoD QSM 5.0	Repeat ICAL and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Accutest Florida Analyst	SOP GC031
GC/ECD for herbicides	ICV	Immediately following ICAL	All project analytes within $\pm 20\%$ of expected value from the ICAL	Correct problem, rerun ICV. If that fails, repeat ICAL.	Accutest Florida Analyst	SOP GC031
GC/ECD for herbicides	CCV	After every 10 samples; If calibration curve previously analyzed, analyze daily before samples.	$\%D \leq 20$ for both the quantitation and confirmation columns	If the $\%D \geq 20\%$ and sample results are $<$ Project QL, report with qualification. Otherwise, reanalyze all samples analyzed since the last successful CCV. Follow procedures in App. A of DoD QSM 5.0. Repeat ICAL if necessary	Accutest Florida Analyst	SOP GC031

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
HPLC	ICAL, minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, major instrument change, when CV does not meet criteria	One of the options below: Option 1: RSD for each analyte $\leq 15\%$ ; Option 2: linear least squares regression: $r \geq 0.995$ or $r^2 \geq 0.99$ ; Option 3: non-linear regression: $r^2 \geq 0.99$ (6 points shall be used for second order)	Repeat ICAL and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Accutest Florida Analyst	SOP GC034
HPLC	ICV	Immediately following ICAL	All project analytes within $\pm 20\%$ of expected value from the ICAL	Correct problem, rerun ICV. If that fails, repeat ICAL.	Accutest Florida Analyst	SOP GC034
HPLC	CCV	After every 10 samples; If calibration curve previously analyzed, analyze daily before samples.	$\%D \leq 20$ for both the quantitation and confirmation columns	If the $\%D \geq 20\%$ and sample results are $<$ Project QL, report with qualification. Otherwise, reanalyze all samples analyzed since the last successful CCV. Follow procedures in App. A of DoD QSM 5.0. Repeat ICAL if necessary. Applies to both primary and confirmation columns.	Accutest Florida Analyst	SOP GC034

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
GC/FID	ICAL, minimum 5 points. Accutest routinely analyzes 6 points.	Instrument receipt, major instrument change, when CV does not meet criteria	One of the options below: Option 1: RSD for each analyte $\leq 20\%$ ; Option 2: linear least squares regression: $r \geq 0.995$ or $r^2 \geq 0.99$ ; Option 3: non-linear regression: $r^2 \geq 0.99$ (6 points shall be used for second order)	Repeat ICAL and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Accutest Florida Analyst	SOP GC010, GC011
GC/FID	ICV	Immediately following ICAL	All project analytes within $\pm 20\%$ of expected value from the ICAL	Correct problem, rerun ICV. If that fails, repeat ICAL.	Accutest Florida Analyst	SOP GC010, GC011
GC/FID	CCV	After every 10 samples; If calibration curve previously analyzed, analyze daily before samples.	$\%D \leq 20$ for both the quantitation and confirmation columns	Evaluate the samples: If the $\%D \geq 15\%$ and sample results are $<$ Project QL, narrate. If $\%D \pm 15\%$ only on one channel, narrate. If $\%D \pm 15\%$ for closing CV, and is likely a result of matrix interference, narrate. Otherwise, reanalyze all samples back to last acceptable CV.	Accutest Florida Analyst	SOP GC010, GC011

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
ICP-AES	ICAL	Daily	If more than one calibration standard is used, correlation coefficient ( $r \geq 0.995$ ( $r^2 > 0.990$ ))	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards.	Accutest Florida Analyst	SOP MET100
ICP-AES	ICV	Once after each ICAL, before beginning a sample run.	The %R must be within 90-110% of true value for all analytes.	Do not use results for failing elements unless the ICV > 110% and the sample results are not detect. Investigate and correct the problem.	Accutest Florida Analyst	SOP MET100
ICP-AES	CCV	At the beginning and end of each run sequence and every 10 samples	90-110% of True Values	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Accutest Florida Analyst	SOP MET100

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
Cold vapor analyzer	ICAL	Instrument receipt, major instrument change, at the start of each day	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared >0.990 (R>0.995)	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards.	Accutest Florida Analyst	SOP MET105
Cold vapor analyzer	ICV	Once after each ICAL, before beginning a sample run.	The %R must be within 90-110% of true value for mercury.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Accutest Florida Analyst	SOP MET105
Cold vapor analyzer	CCV	At beginning and end of each run sequence and every 10 samples	90-110% of True Value	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Accutest Florida Analyst	SOP MET105

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
Spectrophotometer	ICAL	<ul style="list-style-type: none"> <li>_ Every 30 days or as required when ICV/CCV exceeds limits, whichever comes first.</li> <li>_ Minimum 5 standards and a calibration blank</li> <li>_ Low standard at the RL/LOQ level</li> </ul>	Linear fit with a correlation coefficient (r) of $\geq 0.995$ ( $r^2 \geq 0.990$ )	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards.	Accutest Florida Analyst	SOP GN171
Spectrophotometer	ICV	Alternate source standard to be analyzed after every calibration curve and at the beginning of every analytical sequence	Value of second source for all analytes(s) within $\pm 10\%$ of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Accutest Florida Analyst	SOP GN171
Spectrophotometer	CCV	After every 10-client samples and at the end of the analytical sequence	Within $\pm 10\%$ of true value.	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Accutest Florida Analyst	SOP GN171

**SAP Worksheet #24 – Analytical Instrument Calibration Table (Continued)**

<b>Instrument</b>	<b>Calibration Procedure</b>	<b>Frequency of Calibration</b>	<b>Acceptance Criteria</b>	<b>Corrective Action (CA)</b>	<b>Person Responsible for CA</b>	<b>SOP Reference</b>
Lachat QuikChem	ICAL	5 point and a blank calibration; Correlation coefficient $\geq 0.995$ or R-Squared $\geq 0.990$ .	5 point and a blank calibration; Correlation coefficient $\geq 0.995$ .	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards.	Accutest Florida Analyst	SOP GN115
Lachat QuikChem	ICV	Once after each ICAL, before beginning a sample run.	The %R must be within 90-110% of true value for mercury.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Accutest Florida Analyst	SOP GN115
Lachat QuikChem	CCV	At beginning and end of each run sequence and every 10 samples	90-110% of True Value	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Accutest Florida Analyst	SOP GN115

**SAP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table**

<b>Instrument Equipment</b>	<b>Maintenance Activity</b>	<b>Testing Activity</b>	<b>Inspection Activity</b>	<b>Frequency</b>	<b>Acceptance Criteria</b>	<b>Corrective Action</b>	<b>Responsible Person</b>	<b>SOP Reference</b>
GC/MS for VOCs	Check pressure and gas supply daily. Bake out trap and column, manual tune if BFB not in criteria, change septa as needed, cut column as needed, change trap as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Ion source, injector liner, column, column flow, purge lines, purge flow, trap	Before ICAL and/or as necessary.	Acceptable Tune	Correct the problem and repeat tune check	Accutest Florida Analyst	SOP MS005
GC/MS for SVOCs or SVOCs SIM	Check pressure and gas supply daily. Manual tune if DFTPP not in criteria, change septa as needed, change liner as needed, cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Ion source, injector liner, column, column flow	Before ICAL and/or as necessary	Acceptable Tune	Correct the problem and repeat tune check	Accutest Florida Analyst	SOP MS006, MS008
GC/ECD	Check pressure and gas supply daily. Change septa and/or liner as needed, replace or cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Injector liner, septa, column, column flow.	Before ICAL and/or as necessary.	Acceptable calibration or CCV	Correct the problem and repeat calibration or CCV	Accutest Florida Analyst	SOP GC014, GC015

**SAP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (Continued)**

<b>Instrument Equipment</b>	<b>Maintenance Activity</b>	<b>Testing Activity</b>	<b>Inspection Activity</b>	<b>Frequency</b>	<b>Acceptance Criteria</b>	<b>Corrective Action</b>	<b>Responsible Person</b>	<b>SOP Reference</b>
GC/ECD for herbicides	Check pressure and gas supply daily. Change septa and/or liner as needed, replace or cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Injector liner, septa, column, column flow.	Before ICAL and/or as necessary.	Acceptable calibration or CCV	Correct the problem and repeat calibration or CCV	Accutest Florida Analyst	SOP GC031
HPLC	Check pressure and gas supply daily – change when <200psi, change analytical column as needed, change mobile phase when insufficient for run or contamination, change inlet filters as needed for contamination.	Dinitrotoluenes and Nitroglycerin	Check pump pressure, check for leaks, check for adequate mobile phase.	Prior to initial calibration or as necessary.	CCV $\leq$ 20% difference.	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Accutest Florida Analyst	SOP GC034
GC/FID	Check pressure and gas supply daily. Bake out column, change septa, liner, seal as needed, cut column as needed.	Liner, seal, septum, column	Prior to initial calibration or as necessary	Percent difference $\leq$ 20%	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data	Check pressure and gas supply daily. Bake out column, change septa, liner, seal as needed, cut column as needed.	Accutest Florida Analyst	SOP GC010, GC011

**SAP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (Continued)**

<b>Instrument Equipment</b>	<b>Maintenance Activity</b>	<b>Testing Activity</b>	<b>Inspection Activity</b>	<b>Frequency</b>	<b>Acceptance Criteria</b>	<b>Corrective Action</b>	<b>Responsible Person</b>	<b>SOP Reference</b>
ICP-AES	Clean torch assembly and spray chamber when discolored or when degradation in data quality is observed. Clean nebulizer, check argon, replace peristaltic pump tubing as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Torch, nebulizer chamber, pump, pump tubing	Before ICAL and as necessary	Acceptable calibration or CCV	Correct the problem and repeat calibration or CCV	Accutest Florida Analyst	SOP MET100
Cold vapor analyzer	Replace peristaltic pump tubing, replace mercury lamp, replace drying tube, clean optical cell and/or clean liquid/gas separator as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Tubing, sample probe, optical cell	Before ICAL and as necessary	Acceptable calibration or CCV	Correct the problem and repeat calibration or CCV	Accutest Florida Analyst	SOPMET105
Hex chrome	Checking cuvette for cracks and deposits	Hex Chrome	Lamp replacement, Cuvette cleaning	Frequency determined by passing calibration	CCV < 10% difference.	Repeat maintenance activity of remove from service	Accutest Florida Analyst	SOP GN171
Lachat	Flush/replace tubing	Cyanide	Tubing, peristaltic pump, lamp, detector optical cell	As needed	CCV < 10% difference.	Repeat maintenance activity of remove from service	Accutest Florida Analyst	SOP GN115

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## SAP Worksheet #26 – Sample Handling System

### Sample Handling System

<b>SAMPLE COLLECTION, PACKAGING, AND SHIPMENT</b>
Sample Collection (Personnel/Organization): Sampler/TtEC
Sample Packaging (Personnel/Organization): Sampler/TtEC
Coordination of Shipment (Personnel/Organization): Sampler/TtEC
Type of Shipment/Carrier: Commercial carrier
<b>SAMPLE RECEIPT AND ANALYSIS</b>
Sample Receipt (Personnel/Organization): Sample Custodian/Accutest Florida
Sample Custody and Storage (Personnel/Organization): Sample Custodian/ Accutest Florida
Sample Preparation (Personnel/Organization): Sample preparation personnel/ Accutest Florida
Sample Determinative Analysis (Personnel/Organization): Analyst/ Accutest Florida
<b>SAMPLE ARCHIVING</b>
Field Sample Storage (No. of days from sample collection): 45 calendar days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 30 calendar days
Biological Sample Storage (No. of days from sample collection): Not applicable to this project
<b>SAMPLE DISPOSAL/ARCHIVE</b>
Personnel/Organization: Sample Custodian/ Accutest Florida
Number of Days from Analysis: 90 calendar days from sample receipt

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## **SAP Worksheet #27 – Sample Custody Requirements Table**

An overriding consideration for data resulting from laboratory analyses is the ability to demonstrate that the data are legally defensible, i.e., that the samples were obtained from the locations stated and that they reached the laboratory without alteration. To accomplish this, evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal will be documented through the COC record. A sample is considered to be in custody if the following conditions have been observed:

- In actual possession or in view of the person who collected the samples
- Locked in a secure area
- Placed in an area restricted to authorized personnel

The COC record lists each sample and the individuals performing the sample collection, shipment, and receipt. The COC record will be the controlling document to ensure that the sample custody is maintained. Each time the sample custody is transferred, the former custodian will sign the COC on the \_Relinquished By\_ line, and the new custodian will sign the COC on the \_Received By\_ line. The date, time, and project or company affiliation will accompany each signature. When a commercial carrier is used to ship samples to the laboratory, the waybill number and carrier name (i.e., FedEx or UPS) will be recorded on the COC. The shipping container will be secured with two custody seals, thereby allowing for custody to be maintained by the shipping personnel until receipt by the laboratory.

Sample custody will be the responsibility of sampling personnel from the time of sample collection until the samples are accepted by the laboratory. Thereafter, the laboratory performing the analysis will maintain custody. The sample custodian will sign the COC, inventory each shipment, and note any discrepancies on the sample login form. The laboratory will immediately notify the TtEC Project Chemist of any discrepancies. The laboratory will have a system for tracking samples consistent with the Quality Systems Manual (QSM) (DoD 2013).

In addition to providing a custody exchange record for the samples, the COC record serves as a formal request for sample analyses. The COC records will be completed, signed, and distributed as follows:

- The original copy sent to the laboratory along with the samples
- A copy retained on-site for inclusion in the project files
- A copy e-mailed to the Project Chemist on a daily basis to allow tracking of samples sent to laboratories to confirm laboratory receipt of samples

### **SAMPLE NUMBERING**

The sample number will be recorded in the field logbook, on the labels, and on the COC record at the time of sample collection. A complete description of the sample and sampling conditions will be recorded in the field logbook and referenced using the unique sample identification number. Samples will be uniquely designated using a numbering system as indicated in SAP Worksheet #18.

## **SAP Worksheet #27 – Sample Custody Requirements Table (Continued)**

### **SAMPLE PACKAGING**

All glass containers will be wrapped with bubble wrap (if transported by Fedex). Samples will be shipped in coolers. Each cooler will be shipped with a temperature blank. A temperature blank is a container filled with tap water and stored in the cooler during sample collection and transportation. The sample cooler will be lined with a plastic bag. Double-bagged ice will be added inside the plastic bag at the bottom of the cooler, one layer of sample containers will be placed on the ice, and more double-bagged ice will be placed on top of the containers. This will be repeated until the cooler is filled with ice as the top layer in the cooler. Sample cooler drain spouts will be taped from the inside and outside of the cooler to prevent any leakage.

For FedEx delivery, the COC record will include the air bill number, and the “Received By” box will be labeled with “Fedex”. The COC record will be sealed in a double-resealable bag and then taped to the inside of the sample cooler lid. The cooler will be taped shut with strapping tape. Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipment. The pouch for the air bill will be placed on the cooler and secured with clear tape. The air bill will be completed for priority overnight delivery and placed in the pouch. If multiple coolers are being shipped, the original air bill will be placed on the cooler with the COC record, and copies of the air bill will be placed on the other coolers. The number of packages should be included on each air bill (1 of 2, 2 of 2). Saturday deliveries, if required, should be coordinated with the laboratory in advance via the Project Chemist, and field sampling personnel or their designee must ensure that Saturday delivery stickers are placed on each cooler by Fedex.

## SAP Worksheet #28 – Laboratory QC Samples Table

**Matrix:** Soil

**Analytical Group:** VOCs

**Analytical Method/SOP Reference:** EPA 8260B / SOP MS005

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprep within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

**Matrix:** Soil

**Analytical Group:** SVOCs and SVOCs by SIM

**Analytical Method/SOP Reference :** EPA 8270D and 8270D SIM/ SOPs MS006 and MS008

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprep within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Pesticides

**Analytical Method/SOP Reference**<sup>a</sup> : EPA 8081B / SOP GC015

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprep within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

### SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

**Matrix:** Soil

**Analytical Group:** PCBs

**Analytical Method/SOP Reference**<sup>a</sup> : EPA 8082A / SOP GC014

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprep within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Herbicides

**Analytical Method/SOP Reference**<sup>a</sup> : EPA 8151A / GC031

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprepared within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

### SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

**Matrix:** Soil

**Analytical Group:** Explosives

**Analytical Method/SOP Reference** <sup>a</sup>: EPA 8330B / GC034

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be reprepped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be reprepped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be reprep within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

**Matrix:** Soil

**Analytical Group:** TPH-GRO/DRO/ORO

**Analytical Method/SOP Reference**<sup>a</sup> : EPA8015C / SOPGC010, GC011

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Surrogate	All samples, Standards and QC	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Surrogate spike results shall be compared with DoD QSM 5.0 Appendix C LCS limits. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

**Matrix:** Soil

**Analytical Group:** Metals

**Analytical Method/SOP Reference**<sup>a</sup> : EPA 6010C and 7471B / SOP MET100 and MET105

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
Calibration Blank	Before beginning a sample run, after every 10 samples, and at end of the analysis sequence	No analytes detected > 2 × DL	Correct problem. Re-prepare and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed.	Accutest Florida Analyst	Accuracy	No analytes detected > 2 × DL

### SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be repped within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
MS and/or MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. If the matrix spike falls outside of DoD criteria, additional quality control tests are required to evaluate matrix effects.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
Serial dilution	Each new sample matrix	1:5 dilution must agree within ±10% of original determination	Perform post-digestion spike (PDS) addition.	Accutest Florida Analyst	Accuracy	1:5 dilution must agree within ±10% of original determination
Post-digestion spike	When serial dilution or matrix spike fails	80-120% for all metals	Narrate	Accutest Florida Analyst	Accuracy	80-120% for all metals

### SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

**Matrix:** Soil

**Analytical Group:** Hexavalent chromium

**Analytical Method/SOP Reference**<sup>a</sup> : EPA 7196A / SOP GN171

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. Refer to Table G-1 of the DoD QSM 5.0 for number of marginal exceedences allowed. Contact Client if samples cannot be reprepared within hold time.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

**SAP Worksheet #28 – Laboratory QC Samples Table (Continued)**

<b>QC Sample</b>	<b>Frequency/ Number</b>	<b>Method/SOP QC Acceptance Limits</b>	<b>Corrective Action</b>	<b>Person(s) Responsible for Corrective Action</b>	<b>Data Quality Indicator</b>	<b>Measurement Performance Criteria</b>
MS and/or MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. If the matrix spike falls outside of DoD criteria, additional quality control tests are required to evaluate matrix effects.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

## SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

**Matrix:** Soil

**Analytical Group:** Cyanide

**Analytical Method/SOP Reference :** EPA 9012B / SOP GN115

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Correct the problem. Report sample results that are <LOD or >10x the blank concentration. Reprepare and reanalyze the method blank and all associated samples with results > LOD and < 10x the contaminated blank result.	Accutest Florida Analyst	Accuracy	No analytes detected > ½ LOQ or >1/10 sample concentration or >1/10 regulatory limit.
LCS	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Accutest Florida Analyst	Accuracy	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.
MS and/or MSD	1 per preparatory batch (defined as ≤ 20 samples)	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.	Examine the project-specific DQOs. If the matrix spike falls outside of DoD criteria, additional quality control tests are required to evaluate matrix effects.	Accutest Florida Analyst	Accuracy/ Precision	Within limits listed in Appendix C of the DoD QSM 5.0. For analytes not listed in that table, the laboratory will use in-house statistical values.

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## SAP Worksheet #29 – Project Documents and Records Table

<b>Document</b>	<b>Where Maintained</b>
SAP	TtEC project file; Navy Administrative Record
Field logbook	TtEC project file
Field forms	TtEC project file
COC	TtEC project file; Accutest Florida
Shipping records	TtEC project file
Field surveillance reports	TtEC project file
Field Change Requests	TtEC project file
Laboratory results report	TtEC project file; Accutest Florida
Laboratory data package	TtEC project file and Accutest Florida; a copy will subsequently be sent to Navy Administrative Record

Field documentation associated with sampling activities includes field logbooks, sample labels, COCs, sample shipping records, field surveillance reports, and Field Change Request (FCR) forms. In addition, laboratory documentation will be generated during this project. These types are described in the following sections.

### Field Logbook

A permanently bound field logbook with consecutively numbered pages, used for sampling activities only, will be assigned to this project. The logbooks will be numbered sequentially on the cover by the PQCM and that number will be entered into a log-sheet maintained by the PQCM. All entries will be recorded in indelible black or blue ink. At the end of each work day, the logbook pages will be signed by the responsible sampler, and any unused portions of the logbook pages will be crossed out, signed, and dated. If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used. At a minimum, the logbook will contain the following information:

- Project name and site location
- Date and time
- Personnel in attendance
- General weather information
- Work performed
- Field observations

## **SAP Worksheet #29 – Project Documents and Records Table (Continued)**

- Sampling performed, including specifics such as location, type of sample, type of analyses, and sample identification; sample description information such as the soil description and any metal or other waste observed in the excavation
- Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments
- Descriptions of deviations from this SAP
- Problems encountered and corrective action taken
- Identification of field QC samples
- QC activities
- Verbal or written instructions
- Any other events that may affect the samples

### **Sample Labels**

For sample containers collected for Accutest Florida, labels will be hand-written using indelible black or blue ink and affixed to each sample container at the time of sample collection (or labels may be computer generated). The label will contain the following information:

- Sample identification number
- Sample collection date (month/day/year)
- Time of collection (24-hour clock) from the start of sampling
- Sampler's initials
- Preservative (if any)

### **Chain-of-Custody**

COC information is described in SAP Worksheet #27.

### **Sample Shipping Records**

For samples shipped via Fedex, the COC will be packaged within the cooler, and the sender's copy of the air bill will serve as custody documentation and will be maintained on-site in the project file. Sample shipping procedures are detailed in SAP Worksheet #27.

### **Field Surveillance Reports**

Field surveillances will be performed in accordance with the three phases of inspection as required by the QC Program. A Preparatory Inspection will be performed by the PQCM prior to the first sampling activities. This will include a general orientation for health and safety. An Initial Inspection will be conducted at the beginning of field sampling activities for this project. Daily field inspections and subsequent surveillances will be performed at the discretion of the PQCM or

## **SAP Worksheet #29 – Project Documents and Records Table (Continued)**

the QCPM throughout the duration of the project. The PQCM will use the Initial Inspection Checklist during inspection.

### **Field Change Request**

An FCR will be prepared by the Program Chemist, or a designee, if a change to the SAP occurs during sampling or analysis activities. These changes will be minor and not result in a change in scope and/or DQOs for this project. The FCR must be approved prior to field implementation. Major changes to the work scope affecting the original DQOs may require preparation of a SAP Addendum.

### **Laboratory Documentation**

Samples will be assigned into a sample delivery group (SDG) number for every batch of 20 samples or less based on as received on a daily basis by the laboratory. Initial analytical results that are e-mailed to the TtEC Project Chemist for review will be submitted by the laboratories as follows:

#### Accutest Florida results report:

- Case narrative
- Laboratory signed review page
- Copy of COC
- Sample receipt and login
- Sample results
- Batch QC results

The laboratory will then produce a final data package in hardcopy format and in portable document format (PDF) format, both of which will be sent to the TtEC Project Chemist. The packages will resemble an EPA Level IV-equivalent data package, will be page numbered, and contain the following information:

- Cover page (with laboratory name, address, phone number, contact person, and SDG number, as well as the project name and project number)
- Table of contents
- Case narrative including resolution of all corrective actions and nonconformance
- Sample management records, including a copy of the COC record, shipping documents as applicable, and laboratory sample receipt forms
- Cross-reference table for sample IDs versus laboratory IDs
- Analytical results and quality assurance/QC information as follows:
  - Sample results forms, including method blanks
  - Sample raw data

## **SAP Worksheet #29 – Project Documents and Records Table (Continued)**

- QC summaries
- ICAL
- Calibration checks, including all related CCVs
- Instrument run log
- Sample preparation log

All relevant laboratory raw data and documentation including, but not limited to, logbook, data sheets, electronic files, and reports, will be maintained by the laboratory for at least 5 years.

An electronic data deliverable (EDD) will be submitted to the TtEC Project Chemist. Both the EDDs and the data package will present results up to three significant figures. Results for QC analyses (method blanks, LCS, and duplicates) will be reported up to three significant figures.

When revisions to data packages are required, the revised pages will be stamped with the notation “amended or revised report” and have the same page numbering system as the original pages. If the revisions affect the EDDs, the revised EDD will then be sent along with the revised hardcopy pages to the TtEC Project Chemist.

### SAP Worksheet #30 – Analytical Services Table

Matrix	Analytical Group	Sampling Locations/ ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/ Organization (contact information)	Backup Laboratory/ Organization (contact information)
Soil	See worksheet #23	See worksheet #18	See worksheet #19	20 business days	Accutest Contact: Andrea Colby 4405 Vineland Road Suite C-15 Orlando, FL 32811 (386) 615-8479	Another laboratory in the Accutest network that maintains DoD ELAP and Virginia certification for the matrices, methods, and analytes listed in this SAP.

Accutest Florida has been selected to analyze samples for this project and has successfully completed the DoD Environmental Laboratory Accreditation Program (ELAP) certification, as provided in Attachment 1, for the matrices, methods, and analytes listed in this SAP. Accutest Florida is also certified by the Commonwealth of Virginia Department of General Services Division of Consolidated Laboratory Services with the following exceptions not listed on that certification:

- 8260C: Accutest Florida is only running 8260B method and the difference in methods does not affect the project DQOs
- 8270D missing 1,1-biphenyl; atrazine; benzaldehyde; caprolactam: these analytes were not offered when the certification was completed.
- 8015C missing TPH-ORO: this analyte were not offered when the certification was completed.

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**SAP Worksheet #31 – Planned Project Assessments Table**

<b>Assessment Type</b>	<b>Frequency</b>	<b>Internal or External</b>	<b>Organization Performing Assessment</b>	<b>Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)</b>	<b>Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)</b>	<b>Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)</b>	<b>Person(s) Responsible for Monitoring Effectiveness of Corrective Actions (Title and Organizational Affiliation)</b>
Field Sampling Surveillance	Once during the project duration	Internal	TtEC	PQCM, TtEC	Project Manager, TtEC	Project Manager, TtEC	Project Manager and QCPM, TtEC
Management Review	Once during the project duration	Internal	TtEC	QCPM, TtEC	Project Manager, TtEC	Project Manager, TtEC	PQCM, TtEC

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**SAP Worksheet #32 – Assessment Findings and Corrective Action Responses**

<b>Assessment Type</b>	<b>Nature of Deficiencies Documentation</b>	<b>Individual(s) Notified of Findings (Title and Organizational Affiliation)</b>	<b>Time Frame of Notification</b>	<b>Nature of Corrective Action Response Documentation</b>	<b>Individual(s) Receiving Corrective Action Response (Title and Organizational Affiliation)</b>	<b>Time Frame for Response</b>
Field Sampling Surveillance	Surveillance Report	Project Manager, TtEC	7 days after completion of the inspection	Corrective Action Report	Project Manager and QCPM, TtEC	5 days after notification
Management Review	Surveillance Report	Project Manager, TtEC	7 days after completion of the inspection	Corrective Action Report	Project Manager, TtEC	14 days after notification

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**SAP Worksheet #33 – QA Management Reports Table**

<b>Type of Report</b>	<b>Frequency (daily, weekly monthly, quarterly, annually, etc.)</b>	<b>Projected Delivery Date(s)</b>	<b>Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)</b>	<b>Report Recipient(s) (Title and Organizational Affiliation)</b>
Field Sampling Surveillance Report	Once during the project duration	Determined during the project	PQCM, TtEC	Project Manager and QCPM, TtEC
Management Review Report	Once after management review is completed	Determined during the project	QCPM, TtEC	Project Manager and Program Manager, TtEC

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**SAP Worksheet #34 – Verification (Step I) Process Table**

<b>Verification Input</b>	<b>Description</b>	<b>Internal/ External</b>	<b>Responsible for Verification (Title and Organizational Affiliation)</b>
Field logbook	Field logbooks will be reviewed weekly and verified for information accuracy and completeness. The inspection will be documented in daily QC reports.	I	PQCM, TtEC
COC records	COC records will be reviewed daily upon their completion and verified for completeness.	I	PQCM, TtEC Project Chemist, TtEC
Sample receipt	The Project Chemist will verify receipt of samples by the laboratory.	I	Project Chemist, TtEC
Sample logins	Sample login information will be reviewed and verified for accuracy and completeness in accordance with the requirements in this SAP.	E	Laboratory Project Manager, Accutest Florida
Laboratory analytical results prior to release	Laboratory analytical results will be reviewed to verify that the requirements in this SAP have been met. Prior to release, results will be verified as follows:	E	Laboratory Project Manager, Accutest Florida
	All analytical results (100 percent) comply with the method- and project-specific requirements and any deviations or failure to meet criteria is documented for the project file.	E	Analyst, Accutest Florida
	All manual entries (100 percent) are free of transcription errors and manual calculations are accurate; computer calculations are spot-checked to verify program validity; results reported are compliant with method- and project-specific QC requirements; raw data and supporting materials are complete; spectral assignments are confirmed; descriptions of deviations from method or project requirements are documented; significant figures and rounding have been appropriately used; reported values include dilution factors; and results are reasonable.	E	Peer Analyst, Accutest Florida
	Analytical results reported are compliant with method- and project-specific QC requirements; the reported information is complete; the information in the report narrative is complete and accurate; and results are reasonable.	E	Supervisor, Accutest Florida
	Analytical results reported are compliant with method- and project-specific QC; analytical methods are performed in compliance with approved SOPs. This review may be conducted after release of results since reviews are done only on 10 percent of the results.	E	Laboratory Project Manager, Accutest Florida

**SAP Worksheet #34 – Verification (Step I) Process Table (Continued)**

<b>Verification Input</b>	<b>Description</b>	<b>Internal/ External</b>	<b>Responsible for Verification (Title and Organizational Affiliation)</b>
Laboratory analytical results due at turnaround time listed on COC	Laboratory analytical results will be verified for having been obtained following the protocols in this SAP and being of sufficient quality to satisfy DQOs.	I	Project Chemist, TtEC
Laboratory data packages	Screening data reports and EPA Level IV-equivalent laboratory data packages will be verified by the laboratory performing the work for completeness and technical accuracy prior to submittal in accordance with requirements described in SAP Worksheet #29.	E I	Laboratory Project Manager, Accutest Florida Project Chemist, TtEC
Field and electronic data	One hundred percent of manual entries will be reviewed against the hardcopy information and 10 percent of electronic uploads will be checked against the hardcopy.	I	Project Chemist, TtEC

**SAP Worksheet #35 – Validation (Steps IIa and IIb) Process Table**

<b>Step IIa/IIb</b>	<b>Validation Input</b>	<b>Description</b>	<b>Responsible for Validation (Title and Organizational Affiliation)</b>
IIa	Sample Collection	Ensure that the sampling procedures described in this SAP were used to collect samples and that any deviations to those procedures were documented in a FCR.	PQCM, TtEC Project Chemist, TtEC
IIa	Sample Handling	Ensure that the procedures described in this SAP for sample handling, packaging, and transport to the laboratory were followed.	PQCM, TtEC Project Chemist, TtEC
IIa	Sample Documentation	Ensure that the COC procedures described in this SAP were followed for sample collection and that logbooks or field forms were completed as required.	PQCM, TtEC Project Chemist, TtEC
IIa	Analytical Procedures	Ensure that the analytical methods and deliverable requirements described in this SAP were followed including holding times, analyte lists, and QC criteria.	Laboratory Project Manager, Accutest Florida
IIa	Laboratory data reports	Data reports will be validated by the laboratory performing the work for technical accuracy and requirements listed in SAP Worksheet #29 prior to submittal.	Laboratory Project Manager, Accutest Florida
IIb	Sampling Procedures	Review of sampling procedures to appropriately document if any deviations occurred and if corrective action is required.	PQCM, TtEC
IIb	Analytical Procedures	Review of analytical procedures to appropriately document if any deviations occurred and if corrective action is required.	Project Chemist, TtEC
IIb	Project quantitation limits goals and Laboratory QC Criteria	Ensure project quantitation limits and laboratory QC criteria were followed and any deviations documented.	Project Chemist, TtEC

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### SAP Worksheet #36 – Analytical Data Validation (Steps IIa and IIb) Summary Table

<b>Step IIa/IIb</b>	<b>Matrix</b>	<b>Analytical Group</b>	<b>Validation Criteria</b>	<b>Data Validator (Title and Organizational Affiliation)</b>
IIa	All	All	In accordance with laboratory SOPs listed in SAP Worksheet #23	Project Chemist, TtEC
IIb	All	All	In accordance with DoD QSM criteria listed in SAP Worksheet #28	Project Chemist, TtEC

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## **SAP Worksheet #37 – Usability Assessment**

After the analytical results have been reviewed, verified, and validated in accordance with SAP Worksheets #34 through 36, a data quality assessment (DQA) report may be prepared to assess data quality and usability. The DQA will include review of the following:

- Sample collection and analytical methods to verify that these were performed as discussed in SAP Worksheets #14 and 17
- DQOs to determine whether they have been achieved by the data collected
- Project-specific data quality indicators for precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters as discussed below

Analytical DQOs as assessed through the PARCC parameters are as follows:

### **Precision**

Precision is the measure of the reproducibility of a set of replicate results or the agreement among repeat observations made under the same conditions. Analytical precision is the measurement of the variability associated with duplicate or replicate analyses. As applicable, field duplicate, sample duplicate, and laboratory control sample duplicate (LCSD) samples will be used to assess field and analytical precision. The precision measurement will be determined using the RPD between the duplicate sample results as follows:

$$RPD = 100 \times 2 \times (\text{result} - \text{duplicate result}) / (\text{result} + \text{duplicate result})$$

As applicable, the RPD limits for laboratory duplicates and LCSD are presented in SAP Worksheet #28.

### **Accuracy**

Accuracy is defined as the nearness of a result or the mean of a set of results to the true or accepted value. Analytical accuracy is measured by comparing the percent recovery (%R) of analytes spiked into a sample against a control limit. Spiked samples include LCS or LCSD analyzed for every batch of up to 20 samples and serve as a measure of analytical accuracy. Surrogate standards, as applicable, are added to all samples, blanks, LCS, or LCSD and evaluate the method's accuracy and help to determine matrix interferences. %R is calculated as follows:

$$\%R = 100 \times (\text{spiked sample result} - \text{unspiked sample result}) / \text{amount of spike added}$$

As applicable, the laboratory will review the spiked sample and surrogate recoveries for each analysis to ensure that the %R lies within the control limits listed in SAP Worksheet #28.

### **Representativeness**

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an

## **SAP Worksheet #37 – Usability Assessment (Continued)**

environmental condition. It is a qualitative parameter that depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples according to the procedures in this SAP. Errors in sample collection, packaging, preservation, or COC procedures may result in samples being judged non-representative and may form a basis for rejecting the data.

### **Completeness**

Completeness is the percentage of measurements made that is judged to be valid. The completeness goal is to generate a sufficient amount of valid data to meet project needs. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not qualified with a rejected (R) flag. The requirement of completeness is 95 percent for samples and is determined using the following equation:

$$\% \text{ completeness} = 100 \times (\text{number of valid analyte results} / \text{number of possible results})$$

### **Comparability**

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another, whether it was generated by a single laboratory or during interlaboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical results.

Sample collection and handling procedures will adhere to EPA-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units and standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

## REFERENCES

- DoD (Department of Defense). 2013. Quality Systems Manual for Environmental Laboratories. Version 5.0. July.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS. December.
- . 2005. Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP). March.
- . 2006a. EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, QAMS. May.
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## **FIGURES**

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CAD FILE: WE35 FIGURE1.DWG

SOURCE: CH2M



TETRA TECH EC, INC.

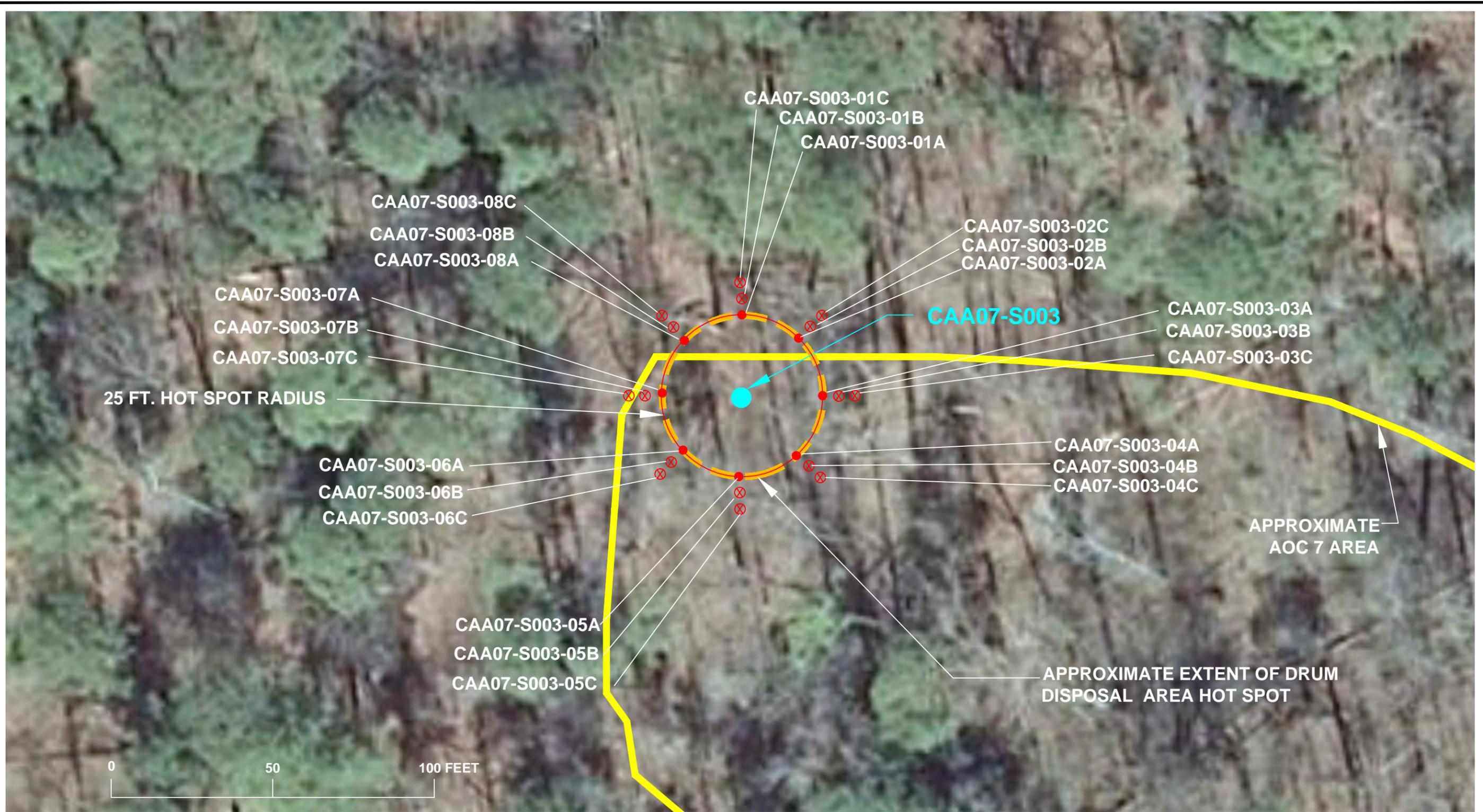
Cheatham Annex AOC 7  
**NON-TIME CRITICAL REMOVAL ACTION**  
 LOCATION MAP

PREP	CHK	APPR	DATE

**FIGURE**  
**1**

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CAD FILE: ACAD-WE35 FIGURE4-REV.DWG



SOURCE: ESRI Maps



TETRA TECH EC, INC.

Cheatham Annex AOC 7

NON-TIME CRITICAL REMOVAL ACTION  
PRE-EXCAVATION SAMPLE LOCATIONS

PREP	CHK	APPR	DATE

FIGURE  
4

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**ATTACHMENT 1**  
**LABORATORY DOD ELAP ACCREDITATION**

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## Scope of Accreditation For Accutest Laboratories Southeast, Inc.

4405 Vineland Road, Suite C-15  
Orlando, FL 32811  
Svetlana Izosimova, Ph.D., QA Officer  
407-425-6700

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (LABPR 403 DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM V5) based on the TNI Standard - Environmental Laboratory Sector, Volume 1 – Management and Technical Requirements for Laboratories Performing Environmental Analysis, Sept 2009 (EL-V1-2009); accreditation is granted to **Accutest Laboratories Southeast, Inc.** to perform the following tests:

Accreditation granted through: **December 15, 2015**

### Testing – Environmental

Drinking Water		
Technology	Method	Analyte
LC/MS/MS	EPA 537	Perfluorohexanoic Acid
LC/MS/MS	EPA 537	Perfluoroheptanoic Acid
LC/MS/MS	EPA 537	Perfluorooctanoic Acid
LC/MS/MS	EPA 537	Perfluorononanoic Acid
LC/MS/MS	EPA 537	Perfluorodecanoic Acid
LC/MS/MS	EPA 537	Perfluoroundecanoic Acid
LC/MS/MS	EPA 537	Perfluorododecanoic Acid
LC/MS/MS	EPA 537	Perfluorotridecanoic Acid
LC/MS/MS	EPA 537	Perfluorotetradecanoic Acid
LC/MS/MS	EPA 537	Perfluorobutanesulfonic Acid
LC/MS/MS	EPA 537	Perfluorohexanesulfonic Acid
LC/MS/MS	EPA 537	Perfluorooctanesulfonic Acid

Non-Potable Water		
Technology	Method	Analyte
GC/ECD	EPA 8011	1,2-Dibromoethane (EDB)
GC/ECD	EPA 8011	1,2-Dibromo-3-Chloropropane (DBCP)
GC/FID	EPA 8015C/D	Diesel range organics (DRO)
GC/FID	EPA 8015C/D	Oil Range Organics (ORO)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/FID	EPA 8015C/D	Gasoline range organics (GRO)
GC/FID	EPA 8015C/D	Ethanol
GC/FID	EPA 8015C/D	2-Ethoxyethanol
GC/FID	EPA 8015C/D	Isobutyl alcohol (2-Methyl-1-propanol)
GC/FID	EPA 8015C/D	Isopropyl alcohol (2-Propanol)
GC/FID	EPA 8015C/D	Methanol
GC/FID	EPA 8015C/D	n-Butyl alcohol
GC/FID	EPA 8015C/D	n-Propanol
GC/PID	EPA 602; EPA 8021B	Benzene
GC/PID	EPA 602; EPA 8021B	Ethylbenzene
GC/PID	EPA 602; EPA 8021B	Chlorobenzene
GC/PID	EPA 602; EPA 8021B	Toluene
GC/PID	EPA 602; EPA 8021B	1,2-Dichlorobenzene (o-Dichlorobenzene)
GC/PID	EPA 602; EPA 8021B	1,3-Dichlorobenzene (m-Dichlorobenzene)
GC/PID	EPA 602; EPA 8021B	1,4-Dichlorobenzene (p-Dichlorobenzene)
GC/PID	EPA 602; EPA 8021B	m,p-Xylene
GC/PID	EPA 602; EPA 8021B	o-Xylene
GC/PID	EPA 602; EPA 8021B	Methyl-tert-Butyl Ether
GC/ECD	EPA 608; EPA 8081B	4,4' -DDD
GC/ECD	EPA 608; EPA 8081B	4,4' -DDE
GC/ECD	EPA 608; EPA 8081B	4,4' -DDT
GC/ECD	EPA 608; EPA 8081B	Aldrin
GC/ECD	EPA 608; EPA 8081B	alpha-BHC (alpha-Hexachlorocyclohexane)
GC/ECD	EPA 608; EPA 8081B	beta-BHC (beta-Hexachlorocyclohexane)
GC/ECD	EPA 608; EPA 8081B	delta-BHC
GC/ECD	EPA 608; EPA 8081B	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC/ECD	EPA 608; EPA 8081B	Chlordane (tech.)
GC/ECD	EPA 608; EPA 8081B	alpha-Chlordane
GC/ECD	EPA 608; EPA 8081B	gamma-Chlordane
GC/ECD	EPA 608; EPA 8081B	Dieldrin
GC/ECD	EPA 608; EPA 8081B	Endosulfan I
GC/ECD	EPA 608; EPA 8081B	Endosulfan II
GC/ECD	EPA 608; EPA 8081B	Endosulfan sulfate
GC/ECD	EPA 608; EPA 8081B	Endrin
GC/ECD	EPA 608; EPA 8081B	Endrin aldehyde
GC/ECD	EPA 608; EPA 8081B	Endrin ketone
GC/ECD	EPA 608; EPA 8081B	Heptachlor
GC/ECD	EPA 608; EPA 8081B	Heptachlor epoxide
GC/ECD	EPA 608; EPA 8081B	Methoxychlor
GC/ECD	EPA 608; EPA 8081B	Toxaphene (Chlorinated camphene)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1016 (PCB-1016)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/ECD	EPA 608; EPA 8082A	Aroclor-1221 (PCB-1221)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1232 (PCB-1232)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1242 (PCB-1242)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1248 (PCB-1248)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1254 (PCB-1254)
GC/ECD	EPA 608; EPA 8082A	Aroclor-1260 (PCB-1260)
GC/ECD	EPA 8082A	Aroclor-1262 (PCB-1262)
GC/ECD	EPA 8082A	Aroclor-1268 (PCB-1268)
GC/ECD	EPA 8082A	2,4'-diCB bz8
GC/ECD	EPA 8082A	2,2',5-trCB bz18
GC/ECD	EPA 8082A	2,4,4'-trCB bz28
GC/ECD	EPA 8082A	2,2',3,5'-teCB bz44
GC/ECD	EPA 8082A	2,2',4,5'-teCB bz49
GC/ECD	EPA 8082A	2,2',5,5'-teCB bz52
GC/ECD	EPA 8082A	2,3'4,4'-teCB bz66
GC/ECD	EPA 8082A	3,4,4',5-teCB bz81
GC/ECD	EPA 8082A	2,2',3,4,5'-peCB bz87
GC/ECD	EPA 8082A	2,2',3,4',5-peCB bz90
GC/ECD	EPA 8082A	2,2',4,5,5'-peCB bz101
GC/ECD	EPA 8082A	2,3,3',4,4'-peCB bz105
GC/ECD	EPA 8082A	2,3',4,4',5-peCB bz118
GC/ECD	EPA 8082A	2',3,4,4',5-peCB bz123
GC/ECD	EPA 8082A	3,3',4,4',5-peCB bz126
GC/ECD	EPA 8082A	2,2',3,3',4,4'-hxCB bz128
GC/ECD	EPA 8082A	2,2',3,4,4',5'-hxCB bz138
GC/ECD	EPA 8082A	2,2',3,5,5',6-hxCB bz151
GC/ECD	EPA 8082A	2,2',4,4',5,5'-hxCB bz153
GC/ECD	EPA 8082A	2,3,3',4,4',5-hxCB bz156
GC/ECD	EPA 8082A	2,3,3',4,4',5'-hxCB bz157
GC/ECD	EPA 8082A	2,3',4,4',5,5'-hxCB bz167
GC/ECD	EPA 8082A	3,3',4,4',5,5'-hxCB bz169
GC/ECD	EPA 8082A	2,2',3,3',4,4',5-hpCB bz170
GC/ECD	EPA 8082A	2,2',3,4,4',5,5'-hpCB bz180
GC/ECD	EPA 8082A	2,2',3,4,4',5',6-hpCB bz183
GC/ECD	EPA 8082A	2,2',3,4,4',6,6'-hpCB bz184
GC/ECD	EPA 8082A	2,2',3,4',5,5',6-hpCB bz187
GC/ECD	EPA 8082A	2,3,3',4,4',5,5'-hpCB bz189
GC/ECD	EPA 8082A	2,2',3,3',4,4',5,6-ocCB bz195
GC/ECD	EPA 8082A	2,2',3,3',4,4',5,5',6-noCB bz206
GC/ECD	EPA 8082A	Decachlorobiphenyl bz209
GC/ECD	EPA 8091	2,4-Dinitrotoluene (2,4-DNT)
GC/ECD	EPA 8091	2,6-Dinitrotoluene (2,6-DNT)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/FPD	EPA 8141B	Azinphos-methyl (Guthion)
GC/FPD	EPA 8141B	Bolstar (Sulprofos)
GC/FPD	EPA 8141B	Carbophenothion
GC/FPD	EPA 8141B	Chlorpyrifos
GC/FPD	EPA 8141B	Coumaphos
GC/FPD	EPA 8141B	Demeton-o
GC/FPD	EPA 8141B	Demeton-s
GC/FPD	EPA 8141B	Diazinon
GC/FPD	EPA 8141B	Dichlorvos (DDVP Dichlorvos)
GC/FPD	EPA 8141B	Dimethoate
GC/FPD	EPA 8141B	Disulfoton
GC/FPD	EPA 8141B	EPN
GC/FPD	EPA 8141B	Ethion
GC/FPD	EPA 8141B	Ethoprop
GC/FPD	EPA 8141B	Famphur
GC/FPD	EPA 8141B	Fensulfothion
GC/FPD	EPA 8141B	Fenthion
GC/FPD	EPA 8141B	Malathion
GC/FPD	EPA 8141B	Merphos
GC/FPD	EPA 8141B	Methyl parathion (Parathion methyl)
GC/FPD	EPA 8141B	Mevinphos
GC/FPD	EPA 8141B	Monocrotophos
GC/FPD	EPA 8141B	Naled
GC/FPD	EPA 8141B	Parathion ethyl
GC/FPD	EPA 8141B	Phorate
GC/FPD	EPA 8141B	Ronnel
GC/FPD	EPA 8141B	Stirofos
GC/FPD	EPA 8141B	Sulfotepp
GC/FPD	EPA 8141B	Tetraethyl pyrophosphate (TEPP)
GC/FPD	EPA 8141B	Thionazin (Zinophos)
GC/FPD	EPA 8141B	Tokuthion (Prothiophos)
GC/FPD	EPA 8141B	Trichloronate
GC/FPD	EPA 8141B	O,O,O-Triethyl phosphorothioate
GC/ECD	EPA 8151A	2,4,5-T
GC/ECD	EPA 8151A	2,4-D
GC/ECD	EPA 8151A	2,4-DB
GC/ECD	EPA 8151A	Dalapon
GC/ECD	EPA 8151A	Dicamba
GC/ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC/ECD	EPA 8151A	Dinoseb (2-sec-butyl-4,6-dinitrophenol DNBP)
GC/ECD	EPA 8151A	MCPA

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/ECD	EPA 8151A	MCPPP
GC/ECD	EPA 8151A	Pentachlorophenol
GC/ECD	EPA 8151A	Silvex (2,4,5-TP)
GC/FID	RSK-175	Acetylene
GC/FID	RSK-175	Methane
GC/FID	RSK-175	Ethane
GC/FID	RSK-175	Ethene
GC/FID	RSK-175	Propane
GC/FID	FL-PRO	Total Petroleum Hydrocarbons (TPH)
GC/FID	MA-VPH	Volatile petroleum range organics (VPH)
GC/FID	MA-EPH	Extractable petroleum range organics (EPH)
GC/FID	IA-OA1	Gasoline range organics (GRO)
GC/FID	IA-OA2	Diesel range organics (DRO)
GC/FID	TN-GRO	Gasoline range organics (GRO)
GC/FID	TN-EPH	Extractable petroleum range organics (EPH)
GC/FID	WI-DRO	Diesel range organics (DRO)
GC/FID	AK-101	Gasoline range organics (GRO)
GC/FID	AK-102	Diesel range organics (DRO)
GC/FID	OK-GRO	Gasoline range organics (GRO)
GC/FID	OK-DRO	Diesel range organics (DRO)
GC/FID	TX-1005	Total Petroleum Hydrocarbons (TPH)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1,1,2-Tetrachloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1,1-Trichloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1,2,2-Tetrachloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1,2-Trichloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1-Dichloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1-Dichloroethylene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,1-Dichloropropene
GC/MS	EPA 624; EPA 8260B/C	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2,3-Trichlorobenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2,3-Trichloropropane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2,4-Trichlorobenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2,4-Trimethylbenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2-Dibromoethane (EDB Ethylene dibromide)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2-Dichlorobenzene (o-Dichlorobenzene)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2-Dichloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,2-Dichloropropane
GC/MS	EPA 8260B/C	1,2-Dichlorotrifluoroethane (Freon 123)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,3,5-Trimethylbenzene

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,3-Dichlorobenzene (m-Dichlorobenzene)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,3-Dichloropropane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	1,4-Dichlorobenzene (p-Dichlorobenzene)
GC/MS	EPA 8260B/C	1-Chlorohexane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	2,2-Dichloropropane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	2-Butanone (Methyl ethyl ketone MEK)
GC/MS	EPA 624; EPA 8260B/C	2-Chloroethyl vinyl ether
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	2-Chlorotoluene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	2-Hexanone
GC/MS	EPA 8260B/C	2-Nitropropane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	4-Chlorotoluene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	4-Methyl-2-pentanone (MIBK)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Acetone
GC/MS	EPA 8260B/C	Acetonitrile
GC/MS	EPA 624; EPA 8260B/C	Acrolein (Propenal)
GC/MS	EPA 624; EPA 8260B/C	Acrylonitrile
GC/MS	EPA 8260B/C	Allyl chloride (3-Chloropropene)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Benzene
GC/MS	EPA 8260B/C	Benzyl Chloride
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Bromobenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Bromochloromethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Bromodichloromethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Bromoform
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	n-Butylbenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	sec-Butylbenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	tert-Butylbenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Carbon disulfide
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Carbon tetrachloride
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Chlorobenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Chloroethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Chloroform
GC/MS	EPA 8260B/C	Chloroprene
GC/MS	EPA 624; EPA 8260B,C	Cyclohexane
GC/MS	EPA 8260B/C	Cyclohexanone
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	cis-1,2-Dichloroethylene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	trans-1,2-Dichloroethylene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	cis-1,3-Dichloropropene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	trans-1,3-Dichloropropylene
GC/MS	EPA 8260B/C	cis-1,4-Dichloro-2-butene
GC/MS	EPA 8260B/C	trans-1,4-Dichloro-2-butene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Di-isopropylether (DIPE)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Dibromochloromethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Dibromomethane (Methylene Bromide)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Dichlorodifluoromethane
GC/MS	EPA 8260B/C	Diethyl ether
GC/MS	EPA 624, EPA 8260B/C, EPA 8260B/C SIM	p-Dioxane (1,4-Dioxane)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Ethanol (Ethyl Alcohol)
GC/MS	EPA 8260B/C	Ethyl acetate
GC/MS	EPA 8260B/C	Ethyl methacrylate
GC/MS	EPA 8260B/C	Ethyl tert-butyl alcohol (ETBA)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Ethyl tert-butyl ether (ETBE)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Ethylbenzene
GC/MS	EPA 8260B/C	Ethylene Oxide
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Hexachlorobutadiene
GC/MS	EPA 8260B/C	Hexane
GC/MS	EPA 8260B/C	Iodomethane (Methyl iodide)
GC/MS	EPA 8260B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	p-Isopropyltoluene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Isopropylbenzene
GC/MS	EPA 8260B/C	Methacrylonitrile
GC/MS	EPA 624; EPA 8260B/C	Methyl Acetate
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Methyl bromide (Bromomethane)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Methyl chloride (Chloromethane)
GC/MS	EPA 624; EPA 8260B,C	Methylcyclohexane
GC/MS	EPA 8260B/C	Methyl methacrylate
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Methylene chloride
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Naphthalene
GC/MS	EPA 8260B/C	Pentachloroethane
GC/MS	EPA 8260B/C	Propionitrile (Ethyl cyanide)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	n-Propylbenzene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Styrene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	tert-Amyl alcohol (TAA)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	tert-Amyl methyl ether (TAME)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	tert-Butyl alcohol (TBA)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	tert-Butyl formate (TBF)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Tetrachloroethylene (Perchloroethylene)
GC/MS	EPA 8260B/C	Tetrahydrofuran
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Toluene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Trichloroethene (Trichloroethylene)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Trichlorofluoromethane
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Vinyl acetate
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Vinyl chloride

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	Xylene (total)
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	m,p-Xylene
GC/MS	EPA 624; SM 6200B-11; EPA 8260B/C	o-Xylene
GC/MS	EPA 625; EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 625; EPA 8270D	1,2,4-Trichlorobenzene
GC/MS	EPA 625; EPA 8270D	1,2-Dichlorobenzene (o-Dichlorobenzene)
GC/MS	EPA 625; EPA 8270D	1,2-Diphenylhydrazine
GC/MS	EPA 8270D	1,3,5-Trinitrobenzene (1,3,5-TNB)
GC/MS	EPA 625; EPA 8270D	1,3-Dichlorobenzene (m-Dichlorobenzene)
GC/MS	EPA 8270D	1,3-Dinitrobenzene (1,3-DNB)
GC/MS	EPA 625; EPA 8270D	1,4-Dichlorobenzene (p-Dichlorobenzene)
GC/MS	EPA 8270D	1,4-Dithiane
GC/MS	EPA 8270D	1,4-Oxathiane
GC/MS	EPA 8270D	1,4-Naphthoquinone
GC/MS	EPA 8270D	1,4-Phenylenediamine
GC/MS	EPA 8270D	1-Chloronaphthalene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	1-Methylnaphthalene
GC/MS	EPA 8270D	1-Naphthylamine
GC/MS	EPA 625; EPA 8270D	2,3,4,6-Tetrachlorophenol
GC/MS	EPA 625; EPA 8270D	2,4,5-Trichlorophenol
GC/MS	EPA 625; EPA 8270D	2,4,6-Trichlorophenol
GC/MS	EPA 625; EPA 8270D	2,4-Dichlorophenol
GC/MS	EPA 625; EPA 8270D	2,4-Dimethylphenol
GC/MS	EPA 625; EPA 8270D	2,4-Dinitrophenol
GC/MS	EPA 625; EPA 8270D	2,4-Dinitrotoluene (2,4-DNT)
GC/MS	EPA 8270D	2,6-Dichlorophenol
GC/MS	EPA 625; EPA 8270D	2,6-Dinitrotoluene (2,6-DNT)
GC/MS	EPA 8270D	2-Acetylaminofluorene
GC/MS	EPA 625; EPA 8270D	2-Chloronaphthalene
GC/MS	EPA 625; EPA 8270D	2-Chlorophenol
GC/MS	EPA 625; EPA 8270D	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-o-cresol)
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	2-Methylnaphthalene
GC/MS	EPA 625; EPA 8270D	2-Methylphenol (o-Cresol)
GC/MS	EPA 8270D	2-Naphthylamine
GC/MS	EPA 625; EPA 8270D	2-Nitroaniline
GC/MS	EPA 625; EPA 8270D	2-Nitrophenol
GC/MS	EPA 8270D	2-Picoline (2-Methylpyridine)
GC/MS	EPA 625; EPA 8270D	3,3'-Dichlorobenzidine
GC/MS	EPA 8270D	3,3'-Dimethylbenzidine
GC/MS	EPA 8270D	3-Methylcholanthrene
GC/MS	EPA 625; EPA 8270D	3&4-Methylphenol (m,p-Cresol)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 625; EPA 8270D	3-Nitroaniline
GC/MS	EPA 8270D	4-Aminobiphenyl
GC/MS	EPA 625; EPA 8270D	4-Bromophenyl phenyl ether
GC/MS	EPA 625; EPA 8270D	4-Chloro-3-methylphenol
GC/MS	EPA 625; EPA 8270D	4-Chloroaniline
GC/MS	EPA 625; EPA 8270D	4-Chlorophenyl phenylether
GC/MS	EPA 8270D	4-Dimethyl aminoazobenzene
GC/MS	EPA 625; EPA 8270D	4-Nitroaniline
GC/MS	EPA 625; EPA 8270D	4-Nitrophenol
GC/MS	EPA 8270D	4,4'-methylene-bis(2-chloroaniline)
GC/MS	EPA 8270D	5-Nitro-o-toluidine
GC/MS	EPA 8270D	7,12-Dimethylbenz(a) anthracene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Acenaphthene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Acenaphthylene
GC/MS	EPA 625; EPA 8270D	Acetophenone
GC/MS	EPA 625; EPA 8270D	Aniline
GC/MS	EPA 8270D	Anilazine
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Anthracene
GC/MS	EPA 8270D	Aramite
GC/MS	EPA 625; EPA 8270D	Atrazine
GC/MS	EPA 625; EPA 8270D	Benzaldehyde
GC/MS	EPA 625; EPA 8270D	Benzidine
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Benzo(a)anthracene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Benzo(a)pyrene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Benzo(b)fluoranthene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Benzo(g,h,i)perylene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Benzo(k)fluoranthene
GC/MS	EPA 625; EPA 8270D	Benzoic acid
GC/MS	EPA 625; EPA 8270D	Benzyl alcohol
GC/MS	EPA 625; EPA 8270D	Biphenyl (1,1'-Biphenyl)
GC/MS	EPA 625; EPA 8270D	bis(2-Chloroethoxy)methane
GC/MS	EPA 625; EPA 8270D	bis(2-Chloroethyl) ether
GC/MS	EPA 625; EPA 8270D	bis(2-Chloroisopropyl) ether (2,2'-Oxybis(1-chloropropane))
GC/MS	EPA 625; EPA 8270D	bis(2-Ethylhexyl) phthalate (DEHP)
GC/MS	EPA 625; EPA 8270D	Butyl benzyl phthalate
GC/MS	EPA 625; EPA 8270D	Carbazole
GC/MS	EPA 625; EPA 8270D	Caprolactam
GC/MS	EPA 8270D	Chlorobenzilate
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Chrysene
GC/MS	EPA 8270D	Diallate
GC/MS	EPA 625; EPA 8270D	Di-n-butyl phthalate

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 625; EPA 8270D	Di-n-octyl phthalate
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Dibenz(a,h)anthracene
GC/MS	EPA 8270D	Dibenz(a,j)acridine
GC/MS	EPA 625; EPA 8270D	Dibenzofuran
GC/MS	EPA 625; EPA 8270D	Diethyl phthalate
GC/MS	EPA 625; EPA 8270D	Dimethyl phthalate
GC/MS	EPA 8270D	a,a-Dimethylphenethylamine
GC/MS	EPA 8270D	Diphenyl Ether
GC/MS	EPA 8270D	p-Dioxane (1,4-Dioxane)
GC/MS	EPA 8270D	Ethyl methanesulfonate
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Fluoranthene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Fluorene
GC/MS	EPA 625; EPA 8270D	Hexachlorobenzene
GC/MS	EPA 625; EPA 8270D	Hexachlorobutadiene
GC/MS	EPA 625; EPA 8270D	Hexachlorocyclopentadiene
GC/MS	EPA 625; EPA 8270D	Hexachloroethane
GC/MS	EPA 8270D	Hexachlorophene
GC/MS	EPA 8270D	Hexachloropropene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Indeno(1,2,3-cd)pyrene
GC/MS	EPA 8270D	Isodrin
GC/MS	EPA 625; EPA 8270D	Isophorone
GC/MS	EPA 8270D	Isosafrole
GC/MS	EPA 8270D	Kepone
GC/MS	EPA 8270D	Methapyrilene
GC/MS	EPA 8270D	Methyl methanesulfonate
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Naphthalene
GC/MS	EPA 8270D	Nicotine
GC/MS	EPA 625; EPA 8270D	Nitrobenzene
GC/MS	EPA 8270D	Nitroquinoline-1-oxide
GC/MS	EPA 8270D	n-Nitroso-di-n-butylamine
GC/MS	EPA 625; EPA 8270D	n-Nitrosodi-n-propylamine
GC/MS	EPA 8270D	n-Nitrosodiethylamine
GC/MS	EPA 625; EPA 8270D	n-Nitrosodimethylamine
GC/MS	EPA 625; EPA 8270D	n-Nitrosodiphenylamine
GC/MS	EPA 8270D	n-Nitrosodiphenylamine/Diphenylamine (analyte pair)
GC/MS	EPA 8270D	n-Nitrosomethylethylamine
GC/MS	EPA 8270D	n-Nitrosomorpholine
GC/MS	EPA 8270D	n-Nitrosopiperidine
GC/MS	EPA 8270D	n-Nitrosopyrrolidine
GC/MS	EPA 8270D	Pentachlorobenzene
GC/MS	EPA 8270D	Pentachloroethane

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8270D	Pentachloronitrobenzene
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Pentachlorophenol
GC/MS	EPA 8270D	Phenacetin
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Phenanthrene
GC/MS	EPA 625; EPA 8270D	Phenol
GC/MS	EPA 8270D	Pronamide (Kerb)
GC/MS	EPA 8270D	Propazine
GC/MS	EPA 625; EPA 8270D; EPA 8270D SIM	Pyrene
GC/MS	EPA 625; EPA 8270D	Pyridine
GC/MS	EPA 8270D	Resorcinol
GC/MS	EPA 8270D	Safrole
GC/MS	EPA 8270D	Simazine
GC/MS	EPA 8270D	o-Toluidine
GC/MS	EPA 8270D	Dimethoate
GC/MS	EPA 8270D	Disulfoton
GC/MS	EPA 8270D	Famphur
GC/MS	EPA 8270D	Methyl parathion (Parathion methyl)
GC/MS	EPA 8270D	Parathion ethyl
GC/MS	EPA 8270D	Phorate
GC/MS	EPA 8270D	O,O,O-Triethyl phosphorothioate
HPLC	EPA 610; EPA 8310	1-Methylnaphthalene
HPLC	EPA 610; EPA 8310	2-Methylnaphthalene
HPLC	EPA 610; EPA 8310	Acenaphthene
HPLC	EPA 610; EPA 8310	Acenaphthylene
HPLC	EPA 610; EPA 8310	Anthracene
HPLC	EPA 610; EPA 8310	Benzo(a)anthracene
HPLC	EPA 610; EPA 8310	Benzo(a)pyrene
HPLC	EPA 610; EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 610; EPA 8310	Benzo(g h i)perylene
HPLC	EPA 610; EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 610; EPA 8310	Chrysene
HPLC	EPA 610; EPA 8310	Dibenz(a,h)anthracene
HPLC	EPA 610; EPA 8310	Fluoranthene
HPLC	EPA 610; EPA 8310	Fluorene
HPLC	EPA 610; EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 610; EPA 8310	Naphthalene
HPLC	EPA 610; EPA 8310	Phenanthrene
HPLC	EPA 610; EPA 8310	Pyrene
HPLC	EPA 8330A/B	1,3,5-Trinitrobenzene (1,3,5-TNB)
HPLC	EPA 8330A/B	1,3-Dinitrobenzene (1,3-DNB)
HPLC	EPA 8330A/B	2,4,6-Trinitrotoluene (2,4,6-TNT)
HPLC	EPA 8330A/B	2,4-Dinitrotoluene (2,4-DNT)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
HPLC	EPA 8330A/B	2,6-Dinitrotoluene (2,6-DNT)
HPLC	EPA 8330A/B	2-Amino-4,6-dinitrotoluene (2-am-dnt)
HPLC	EPA 8330A/B	2-Nitrotoluene
HPLC	EPA 8330A/B	3,5-Dinitroaniline
HPLC	EPA 8330A/B	3-Nitrotoluene
HPLC	EPA 8330A/B	4-Amino-2,6-dinitrotoluene (4-am-dnt)
HPLC	EPA 8330A/B	4-Nitrotoluene
HPLC	EPA 8330A/B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
HPLC	EPA 8330A/B	Nitrobenzene
HPLC	EPA 8330A/B; EPA 8332	Nitroglycerin
HPLC	EPA 8330A/B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
HPLC	EPA 8330A/B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
HPLC	EPA 8330A/B; EPA 8332	Pentaerythritoltetranitrate (PETN)
HPLC	EPA 8330A	2,2',6,6'-Tetranitro-4,4'-azoxytoluene
HPLC	EPA 8330A/B	2-amino-6-Nitrotoluene
HPLC	EPA 8330A/B	4-amino-2-Nitrotoluene
HPLC	EPA 8330A/B	2-amino-4-Nitrotoluene
HPLC	EPA 8330A/B	2,4-diamino-6-Nitrotoluene
HPLC	EPA 8330A/B	2,6-diamino-4-Nitrotoluene
HPLC	EPA 8330A/B	DNX
HPLC	EPA 8330A/B	MNX
HPLC	EPA 8330A/B	TNX
LC/MS/MS	EPA 6850	Perchlorate
LC/MS/MS	EPA 537 MOD	Perfluorobutanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoropentanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorohexanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoroheptanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorooctanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorononanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorodecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoroundecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorododecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotridecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotridecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotetradecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorobutanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorohexanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorooctanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorodecanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorooctanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorodecanesulfonic Acid

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
ICP	EPA 200.7; EPA 6010C	Aluminum
ICP	EPA 200.7; EPA 6010C	Antimony
ICP	EPA 200.7; EPA 6010C	Arsenic
ICP	EPA 200.7; EPA 6010C	Barium
ICP	EPA 200.7; EPA 6010C	Beryllium
ICP	EPA 200.7; EPA 6010C	Cadmium
ICP	EPA 200.7; EPA 6010C	Calcium
ICP	EPA 200.7; EPA 6010C	Chromium
ICP	EPA 200.7; EPA 6010C	Cobalt
ICP	EPA 200.7; EPA 6010C	Copper
ICP	EPA 200.7; EPA 6010C	Iron
ICP	EPA 200.7; EPA 6010C	Lead
ICP	EPA 200.7; EPA 6010C	Magnesium
ICP	EPA 200.7; EPA 6010C	Manganese
ICP	EPA 200.7; EPA 6010C	Molybdenum
ICP	EPA 200.7; EPA 6010C	Nickel
ICP	EPA 200.7; EPA 6010C	Potassium
ICP	EPA 200.7; EPA 6010C	Selenium
ICP	EPA 200.7; EPA 6010C	Silver
ICP	EPA 200.7; EPA 6010C	Sodium
ICP	EPA 200.7; EPA 6010C	Strontium
ICP	EPA 200.7; EPA 6010C	Thallium
ICP	EPA 200.7; EPA 6010C	Tin
ICP	EPA 200.7; EPA 6010C	Titanium
ICP	EPA 200.7; EPA 6010C	Vanadium
ICP	EPA 200.7; EPA 6010C	Zinc
ICP/MS	EPA 200.8; EPA 6020A	Aluminum
ICP/MS	EPA 200.8; EPA 6020A	Antimony
ICP/MS	EPA 200.8; EPA 6020A	Arsenic
ICP/MS	EPA 200.8; EPA 6020A	Barium
ICP/MS	EPA 200.8; EPA 6020A	Beryllium
ICP/MS	EPA 200.8; EPA 6020A	Cadmium
ICP/MS	EPA 200.8; EPA 6020A	Calcium
ICP/MS	EPA 200.8; EPA 6020A	Chromium
ICP/MS	EPA 200.8; EPA 6020A	Cobalt
ICP/MS	EPA 200.8; EPA 6020A	Copper
ICP/MS	EPA 200.8; EPA 6020A	Iron
ICP/MS	EPA 200.8; EPA 6020A	Lead
ICP/MS	EPA 200.8; EPA 6020A	Magnesium
ICP/MS	EPA 200.8; EPA 6020A	Manganese
ICP/MS	EPA 200.8; EPA 6020A	Molybdenum
ICP/MS	EPA 200.8; EPA 6020A	Nickel

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
ICP/MS	EPA 200.8; EPA 6020A	Potassium
ICP/MS	EPA 200.8; EPA 6020A	Selenium
ICP/MS	EPA 200.8; EPA 6020A	Silver
ICP/MS	EPA 200.8; EPA 6020A	Sodium
ICP/MS	EPA 200.8; EPA 6020A	Strontium
ICP/MS	EPA 200.8; EPA 6020A	Thallium
ICP/MS	EPA 200.8; EPA 6020A	Tin
ICP/MS	EPA 200.8; EPA 6020A	Titanium
ICP/MS	EPA 200.8; EPA 6020A	Vanadium
ICP/MS	EPA 200.8; EPA 6020A	Zinc
CVAA	EPA 7470A	Mercury
UV/VIS	EPA 7196A	Hexavalent Chromium (Cr6+)
UV/VIS	EPA 9012B	Cyanide (Total)
IC	EPA 300; EPA 9056A	Bromide
IC	EPA 300; EPA 9056A	Chloride
IC	EPA 300; EPA 9056A	Fluoride
IC	EPA 300; EPA 9056A	Nitrate
IC	EPA 300; EPA 9056A	Nitrite
IC	EPA 300; EPA 9056A	Sulfate
IC	EPA 300; EPA 9056A	Total nitrate-nitrite
Automated Colorimetry	EPA 350.1	Ammonia
Automated Colorimetry	EPA 351.2	Total Kjeldahl Nitrogen
Automated Colorimetry	EPA 420.4	Total Phenolics
Automated Colorimetry	EPA 353.2	Nitrate
Automated Colorimetry	EPA 353.2	Nitrite
Automated Colorimetry	EPA 353.2	Nitrate+Nitrite
Manual Colorimetry	EPA 365.3	Orthophosphate
Manual Colorimetry	EPA 365.3	Total Phosphorus
Titrimetric	SM 2320B-11	Alkalinity, Total
Titrimetric	SM 4500-S2 F-11	Sulfide, Iodometric
Gravimetric Methods	EPA 1664A; EPA 9070A	Oil and Grease
Gravimetric Methods	SM 2540B-11	Total Residue (Total Solids)
Gravimetric Methods	SM 2540C-11	Filterable Residue (Total Dissolved Solids)

<b>Non-Potable Water</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
Gravimetric Methods	SM 2540D-11	Non-Filterable Residue (Total Suspended Solids)
Electrometric Methods	SM 4500H+B-11; EPA 9040C	Hydrogen Ion (Ph)
Electrometric Methods	EPA 120.1	Specific conductivity
Combustion	EPA 9060A	Total Organic Carbon
Ignitability	EPA 1010A	Flash Point
Waste Characterization	EPA Ch.7	Reactive Cyanide and Reactive Sulfide
Waste Characterization	EPA Section 7.3	Reactive Cyanide
Waste Characterization	EPA Section 7.3	Reactive Sulfide
<b>Preparation</b>	<b>Method</b>	<b>Type</b>
Organic Preparation	EPA 3510C	Separatory Funnel Liquid-Liquid Extraction
Organic Preparation	EPA 3511	Micro-extraction
Organic Preparation	EPA 3535A; EPA 3535A MOD	Solid Phase Extraction
Organic Preparation	EPA 8015C/D	Non-Halogenated Organics (Alcohols), direct injection
Organic Preparation	EPA 8151A	Chlorinated Herbicides, Liquid-Liquid Extraction
Organic Preparation	EPA 608; EPA 610; EPA 625	Separatory Funnel Liquid-Liquid Extraction
Volatile Organic Preparation	SW836 5030B	Closed System Purge and Trap
Volatile Organic Preparation	EPA 624	Closed System Purge and Trap
Volatile Organic Preparation	SM 6200B-11	Closed System Purge and Trap
Lachat MicroDistillation	EPA 9012B	Cyanide MicroDistillation; proprietary method
Inorganic Preparation	EPA 3010C	Metals Acid Digestion by Hotblock
Inorganic Preparation	EPA 7470A	CVAA Digestion by Hotblock
Organics Cleanup	EPA 3660B	Sulfur Cleanup
Organics Cleanup	EPA 3665A	Sulfuric Acid Cleanup

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/ECD	EPA 8011	1,2-Dibromoethane (EDB)
GC/ECD	EPA 8011	1,2-Dibromo-3-Chloropropane (DBCP)
GC/FID	EPA 8015C/D	Diesel range organics (DRO)
GC/FID	EPA 8015C/D	Oil Range Organics (ORO)
GC/FID	EPA 8015C/D	Gasoline range organics (GRO)
GC/FID	EPA 8015C/D	Ethanol
GC/FID	EPA 8015C/D	2-Ethoxyethanol
GC/FID	EPA 8015C/D	Isobutyl alcohol (2-Methyl-1-propanol)
GC/FID	EPA 8015C/D	Isopropyl alcohol (2-Propanol)
GC/FID	EPA 8015C/D	Methanol
GC/FID	EPA 8015C/D	n-Butyl alcohol
GC/FID	EPA 8015C/D	n-Propanol
GC/ECD	EPA 8081B	4,4' -DDD
GC/ECD	EPA 8081B	4,4' -DDE
GC/ECD	EPA 8081B	4,4' -DDT
GC/ECD	EPA 8081B	Aldrin
GC/ECD	EPA 8081B	alpha-BHC (alpha-Hexachlorocyclohexane)
GC/ECD	EPA 8081B	beta-BHC (beta-Hexachlorocyclohexane)
GC/ECD	EPA 8081B	delta-BHC
GC/ECD	EPA 8081B	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC/ECD	EPA 8081B	Chlordane (tech.)
GC/ECD	EPA 8081B	alpha-Chlordane
GC/ECD	EPA 8081B	gamma-Chlordane
GC/ECD	EPA 8081B	Dieldrin
GC/ECD	EPA 8081B	Endosulfan I
GC/ECD	EPA 8081B	Endosulfan II
GC/ECD	EPA 8081B	Endosulfan sulfate
GC/ECD	EPA 8081B	Endrin
GC/ECD	EPA 8081B	Endrin aldehyde
GC/ECD	EPA 8081B	Endrin ketone
GC/ECD	EPA 8081B	Heptachlor
GC/ECD	EPA 8081B	Heptachlor epoxide
GC/ECD	EPA 8081B	Methoxychlor
GC/ECD	EPA 8081B	Toxaphene (Chlorinated camphene)
GC/ECD	EPA 8082A	Aroclor-1016 (PCB-1016)
GC/ECD	EPA 8082A	Aroclor-1221 (PCB-1221)
GC/ECD	EPA 8082A	Aroclor-1232 (PCB-1232)
GC/ECD	EPA 8082A	Aroclor-1242 (PCB-1242)
GC/ECD	EPA 8082A	Aroclor-1248 (PCB-1248)
GC/ECD	EPA 8082A	Aroclor-1254 (PCB-1254)

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/ECD	EPA 8082A	Aroclor-1260 (PCB-1260)
GC/ECD	EPA 8082A	Aroclor-1262 (PCB-1262)
GC/ECD	EPA 8082A	Aroclor-1268 (PCB-1268)
GC/ECD	EPA 8082A	2,4'-diCB bz8
GC/ECD	EPA 8082A	2,2',5-trCB bz18
GC/ECD	EPA 8082A	2,4,4'-trCB bz28
GC/ECD	EPA 8082A	2,2',3,5'-teCB bz44
GC/ECD	EPA 8082A	2,2',4,5'-teCB bz49
GC/ECD	EPA 8082A	2,2',5,5'-teCB bz52
GC/ECD	EPA 8082A	2,3'4,4'-teCB bz66
GC/ECD	EPA 8082A	3,3',4,4'-teCB bz77
GC/ECD	EPA 8082A	3,4,4',5-teCB bz81
GC/ECD	EPA 8082A	2,2',3,4,5'-peCB bz87
GC/ECD	EPA 8082A	2,2',3,4',5-peCB bz90
GC/ECD	EPA 8082A	2,2',4,5,5'-peCB bz101
GC/ECD	EPA 8082A	2,3,3',4,4'-peCB bz105
GC/ECD	EPA 8082A	2,3',4,4',5-peCB bz118
GC/ECD	EPA 8082A	2',3,4,4',5-peCB bz123
GC/ECD	EPA 8082A	3,3',4,4',5-peCB bz126
GC/ECD	EPA 8082A	2,2',3,3',4,4'-hxCB bz128
GC/ECD	EPA 8082A	2,2',3,4,4',5'-hxCB bz138
GC/ECD	EPA 8082A	2,2',3,5,5',6-hxCB bz151
GC/ECD	EPA 8082A	2,2',4,4',5,5'-hxCB bz153
GC/ECD	EPA 8082A	2,3,3',4,4',5-hxCB bz156
GC/ECD	EPA 8082A	2,3,3',4,4',5'-hxCB bz157
GC/ECD	EPA 8082A	2,3',4,4',5,5'-hxCB bz167
GC/ECD	EPA 8082A	3,3',4,4',5,5'-hxCB bz169
GC/ECD	EPA 8082A	2,2',3,3',4,4',5-hpCB bz170
GC/ECD	EPA 8082A	2,2',3,4,4',5,5'-hpCB bz180
GC/ECD	EPA 8082A	2,2',3,4,4',5',6-hpCB bz183
GC/ECD	EPA 8082A	2,2',3,4,4',6,6'-hpCB bz184
GC/ECD	EPA 8082A	2,2',3,4',5,5',6-hpCB bz187
GC/ECD	EPA 8082A	2,3,3',4,4',5,5'-hpCB bz189
GC/ECD	EPA 8082A	2,2',3,3',4,4',5,6-ocCB bz195
GC/ECD	EPA 8082A	2,2',3,3',4,4',5,5',6-noCB bz206
GC/ECD	EPA 8082A	Decachlorobiphenyl bz209
GC/FPD	EPA 8141B	Azinphos-methyl (Guthion)
GC/FPD	EPA 8141B	Bolstar (Sulprofos)
GC/FPD	EPA 8141B	Carbophenothion
GC/FPD	EPA 8141B	Chlorpyrifos
GC/FPD	EPA 8141B	Coumaphos
GC/FPD	EPA 8141B	Demeton-o

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/FPD	EPA 8141B	Demeton-s
GC/FPD	EPA 8141B	Diazinon
GC/FPD	EPA 8141B	Dichlorovos (DDVP Dichlorvos)
GC/FPD	EPA 8141B	Dimethoate
GC/FPD	EPA 8141B	Disulfoton
GC/FPD	EPA 8141B	EPN
GC/FPD	EPA 8141B	Ethion
GC/FPD	EPA 8141B	Ethoprop
GC/FPD	EPA 8141B	Famphur
GC/FPD	EPA 8141B	Fensulfothion
GC/FPD	EPA 8141B	Fenthion
GC/FPD	EPA 8141B	Malathion
GC/FPD	EPA 8141B	Merphos
GC/FPD	EPA 8141B	Methyl parathion (Parathion methyl)
GC/FPD	EPA 8141B	Mevinphos
GC/FPD	EPA 8141B	Monocrotophos
GC/FPD	EPA 8141B	Naled
GC/FPD	EPA 8141B	Parathion ethyl
GC/FPD	EPA 8141B	Phorate
GC/FPD	EPA 8141B	Ronnel
GC/FPD	EPA 8141B	Stirofos
GC/FPD	EPA 8141B	Sulfotepp
GC/FPD	EPA 8141B	Tetraethyl pyrophosphate (TEPP)
GC/FPD	EPA 8141B	Thionazin (Zinophos)
GC/FPD	EPA 8141B	Tokuthion (Prothiophos)
GC/FPD	EPA 8141B	Trichloronate
GC/FPD	EPA 8141B	O,O,O-Triethyl phosphorothioate
GC/ECD	EPA 8151A	2,4,5-T
GC/ECD	EPA 8151A	2,4-D
GC/ECD	EPA 8151A	2,4-DB
GC/ECD	EPA 8151A	Dalapon
GC/ECD	EPA 8151A	Dicamba
GC/ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC/ECD	EPA 8151A	Dinoseb (2-sec-butyl-4,6-dinitrophenol DNBP)
GC/ECD	EPA 8151A	MCPA
GC/ECD	EPA 8151A	MCPP
GC/ECD	EPA 8151A	Pentachlorophenol
GC/ECD	EPA 8151A	Silvex (2,4,5-TP)
GC/FID	FL-PRO	Total Petroleum Hydrocarbons (TPH)
GC/FID	MA-VPH	Volatile petroleum range organics (VPH)
GC/FID	MA-EPH	Extractable petroleum range organics (EPH)

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/FID	IA-OA1	Gasoline range organics (GRO)
GC/FID	IA-OA2	Diesel range organics (DRO)
GC/FID	TN-GRO	Gasoline range organics (GRO)
GC/FID	TN-EPH	Extractable petroleum range organics (EPH)
GC/FID	AK-101	Gasoline range organics (GRO)
GC/FID	AK-102	Diesel range organics (DRO)
GC/FID	AK-103	Residual range organics (RRO)
GC/FID	OK-GRO	Gasoline range organics (GRO)
GC/FID	OK-DRO	Diesel range organics (DRO)
GC/FID	TX-1005	Total Petroleum Hydrocarbons (TPH)
GC/MS	EPA 8260B/C	1,1,1,2-Tetrachloroethane
GC/MS	EPA 8260B/C	1,1,1-Trichloroethane
GC/MS	EPA 8260B/C	1,1,2,2-Tetrachloroethane
GC/MS	EPA 8260B/C	1,1,2-Trichloroethane
GC/MS	EPA 8260B/C	1,1-Dichloroethane
GC/MS	EPA 8260B/C	1,1-Dichloroethylene
GC/MS	EPA 8260B/C	1,1-Dichloropropene
GC/MS	EPA 8260B/C	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 8260B/C	1,2,3-Trichlorobenzene
GC/MS	EPA 8260B/C	1,2,3-Trichloropropane
GC/MS	EPA 8260B/C	1,2,4-Trichlorobenzene
GC/MS	EPA 8260B/C	1,2,4-Trimethylbenzene
GC/MS	EPA 8260B/C	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 8260B/C	1,2-Dibromoethane (EDB Ethylene dibromide)
GC/MS	EPA 8260B/C	1,2-Dichlorobenzene (o-Dichlorobenzene)
GC/MS	EPA 8260B/C	1,2-Dichloroethane
GC/MS	EPA 8260B/C	1,2-Dichloropropane
GC/MS	EPA 8260B/C	1,2-Dichlorotrifluoroethane (Freon 123)
GC/MS	EPA 8260B/C	1,3,5-Trimethylbenzene
GC/MS	EPA 8260B/C	1,3-Dichlorobenzene (m-Dichlorobenzene)
GC/MS	EPA 8260B/C	1,3-Dichloropropane
GC/MS	EPA 8260B/C	1,4-Dichlorobenzene (p-Dichlorobenzene)
GC/MS	EPA 8260B/C	1-Chlorohexane
GC/MS	EPA 8260B/C	2,2-Dichloropropane
GC/MS	EPA 8260B/C	2-Butanone (Methyl ethyl ketone MEK)
GC/MS	EPA 8260B/C	2-Chloroethyl vinyl ether
GC/MS	EPA 8260B/C	2-Chlorotoluene
GC/MS	EPA 8260B/C	2-Hexanone
GC/MS	EPA 8260B/C	2-Nitropropane
GC/MS	EPA 8260B/C	4-Chlorotoluene
GC/MS	EPA 8260B/C	4-Methyl-2-pentanone (MBK)

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8260B/C	Acetone
GC/MS	EPA 8260B/C	Acetonitrile
GC/MS	EPA 8260B/C	Acrolein (Propenal)
GC/MS	EPA 8260B/C	Acrylonitrile
GC/MS	EPA 8260B/C	Allyl chloride (3-Chloropropene)
GC/MS	EPA 8260B/C	Benzene
GC/MS	EPA 8260B/C	Benzyl Chloride
GC/MS	EPA 8260B/C	Bromobenzene
GC/MS	EPA 8260B/C	Bromochloromethane
GC/MS	EPA 8260B/C	Bromodichloromethane
GC/MS	EPA 8260B/C	Bromoform
GC/MS	EPA 8260B/C	n-Butylbenzene
GC/MS	EPA 8260B/C	sec-Butylbenzene
GC/MS	EPA 8260B/C	tert-Butylbenzene
GC/MS	EPA 8260B/C	Carbon disulfide
GC/MS	EPA 8260B/C	Carbon tetrachloride
GC/MS	EPA 8260B/C	Chlorobenzene
GC/MS	EPA 8260B/C	Chloroethane
GC/MS	EPA 8260B/C	Chloroform
GC/MS	EPA 8260B/C	Chloroprene
GC/MS	EPA 8260B/C	Cyclohexane
GC/MS	EPA 8260B/C	Cyclohexanone
GC/MS	EPA 8260B/C	cis-1,2-Dichloroethylene
GC/MS	EPA 8260B/C	trans-1,2-Dichloroethylene
GC/MS	EPA 8260B/C	cis-1,3-Dichloropropene
GC/MS	EPA 8260B/C	trans-1,3-Dichloropropylene
GC/MS	EPA 8260B/C	cis-1,4-Dichloro-2-butene
GC/MS	EPA 8260B/C	trans-1,4-Dichloro-2-butene
GC/MS	EPA 8260B/C	Di-isopropylether (DIPE)
GC/MS	EPA 8260B/C	Dibromochloromethane
GC/MS	EPA 8260B/C	Dibromomethane (Methylene Bromide)
GC/MS	EPA 8260B/C	Dichlorodifluoromethane
GC/MS	EPA 8260B/C	Diethyl ether
GC/MS	EPA 8260B/C; EPA 8260B/C SIM	p-Dioxane (1,4-Dioxane)
GC/MS	EPA 8260B/C	Ethanol (Ethyl Alcohol)
GC/MS	EPA 8260B/C	Ethyl acetate
GC/MS	EPA 8260B/C	Ethyl methacrylate
GC/MS	EPA 8260B/C	Ethyl tert-butyl alcohol (ETBA)
GC/MS	EPA 8260B/C	Ethyl tert-butyl ether (ETBE)
GC/MS	EPA 8260B/C	Ethylbenzene
GC/MS	EPA 8260B/C	Ethylene Oxide

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8260B/C	Hexachlorobutadiene
GC/MS	EPA 8260B/C	Hexane
GC/MS	EPA 8260B/C	Iodomethane (Methyl iodide)
GC/MS	EPA 8260B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC/MS	EPA 8260B/C	p-Isopropyltoluene
GC/MS	EPA 8260B/C	Isopropylbenzene
GC/MS	EPA 8260B/C	Methacrylonitrile
GC/MS	EPA 8260B/C	Methyl Acetate
GC/MS	EPA 8260B/C	Methyl bromide (Bromomethane)
GC/MS	EPA 8260B/C	Methyl chloride (Chloromethane)
GC/MS	EPA 8260B/C	Methylcyclohexane
GC/MS	EPA 8260B/C	Methyl methacrylate
GC/MS	EPA 8260B/C	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 8260B/C	Methylene chloride
GC/MS	EPA 8260B/C	Naphthalene
GC/MS	EPA 8260B/C	Pentachloroethane
GC/MS	EPA 8260B/C	Propionitrile (Ethyl cyanide)
GC/MS	EPA 8260B/C	n-Propylbenzene
GC/MS	EPA 8260B/C	Styrene
GC/MS	EPA 8260B/C	tert-Amyl alcohol (TAA)
GC/MS	EPA 8260B/C	tert-Amyl methyl ether (TAME)
GC/MS	EPA 8260B/C	tert-Butyl alcohol (TBA)
GC/MS	EPA 8260B/C	tert-Butyl formate (TBF)
GC/MS	EPA 8260B/C	Tetrachloroethylene (Perchloroethylene)
GC/MS	EPA 8260B/C	Tetrahydrofuran
GC/MS	EPA 8260B/C	Toluene
GC/MS	EPA 8260B/C	Trichloroethene (Trichloroethylene)
GC/MS	EPA 8260B/C	Trichlorofluoromethane
GC/MS	EPA 8260B/C	Vinyl acetate
GC/MS	EPA 8260B/C	Vinyl chloride
GC/MS	EPA 8260B/C	Xylene (total)
GC/MS	EPA 8260B/C	m,p-Xylene
GC/MS	EPA 8260B/C	o-Xylene
GC/MS	EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 8270D	1,2,4-Trichlorobenzene
GC/MS	EPA 8270D	1,2-Dichlorobenzene (o-Dichlorobenzene)
GC/MS	EPA 8270D	1,2-Diphenylhydrazine
GC/MS	EPA 8270D	1,3,5-Trinitrobenzene (1,3,5-TNB)
GC/MS	EPA 8270D	1,3-Dichlorobenzene (m-Dichlorobenzene)
GC/MS	EPA 8270D	1,3-Dinitrobenzene (1,3-DNB)
GC/MS	EPA 8270D	1,4-Dichlorobenzene (p-Dichlorobenzene)

<b>Solid and Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8270D	1,4-Dithiane
GC/MS	EPA 8270D	1,4-Oxathiane
GC/MS	EPA 8270D	1,4-Naphthoquinone
GC/MS	EPA 8270D	1,4-Phenylenediamine
GC/MS	EPA 8270D	1-Chloronaphthalene
GC/MS	EPA 8270D; EPA 8270D SIM	1-Methylnaphthalene
GC/MS	EPA 8270D	1-Naphthylamine
GC/MS	EPA 8270D	2,3,4,6-Tetrachlorophenol
GC/MS	EPA 8270D	2,4,5-Trichlorophenol
GC/MS	EPA 8270D	2,4,6-Trichlorophenol
GC/MS	EPA 8270D	2,4-Dichlorophenol
GC/MS	EPA 8270D	2,4-Dimethylphenol
GC/MS	EPA 8270D	2,4-Dinitrophenol
GC/MS	EPA 8270D	2,4-Dinitrotoluene (2,4-DNT)
GC/MS	EPA 8270D	2,6-Dichlorophenol
GC/MS	EPA 8270D	2,6-Dinitrotoluene (2,6-DNT)
GC/MS	EPA 8270D	2-Acetylaminofluorene
GC/MS	EPA 8270D	2-Chloronaphthalene
GC/MS	EPA 8270D	2-Chlorophenol
GC/MS	EPA 8270D	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-o-cresol)
GC/MS	EPA 8270D; EPA 8270D SIM	2-Methylnaphthalene
GC/MS	EPA 8270D	2-Methylphenol (o-Cresol)
GC/MS	EPA 8270D	2-Naphthylamine
GC/MS	EPA 8270D	2-Nitroaniline
GC/MS	EPA 8270D	2-Nitrophenol
GC/MS	EPA 8270D	2-Picoline (2-Methylpyridine)
GC/MS	EPA 8270D	3,3'-Dichlorobenzidine
GC/MS	EPA 8270D	3,3'-Dimethylbenzidine
GC/MS	EPA 8270D	3-Methylcholanthrene
GC/MS	EPA 8270D	3&4-Methylphenol (m,p-Cresol)
GC/MS	EPA 8270D	3-Nitroaniline
GC/MS	EPA 8270D	4-Aminobiphenyl
GC/MS	EPA 8270D	4-Bromophenyl phenyl ether
GC/MS	EPA 8270D	4-Chloro-3-methylphenol
GC/MS	EPA 8270D	4-Chloroaniline
GC/MS	EPA 8270D	4-Chlorophenyl phenylether
GC/MS	EPA 8270D	4-Dimethyl aminoazobenzene
GC/MS	EPA 8270D	4-Nitroaniline
GC/MS	EPA 8270D	4-Nitrophenol
GC/MS	EPA 8270D	4,4'-methylene-bis(2-chloroaniline)
GC/MS	EPA 8270D	5-Nitro-o-toluidine

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8270D	7,12-Dimethylbenz(a) anthracene
GC/MS	EPA 8270D; EPA 8270D SIM	Acenaphthene
GC/MS	EPA 8270D; EPA 8270D SIM	Acenaphthylene
GC/MS	EPA 8270D	Acetophenone
GC/MS	EPA 8270D	Aniline
GC/MS	EPA 8270D	Anilazine
GC/MS	EPA 8270D; EPA 8270D SIM	Anthracene
GC/MS	EPA 8270D	Aramite
GC/MS	EPA 8270D	Atrazine
GC/MS	EPA 8270D	Benzaldehyde
GC/MS	EPA 8270D	Benzidine
GC/MS	EPA 8270D; EPA 8270D SIM	Benzo(a)anthracene
GC/MS	EPA 8270D; EPA 8270D SIM	Benzo(a)pyrene
GC/MS	EPA 8270D; EPA 8270D SIM	Benzo(b)fluoranthene
GC/MS	EPA 8270D; EPA 8270D SIM	Benzo(g,h,i)perylene
GC/MS	EPA 8270D; EPA 8270D SIM	Benzo(k)fluoranthene
GC/MS	EPA 8270D	Benzoic acid
GC/MS	EPA 8270D	Benzyl alcohol
GC/MS	EPA 8270D	Biphenyl (1,1'-Biphenyl)
GC/MS	EPA 8270D	bis(2-Chloroethoxy)methane
GC/MS	EPA 8270D	bis(2-Chloroethyl) ether
GC/MS	EPA 8270D	bis(2-Chloroisopropyl) ether (2,2'-Oxybis(1-chloropropane))
GC/MS	EPA 8270D	bis(2-Ethylhexyl) phthalate (DEHP)
GC/MS	EPA 8270D	Butyl benzyl phthalate
GC/MS	EPA 8270D	Carbazole
GC/MS	EPA 8270D	Caprolactam
GC/MS	EPA 8270D	Chlorobenzilate
GC/MS	EPA 8270D; EPA 8270D SIM	Chrysene
GC/MS	EPA 8270D	Diallate
GC/MS	EPA 8270D	Di-n-butyl phthalate
GC/MS	EPA 8270D	Di-n-octyl phthalate
GC/MS	EPA 8270D; EPA 8270D SIM	Dibenz(a,h)anthracene
GC/MS	EPA 8270D	Dibenz(a,j)acridine
GC/MS	EPA 8270D	Dibenzofuran
GC/MS	EPA 8270D	Diethyl phthalate
GC/MS	EPA 8270D	Dimethyl phthalate
GC/MS	EPA 8270D	a,a-Dimethylphenethylamine
GC/MS	EPA 8270D	Diphenyl Ether
GC/MS	EPA 8270D	p-Dioxane (1,4-Dioxane)
GC/MS	EPA 8270D	Ethyl methanesulfonate
GC/MS	EPA 8270D; EPA 8270D SIM	Fluoranthene

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8270D; EPA 8270D SIM	Fluorene
GC/MS	EPA 8270D	Hexachlorobenzene
GC/MS	EPA 8270D	Hexachlorobutadiene
GC/MS	EPA 8270D	Hexachlorocyclopentadiene
GC/MS	EPA 8270D	Hexachloroethane
GC/MS	EPA 8270D	Hexachlorophene
GC/MS	EPA 8270D	Hexachloropropene
GC/MS	EPA 8270D; EPA 8270D SIM	Indeno(1,2,3-cd)pyrene
GC/MS	EPA 8270D	Isodrin
GC/MS	EPA 8270D	Isophorone
GC/MS	EPA 8270D	Isosafrole
GC/MS	EPA 8270D	Kepone
GC/MS	EPA 8270D	Methapyrilene
GC/MS	EPA 8270D	Methyl methanesulfonate
GC/MS	EPA 8270D; EPA 8270D SIM	Naphthalene
GC/MS	EPA 8270D	Nicotine
GC/MS	EPA 8270D	Nitrobenzene
GC/MS	EPA 8270D	Nitroquinoline-1-oxide
GC/MS	EPA 8270D	n-Nitroso-di-n-butylamine
GC/MS	EPA 8270D	n-Nitrosodi-n-propylamine
GC/MS	EPA 8270D	n-Nitrosodiethylamine
GC/MS	EPA 8270D	n-Nitrosodimethylamine
GC/MS	EPA 8270D	n-Nitrosodiphenylamine
GC/MS	EPA 8270D	n-Nitrosodiphenylamine/Diphenylamine (analyte pair)
GC/MS	EPA 8270D	n-Nitrosomethylethylamine
GC/MS	EPA 8270D	n-Nitrosomorpholine
GC/MS	EPA 8270D	n-Nitrosopiperidine
GC/MS	EPA 8270D	n-Nitrosopyrrolidine
GC/MS	EPA 8270D	Pentachlorobenzene
GC/MS	EPA 8270D	Pentachloroethane
GC/MS	EPA 8270D	Pentachloronitrobenzene
GC/MS	EPA 8270D; EPA 8270D SIM	Pentachlorophenol
GC/MS	EPA 8270D	Phenacetin
GC/MS	EPA 8270D; EPA 8270D SIM	Phenanthrene
GC/MS	EPA 8270D	Phenol
GC/MS	EPA 8270D	Pronamide (Kerb)
GC/MS	EPA 8270D	Propazine
GC/MS	EPA 8270D; EPA 8270D SIM	Pyrene
GC/MS	EPA 8270D	Pyridine
GC/MS	EPA 8270D	Resorcinol
GC/MS	EPA 8270D	Safrole

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
GC/MS	EPA 8270D	Simazine
GC/MS	EPA 8270D	o-Toluidine
GC/MS	EPA 8270D	Dimethoate
GC/MS	EPA 8270D	Disulfoton
GC/MS	EPA 8270D	Famphur
GC/MS	EPA 8270D	Methyl parathion (Parathion methyl)
GC/MS	EPA 8270D	Parathion ethyl
GC/MS	EPA 8270D	Phorate
GC/MS	EPA 8270D	Sulfotepp
GC/MS	EPA 8270D	Thionazin (Zinophos)
GC/MS	EPA 8270D	O,O,O-Triethyl phosphorothioate
HPLC	EPA 8310	1-Methylnaphthalene
HPLC	EPA 8310	2-Methylnaphthalene
HPLC	EPA 8310	Acenaphthene
HPLC	EPA 8310	Acenaphthylene
HPLC	EPA 8310	Anthracene
HPLC	EPA 8310	Benzo(a)anthracene
HPLC	EPA 8310	Benzo(a)pyrene
HPLC	EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 8310	Benzo(g h i)perylene
HPLC	EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 8310	Chrysene
HPLC	EPA 8310	Dibenz(a h)anthracene
HPLC	EPA 8310	Fluoranthene
HPLC	EPA 8310	Fluorene
HPLC	EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 8310	Naphthalene
HPLC	EPA 8310	Phenanthrene
HPLC	EPA 8310	Pyrene
HPLC	EPA 8330A/B	1,3,5-Trinitrobenzene (1,3,5-TNB)
HPLC	EPA 8330A/B	1,3-Dinitrobenzene (1,3-DNB)
HPLC	EPA 8330A/B	2,4,6-Trinitrotoluene (2,4,6-TNT)
HPLC	EPA 8330A/B	2,4-Dinitrotoluene (2,4-DNT)
HPLC	EPA 8330A/B	2,6-Dinitrotoluene (2,6-DNT)
HPLC	EPA 8330A/B	2-Amino-4,6-dinitrotoluene (2-am-dnt)
HPLC	EPA 8330A/B	2-Nitrotoluene
HPLC	EPA 8330A/B	3,5-Dinitroaniline
HPLC	EPA 8330A/B	3-Nitrotoluene
HPLC	EPA 8330A/B	4-Amino-2,6-dinitrotoluene (4-am-dnt)
HPLC	EPA 8330A/B	4-Nitrotoluene
HPLC	EPA 8330A/B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
HPLC	EPA 8330A/B	Nitrobenzene
HPLC	EPA 8330A/B; EPA 8332	Nitroglycerin
HPLC	EPA 8330A/B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
HPLC	EPA 8330A/B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
HPLC	EPA 8330A/B; EPA 8332	Pentaerythritoltetranitrate (PETN)
HPLC	EPA 8330A	2,2',6,6'-Tetranitro-4,4'-azoxytoluene
HPLC	EPA 8330A/B	2-amino-6-Nitrotoluene
HPLC	EPA 8330A/B	4-amino-2-Nitrotoluene
HPLC	EPA 8330A/B	2-amino-4-Nitrotoluene
HPLC	EPA 8330A/B	2,4-diamino-6-Nitrotoluene
HPLC	EPA 8330A/B	2,6-diamino-4-Nitrotoluene
HPLC	EPA 8330A/B	DNX
HPLC	EPA 8330A/B	MNX
HPLC	EPA 8330A/B	TNX
LC/MS/MS	EPA 6850	Perchlorate
LC/MS/MS	EPA 537 MOD	Perfluorobutanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoropentanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorohexanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoroheptanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorooctanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorononanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorodecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluoroundecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorododecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotridecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotridecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorotetradecanoic Acid
LC/MS/MS	EPA 537 MOD	Perfluorobutanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorohexanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorooctanesulfonic Acid
LC/MS/MS	EPA 537 MOD	Perfluorodecanesulfonic Acid
ICP	EPA 6010C	Aluminum
ICP	EPA 6010C	Antimony
ICP	EPA 6010C	Arsenic
ICP	EPA 6010C	Barium
ICP	EPA 6010C	Beryllium
ICP	EPA 6010C	Cadmium
ICP	EPA 6010C	Calcium
ICP	EPA 6010C	Chromium
ICP	EPA 6010C	Cobalt
ICP	EPA 6010C	Copper

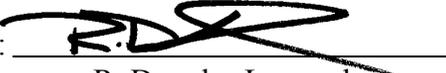
<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
ICP	EPA 6010C	Iron
ICP	EPA 6010C	Lead
ICP	EPA 6010C	Magnesium
ICP	EPA 6010C	Manganese
ICP	EPA 6010C	Molybdenum
ICP	EPA 6010C	Nickel
ICP	EPA 6010C	Potassium
ICP	EPA 6010C	Selenium
ICP	EPA 6010C	Silver
ICP	EPA 6010C	Sodium
ICP	EPA 6010C	Strontium
ICP	EPA 6010C	Thallium
ICP	EPA 6010C	Tin
ICP	EPA 6010C	Titanium
ICP	EPA 6010C	Vanadium
ICP	EPA 6010C	Zinc
ICP/MS	EPA 6020A	Aluminum
ICP/MS	EPA 6020A	Antimony
ICP/MS	EPA 6020A	Arsenic
ICP/MS	EPA 6020A	Barium
ICP/MS	EPA 6020A	Beryllium
ICP/MS	EPA 6020A	Cadmium
ICP/MS	EPA 6020A	Calcium
ICP/MS	EPA 6020A	Chromium
ICP/MS	EPA 6020A	Cobalt
ICP/MS	EPA 6020A	Copper
ICP/MS	EPA 6020A	Iron
ICP/MS	EPA 6020A	Lead
ICP/MS	EPA 6020A	Magnesium
ICP/MS	EPA 6020A	Manganese
ICP/MS	EPA 6020A	Molybdenum
ICP/MS	EPA 6020A	Nickel
ICP/MS	EPA 6020A	Potassium
ICP/MS	EPA 6020A	Selenium
ICP/MS	EPA 6020A	Silver
ICP/MS	EPA 6020A	Sodium
ICP/MS	EPA 6020A	Strontium
ICP/MS	EPA 6020A	Thallium
ICP/MS	EPA 6020A	Tin
ICP/MS	EPA 6020A	Titanium
ICP/MS	EPA 6020A	Vanadium

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
ICP/MS	EPA 6020A	Zinc
CVAA	EPA 7471B	Mercury
UV/VIS	EPA 7196A	Hexavalent Chromium (Cr6+)
UV/VIS	EPA 9012B	Cyanide (Total)
IC	EPA 9056A	Bromide
IC	EPA 9056A	Chloride
IC	EPA 9056A	Fluoride
IC	EPA 9056A	Nitrate
IC	EPA 9056A	Nitrite
IC	EPA 9056A	Sulfate
IC	EPA 9056A	Total nitrate-nitrite
Gravimetric Methods	SM 2540G	% solids
Gravimetric Methods	EPA 9071B	Oil and Grease
Electrometric Methods	EPA 9045D	Hydrogen Ion (pH)
Combustion	EPA 9060A	Total Organic Carbon
Ignitability	EPA 1010A	Flash Point
Waste Characterization	EPA Ch.7	Reactive Cyanide and Reactive Sulfide
Waste Characterization	EPA Section 7.3	Reactive Cyanide
Waste Characterization	EPA Section 7.3	Reactive Sulfide
<b>Preparation</b>	<b>Method</b>	<b>Type</b>
Organics Preparation	EPA 3510C	Separatory Funnel Liquid-Liquid Extraction; Leachates
TCLP Preparation	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP Preparation	EPA 1312	Synthetic Precipitation Leaching Procedure
Organics Preparation	EPA 8011	Microextraction
Organics Preparation	EPA 3546	Microwave Extraction
Organics Preparation	EPA 3550C	Ultrasonic Extraction
Organics Preparation	EPA 3580A	Waste Dilution for Extractable Organics
Organics Preparation	EPA 8330A; EPA 8332	Ultrasonic Extraction
Organics Preparation	EPA 8330B	Shaker Table Extraction
Volatile Organics Preparation	EPA 3585	Waste Dilution for Volatile Organics
Volatile Organics Preparation	EPA 5030A	Closed System Purge and Trap; Bulk Soils
Volatile Organics Preparation	EPA 5030B	Closed System Purge and Trap; Leachates and Methanol Extracts
Volatile Organics Preparation	EPA 5035; EPA 5035A	Closed System Purge and Trap
Organics Cleanup	EPA 3660B	Sulfur Cleanup
Organics Cleanup	EPA 3665A	Sulfuric Acid Cleanup

<b>Solid Chemical Materials</b>		
<b>Technology</b>	<b>Method</b>	<b>Analyte</b>
Lachat MicroDistillation	EPA 9012B	Cyanide MicroDistillation; proprietary method
Inorganic Preparation	EPA 3010C	Metals Acid Digestion by Hotblock; Leachates
Inorganic Preparation	EPA 3050B	Metals Acid Digestion by Hotblock
Inorganic Preparation	EPA 3060A	Alkaline Digestion, Cr6+
Inorganic Preparation	EPA 7470A	CVAA Digestion by Hotblock; Leachates
Inorganic Preparation	EPA 7471B	CVAA Digestion by Hotblock

Notes:

- 1) This laboratory offers commercial testing service.

Approved by:   
R. Douglas Leonard  
Chief Technical Officer

Date: January 22, 2015

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