

Prepared for:

TN & Associates, Inc.



U.S. Army Corps of Engineers



U.S. Environmental Protection Agency



## Remedial Action Workplan

**Pemaco Superfund Site**  
**5050 E. Slauson Avenue**  
**Maywood, California**

October 2006

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This *Remedial Action Workplan* (Workplan) has been developed pursuant to Section 5 of the *Remedial Design Report Draft-Final*, Vol. I, Vol. II, Pemaco Superfund Site, Maywood, California, June 2006, developed by TN & Associates, Inc. (TN&A, 2006). The Workplan provides guidance for building a treatment system at the Pemaco Superfund site ("site"; Figure 1). The City of Maywood, in conjunction with the Trust for Public Land, is developing the site and adjacent properties to build the Maywood Riverfront Park (the Park), a public recreation park. Future remedial activities at the site and adjacent properties will be integrated with the existence of this park. A detailed site background and investigation history and results are summarized in the *Remedial Design Report Draft-Final* (TN&A, 2006).

The scope of work presented in this Workplan involves procurement, installation, and operation of a vapor and groundwater treatment system. The Project Schedule is provided in Attachment A of Appendix C, the Construction Quality Control Plan. This system is an integral part of the larger electrical resistance heating (ERH) system that was chosen for remediation of volatile organic compounds (VOCs) at the site. These VOCs comprise gasoline-range hydrocarbons and chlorinated hydrocarbons, predominantly trichloroethene. TN&A designed the treatment system to be integrated with the ERH system to function as a single unit. The goals of the treatment system are two-fold:

1. Treat extracted vapors to the discharge limits of a typical South Coast Air Quality Management District (SCAQMD) Permit for the subject treatment system; and
2. Treat extracted groundwater from the dual-phase extraction pumps to meet the discharge limits specified by the Los Angeles County Sewer District (LACSD), with the exception of liquid-phase VOCs, which shall have a discharge concentration of less than the 100-microgram-per-liter remedial goal for the site.

The objective of the ERH for soil and groundwater is to volatilize the dissolved- and adsorbed-phase VOCs in the tight soils comprising the vadose and saturated zones in the target zone. Once volatilized, the bulk of the VOCs will be extracted as a vapor stream consisting of saturated VOCs, water vapor, and air at elevated temperatures. The vapors will be extracted under negative pressure by blowers controlled by the system programmable logic controller (PLC) and motor control center. The blowers will be located downstream of the moisture knockout, where



condensable vapors, mostly water, will be removed from the vapor stream. Water from the knockout will be pumped through single bag filters to holding tank V-106. Filters upstream and downstream of the blowers will remove particulates from the vapor stream prior to introduction to a flameless thermal oxidizer (FTO), which will oxidize the VOC vapor stream with high destruction efficiency. An acid gas scrubber, part of the FTO package, will be constructed off site, and delivered to the site as a single unit.

While the FTO is capable of meeting the SCAQMD permit requirements for off-gas concentrations, it is understood that a vapor conditioning package (VCP), consisting of a triple-core heat exchanger with cooling tower and chiller, will be provided by a contractor other than ERM. The VCP will be operated as a polishing unit to alleviate fears expressed by the neighborhood Remediation Review Committee regarding dioxin production and discharge. The polished vapor stream will be directed through the granular activated carbon (GAC) adsorbers by a blower located upstream and then discharged to the atmosphere. As with the FTO, the VCP will be assembled by an outside firm and delivered to the site for installation by the ERM team.

A rotary screw compressor, P-301, with an integral receiver tank and condensate drain, will be used to provide compressed air to downhole pneumatic pumps installed in the well field. These pumps will extract groundwater from the saturated zone and deliver it to a booster tank, V-110, where it is mixed with condensate water from the vapor condensate sump. The blended water stream will be pumped through a pair of bag filters, F-107 and -108, into holding tank V-106, where it will be further blended with the water from the moisture knockout. Vapors from both the holding tank, V-106, and the booster tank, V-110 will be vented through a 200-pound GAC absorber for treatment. Water from the holding tank will be pumped through a second pair of bag filters, F-109 and -110, and through liquid-phase GAC adsorbers before discharge to the sanitary sewer. A sampling box will be installed above grade, upstream of the sewer connection for LACSD compliance monitoring.

All equipment, including owner-supplied equipment, will be thoroughly inspected at delivery to ensure damage-free condition. The equipment will be stored for installation at the proper time in the installation sequence. Installation will be as noted on Drawings M-1 and M-4 and in the specifications. The location and orientation of all equipment will be coordinated with the TN&A design engineer to ensure that the equipment is located to optimize access and Operations and Maintenance (O&M) performance. All skid-mounted equipment will be bolted to the floor in compliance with seismic restraint requirements applicable for the piece of

equipment. The groundwater, vapor, and air piping manifolds will be supported using deep Unistrut channel, clamps and post bases. Inlet and outlets to all skid mounted equipment will include Vanstone-style flanges to enable removal and service of equipment if necessary. The piping between skids will be 8 feet in height, where applicable, to allow forklift access. All piping influent and effluent of flow measuring instruments will take into consideration minimum straight-pipe-run requirements per manufacturer recommendations. ERM will ensure that the pipe layout and elevations meet the performance standards of the instrumentation and equipment, and design the system to facilitate future O&M efforts.

All work performed pursuant to the Workplan shall conform to the Drawings and Specifications detailed in the *Remedial Design Report Draft-Final*, Vol. I, Vol. II (TN&A, 2006).

The remainder of the Workplan consists of the following:

- Section 2 describes construction implementation and temporary facilities;
- Section 3 outlines instructions for installation of remedial treatment process equipment;
- Section 4 provides guidance for installation of process piping, valves and associated apparatus;
- Section 5 provides instruction for electrical equipment connections;
- Section 6 describes PLC wiring and connections; and
- Section 7 lists references used in preparing this document.

Appendices to this Workplan include the following:

- Site Safety and Health Plan (SSHP) (Appendix A), which is an amendment to the existing Remedial Investigation/Feasibility Study SSHP (TN&A, 2001);
- Environmental Compliance Plan (Appendix B) describing air quality compliance during the remedial construction and characterization;
- Construction Quality Control Plan (Appendix C), which establishes project organization and includes requirements for independent evaluation of construction conformance to design specifications; and
- Waste Management Plan (Appendix D) which details management of anticipated non-hazardous and hazardous wastes generated at the site.

This section describes the various construction issues involved in building the treatment system.

The following topics are addressed:

- Identification of interagency coordination and communication;
- Site preparation;
- Property access and contractor identification; and
- Staging requirements.

Construction implementation issues are also addressed in Section 5 of the *Remedial Design Report Draft-Final* (TN&A, 2006). Temporary construction facilities are addressed in Section 01500 of the project specifications.

## 2.1

### **INTERAGENCY COORDINATION AND COMMUNICATION**

Federal law provides that response actions performed under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), such as the Pemaco site activities, are exempt from the requirement to obtain federal, state, or local permits related to any activities conducted on the CERCLA site (United States Environmental Protection Agency [USEPA], 1992). It is USEPA policy to ensure that all activities conducted on CERCLA sites are protective of human health and the environment. As the lead agency for this project, the USEPA will coordinate and consult with state and local agencies to facilitate CERCLA actions at the site. Section 5.1 of the *Remedial Design Report, Draft-Final* (TN&A, 2006) describes the state and local agencies with whom the USEPA will coordinate and consult, along with applicable federal, state, and local regulations protective of human health and the environment with which the project will comply.

## 2.2

### **SITE PREPARATION**

Site preparation activities include:

- Locating subsurface utilities;
- Establishing temporary office facilities and utilities for construction;

- Erecting a project communication bulletin board;
- Defining temporary construction staging and storage areas;
- Installing sanitation facilities; and
- Locating waste disposal and stockpile areas.

ERM shall locate existing subsurface utilities and remedial piping as required for completion of construction activities under this Workplan. Note that approximate locations for existing and proposed utilities are depicted on Figure 2.

Site preparation infrastructure for construction activities to be completed under this Workplan is to be located near the Treatment Compound as depicted on Figure 2. ERM will be provided with existing office and telephone service within the TN&A office trailer.

Water and electrical service are available near the Office Trailer. There is a water supply stub-up next to the water meter at the southeastern end of the Site. Two water taps are available on the bike path wall, one on the northern end of the Office Trailer and one south of the office trailer close to the ingress and egress gate. ERM may also use the power from the Office Trailer.

A bulletin board will be established in front of the office trailer to display an Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, a Wage Rate Information poster, pertinent health and safety information, and other information approved by the USEPA.

Sanitation facilities will be located adjacent to the Conex Box north of the Staging Area. A hand-wash station is located on the northern side of the office trailer next to an eye-wash station. Sanitation facilities and the hand-wash station are depicted on Figure 2.

A waste disposal construction bin will be located near the Treatment Compound as shown on Figure 2.

Note that locations of some temporary-construction-related infrastructure may change at the discretion of the Construction Manager.

## 2.3

### ***PROPERTY ACCESS AND CONTRACTOR IDENTIFICATION***

Remediation system construction as defined in this Workplan shall be coordinated by ERM through TN&A. Access to the Park areas and adjoining roadways will be coordinated through the City of Maywood and the Park Contractor. Truck traffic importing site materials will follow neighborhood restrictions.

Ingress and egress to the site is at the eastern end of 60<sup>th</sup> Street (see Figure 2). Construction personnel (contractors and subcontractors) shall park personal vehicles along the roadway on 60th Street or Walker Avenue.

Construction personnel shall display identification as approved by the Construction Manager and wear markings on hard hats clearly identifying the company for which they work.

## 2.4

### ***STAGING AND STORAGE REQUIREMENTS***

Storage areas for equipment and supplies are to be determined by the TN&A Project Engineer and Construction Manager. Areas presently under consideration are south of the W.W. Henry Equipment site, near the ERH transformer area, and/or within the Treatment Compound building as depicted on Figure 2.

The primary staging area for delivery of equipment and supplies will be north of the Treatment Compound Building (see Figure 2). Equipment may also be staged directly to designated storage areas at the discretion of the Construction Manager. Site security will be employed from 6:00 pm to 7:00 am seven days a week, commencing at the onset of equipment delivery.

Installation of remedial treatment process equipment includes multiple tasks:

- Moving equipment into the treatment building and setting up at designated locations;
- Mounting and anchoring equipment and equipment skids;
- Connecting process piping to components, valves, and associated equipment;
- Making electrical connections to equipment;
- Completing PLC wiring and control circuit enclosure assembly; and
- Maintaining a clean work site. All contractors shall clean up their work areas as their work progresses throughout the day to keep the work area clear of discarded materials and waste debris and free of slip, trip, and fall hazards (see SSHP).

Extraction equipment and skids will be installed with the use of an appropriately sized forklift. Equipment shall be handled in a safe manner to prevent damage to the equipment and any nearby equipment. Contractor's personnel shall have current forklift certifications and appropriate forklift operating experience.

Extraction equipment and skids will be bolted onto the concrete slab according to Specification Section 13080 – *Seismic Protection for Miscellaneous Equipment*. All slab connections are subject to inspection according to Specification Section 01452 – *Special Inspection for Seismic-Restraining Systems*. Items that cannot be skid-mounted will be similarly mounted or restrained by cable or wall braces and subject to the same special inspection for seismic-restraining systems.

Equipment layout, piping runs, and associated components are shown on drawings M-1 (rev. 8) and M-4 (rev. 10) provided by TN&A.

**MAJOR EQUIPMENT**

Refer to *Remedial Design Report, Volume II – Specifications*, for equipment and component installation details.

### **Moisture Separator (V-101) and Transfer Pump (P-201) Skid-Mounted**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 1, for detailed moisture separator and transfer pump specifications

### **High Vacuum Blowers (x2) (P-101 and P102) Skid-Mounted, Two Oil-Sealed 75-hp Dekker Vacuum Technologies, Inc. Model VMX1103K**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 2, for detailed high-vacuum blower specifications

### **Groundwater Booster Vessel (V-110) and Groundwater Booster Pump (P-203), 905-gallon (5'4" Dia x 6'7" Tall)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 3, for detailed groundwater booster vessel and booster pump specifications

### **4900-Gallon Holding Tank (V-106) and Transfer Pump (P-202)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 4, for detailed holding tank and transfer pump specifications

### **Air Compressor (P-201) Kaeser Rotary Screw Model AS 30 Compressor. A 240-Gallon Receiver Tank (V-112) and a Condensate Purge Drum (V-111) are placed adjacent to the Compressor.**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location

- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 5 for detailed compressor specifications

#### **Heat Exchanger (H-202)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 5, for detailed heat exchanger specifications

#### **Vapor-Phase Carbon Vessels (x2) (V-104 and V-105) Skid-Mounted**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 5, for detailed vapor-phase carbon vessel specifications

#### **Liquid-Phase Carbon Vessels (x2) (V-107 and V-108) Skid-Mounted**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 6, for detailed liquid-phase carbon vessel specifications

#### **Caustic Tank (V-102) installed adjacent to the southern wall east of the South Bay door.**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-12, page 6, for detailed caustic tank specifications

### **3.2**

#### ***MINOR EQUIPMENT***

#### **Inlet Vacuum Particulate Filter (x2) (F-101 and F-102)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation



- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-11, page 1, for filter specifications

**Oil Mist Exhaust Filters (x2) (F-103 and F-104)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-11, page 1, for filter specifications

**Water Filter, 7.68" One Size-2 Bag Filter Housing in Each Vessel (x4) (F-105, F-106, F-109, & F-110)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 1 for filter specifications

**Water Filter, Four Size-2 Bag Filter Housings in One Vessel (x4) (F-107)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 1, for filter specifications

**Water Filter, 7.68" Size-2 Bag Filter Housing (x1) (F-108)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 1, for filter specifications

**Air Filter-Compressed Air Particulate, 250cfm @150psi (F-111)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-11, page 1, for filter specifications

**Calcium Filter (F-112)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation

- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 1, for filter specifications

#### **Regenerative Desiccant Dryer (F-113)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-11, page 1, for dryer specifications

#### **Air Chiller/Condenser (H-101)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 1 for chiller/condenser specifications

#### **Air Warmer (H-201)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 2, for air-warmer specifications

#### **Pump for Secondary Containment Sump (P-204)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-11, page 3, for pump specifications

#### **Moisture Separator (V-103)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation
- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 4, for moisture separator specifications

#### **Flame Arrestor (at input to Carbon Adsorbers V104 and V105)**

- Reference: Drawing M-1 (rev. 8) for piping and instrumentation

- Reference: Drawing M-4 (rev. 10) for equipment installation location
- Reference: Table 4-10 for equipment weight and dimensions
- Reference: Table 4-11, page 4, for flame-arrestor specifications

### 3.3 *OTHER EQUIPMENT*

Table 4-11 lists equipment and components not addressed above.

## ***INSTALLATION OF PROCESS PIPING, VALVES, AND ASSOCIATED APPARATUS***

All process piping, valves and associated apparatus will be installed in accordance with local codes to prevent sagging or over-stressing of the pipe and connections. All piping will be supported so that no load or stress is transferred to any equipment.

Pipe of various sizes will be:

- Schedule 80 PVC;
- Schedule 40 PVC;
- Schedule 80 CPVC;
- Schedule 40 Galvanized; or
- Stainless Steel Flexible Pipe.

Internal piping and conveyance systems will be located overhead (8-foot minimum above concrete floor)

The piping will be supported by Unistrut and will be installed per local code and pipe manufacturers' guidelines.

Process piping and valves will be labeled with flow direction and content at all aboveground locations.

Installation of all piping and conveyance systems will be performed in accordance with Specifications Section 15400 – *Process Piping*. Utility piping will be installed per local code.

Electrical service will be routed through a switchboard in the electrical switch gear room of the Treatment Compound and brought to the equipment via sub-slab conduits installed during slab construction. In the event of equipment relocation or other situation which renders the use of the sub-slab conduit inappropriate, electrical conduit will be run along the walls or overhead areas of the treatment building in accordance with NEC and local requirements.

For completion of electrical connections, refer to:

- Drawing M-4 (rev. 10) for the location of the electrical switch gear room of the treatment compound;
- Drawing C-14 for sub-slab penetration and electrical conduit plan;
- Drawings E-1 through E-5 for the electrical legend, single line diagram, treatment compound plan, and other details;
- Table 4-11 for the equipment and instrument specification summary; and
- Construction Specifications, Division 16 – Electrical, for materials and methods (Section 16050N), seismic protection (Section 16070A), inspection and testing (Section 16081N), insulated wire and cable (Section 16120A), underground transmission and distribution (Section 16302N), and interior distribution system (Section 16402N).

The remedial equipment treatment control system will be an automated, microprocessor-based system with a human-machine interface (HMI) to be housed in a control room within the treatment compound. The control system comprises a PLC, a computer HMI, instrumentation, and end devices, which incorporate four primary interlocks, 34 shutdown alarms, nine warning alarms, and four timers.

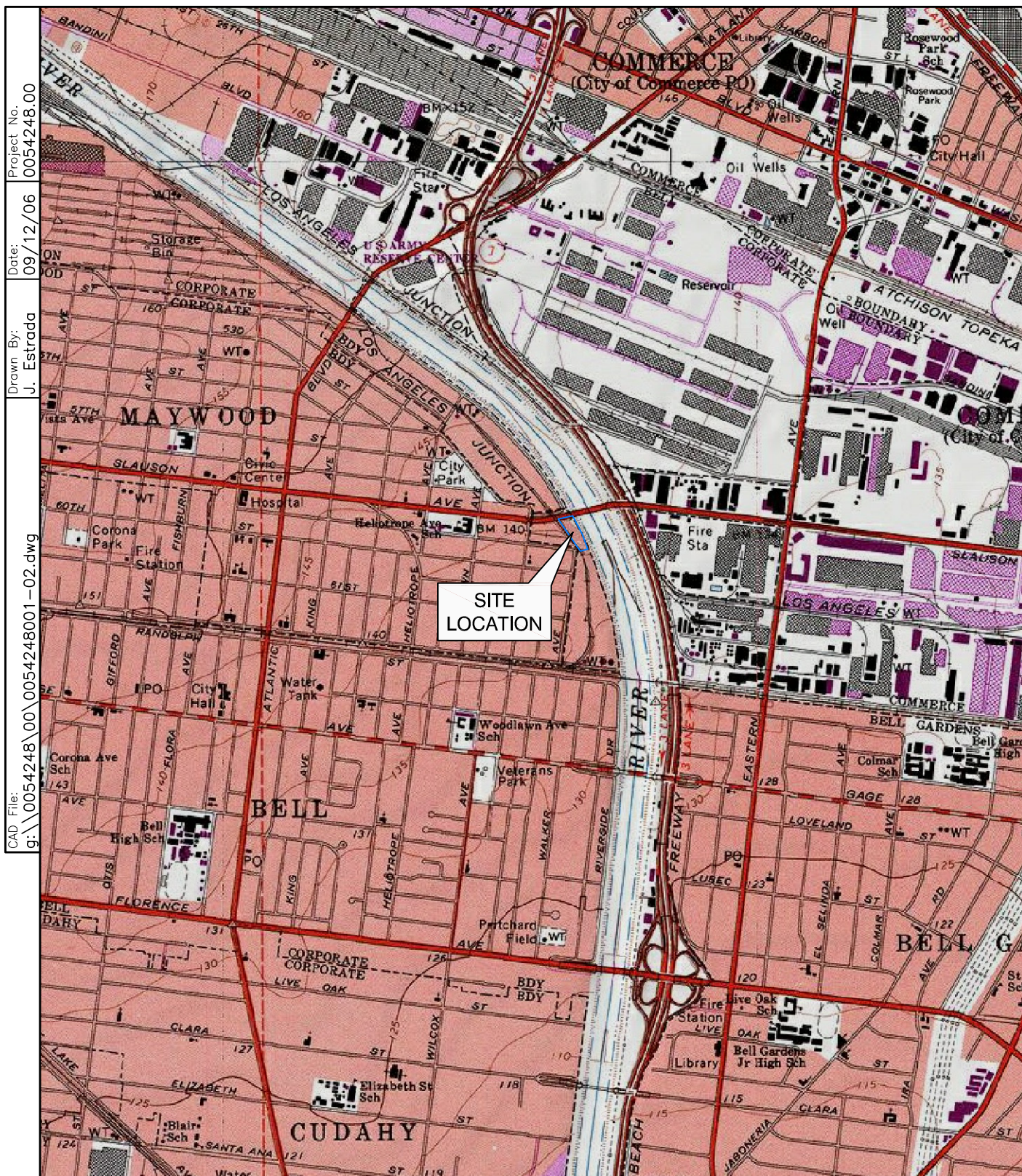
The control system has been outlined on the piping and instrumentation diagram (Drawing M-1, rev. 8) and the treatment compound process layout (Drawing M-4, rev. 10). A complete description of the remedial equipment treatment control system is provided in Section 13405 of the Engineering Specifications, shutdown alarms (Table 1), warning alarms (Table 2), inputs and outputs summary (Table 3), and timer summary (Table 4).

In the event of equipment relocation or other situation which renders the use of the sub-slab conduit inappropriate, electrical conduit for the PLC wiring will be run along the walls or overhead areas of the treatment building in accordance with NEC and local requirements.

- T N & Associates, Inc. (TN&A). 2006. *Remedial Design Report Draft-Final*, Vol. I, Vol. II, and Drawings, Pemaco Superfund Site, Maywood, California. June 2006.
- TN&A. 2001. *Final Site Safety and Health Plan, Remedial Investigation/Feasibility Study*, DCN: 9KCA005S00VSF1, Pemaco Superfund Site, Maywood, California. February 2001.
- United States Environmental Protection Agency, Office of Solid Waste and Emergency Response (OSWER). 1992. *Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions*, OSWER Directive 9355.7-03, February 1992.

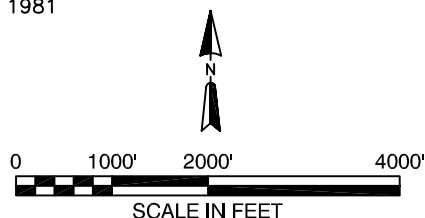
## *Figures*





References:  
 U.S.G.S. 7.5 Minute Series (Topographic) Quadrangle,  
 (Maywood, California)  
 Map Version: 1978 Map Current as of: 1981

Figure 1  
*Site Location Map  
 Pemaco Superfund Site  
 5050 Slauson Avenue  
 Maywood, California*





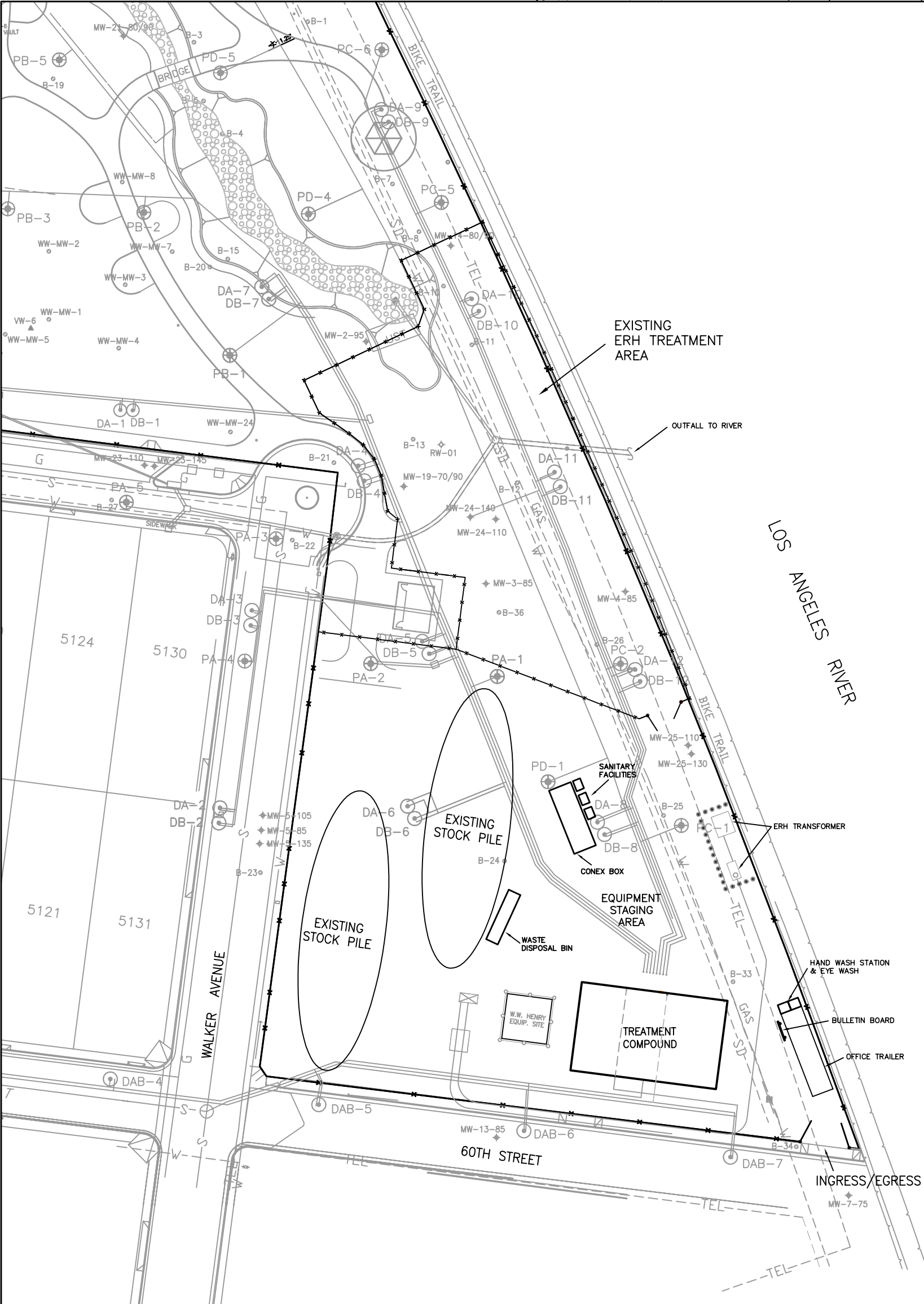
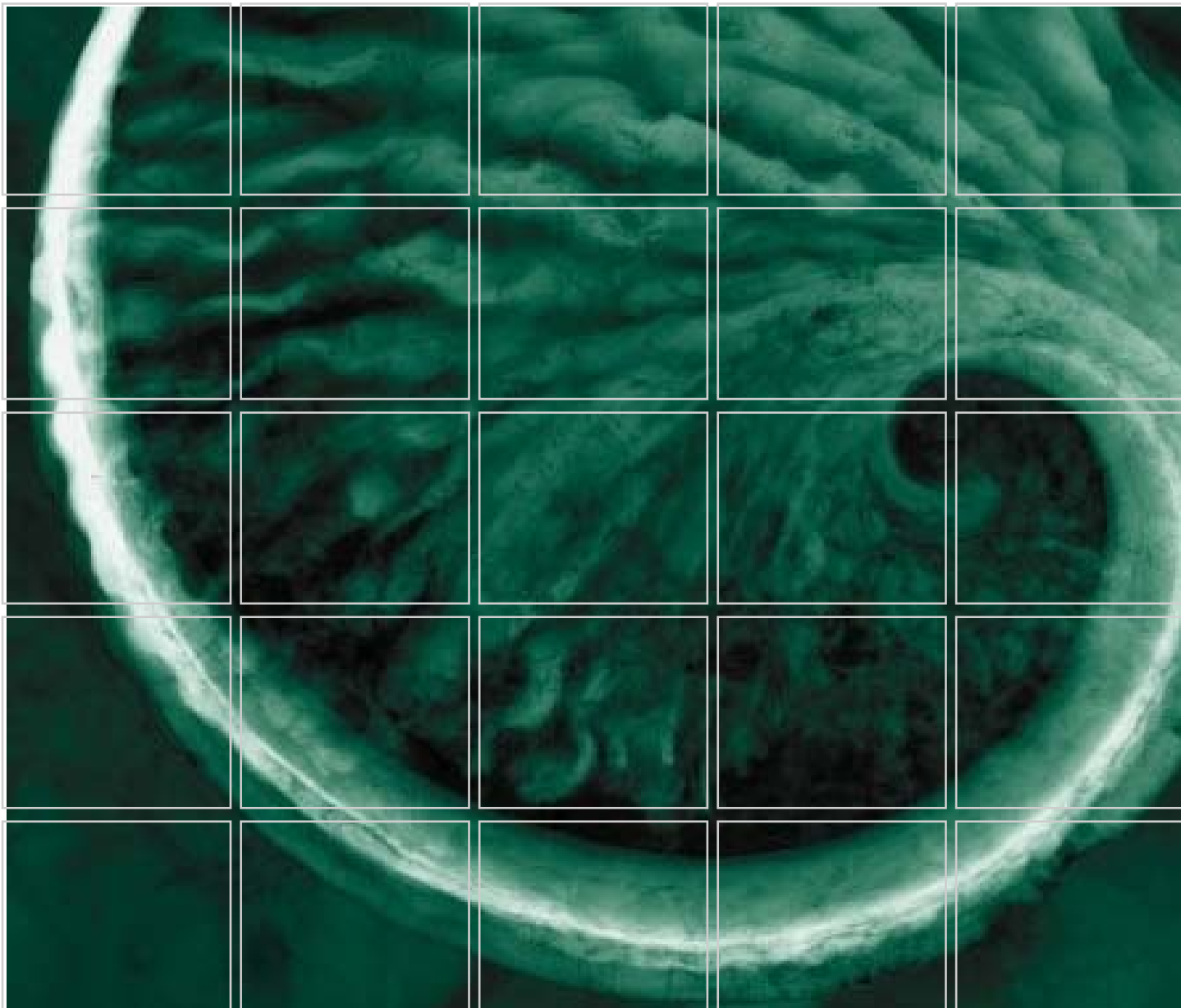


Figure 2  
Temporary Construction  
Facilities Site Plan  
Pemaco Superfund Site  
5050 Slauson Avenue  
Maywood, California

*Appendix A*  
*Site Safety and Health Plan*



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## **SITE SAFETY AND HEALTH PLAN**

ERM-West, Inc. (ERM) developed the following *Site Safety and Health Plan* (SSHP) for use by ERM personnel and by ERM contractors (individually, an “ERM Contractor” and collectively, “ERM Contractors”). ERM personnel must adhere to the practices and procedures specified in the SSHP. Each ERM Contractor must review the SSHP and agree to accept and abide by the SSHP, subject to any modifications to the SSHP (to address the ERM Contractor’s more stringent practices and procedures) agreed upon in writing by ERM and the ERM Contractor. The ERM Contractor shall indicate such acceptance by signing Section 20 of this document prior to commencing work at the site. However, if any ERM Contractor commences work at the site, the ERM Contractor shall be deemed to have accepted the SSHP and the terms hereof and the failure to execute and return to ERM a copy of this notice shall not be relevant to such interpretation.

If a contractor or a person other than the Client, ERM employees and ERM Contractors (individually, a “Third Party” and collectively, “Third Parties”) receives a copy of the SSHP, such Third Party should not assume that the SSHP is appropriate for the activities being conducted by the Third Party.

**NO THIRD PARTY HAS THE RIGHT TO RELY ON THE SSHP. EACH THIRD PARTY SHOULD ABIDE BY ITS OWN SITE SAFETY AND HEALTH PLAN IN ACCORDANCE WITH ITS OWN PROFESSIONAL JUDGMENT AND ESTABLISHED PRACTICES.**

ERM shall not be responsible for the implementation of any Third Party safety program(s), except to the extent otherwise expressly agreed upon by ERM and a Third Party in writing. The services performed by ERM for the Client and any right of the client and/or an ERM Contractor to rely on the SSHP shall in no way inure to the benefit of any Third Party, including, but not limited to, employees, agents, or consultants and subcontractors of ERM Contractors, so as to give rise to any cause of action by such Third Party against ERM.

The SSHP generated by ERM in connection with the Project is for use on a specific site and in connection with a specific project. ERM makes no representation or warranty as to the suitability of the SSHP for reuse on another site or as to the suitability of the SSHP for reuse on another project or for modifications made by the Client or a Third Party to the SSHP.

**1.0**

***SITE NAME AND ADDRESS***

Pemaco Superfund Site  
5050 E. Slauson Avenue  
Maywood, California

ERM Partner-in-Charge (PIC): Truong T. Mai, P.E.  
Responsible for all work and conducts ultimate Quality Assurance/Quality Control (QA/QC) overview.

ERM Project Manager (PM): Rudolph R. Millan  
Manages day-to-day activities; reports to PIC.

ERM Project Health and Safety Consultant: Robin Woolson  
Directs development of SSHP; provides technical advice on health and safety issues.

ERM Site Safety Officer (SSO): Neil Coy  
Responsible for implementation of SSHP; reports to PIC and PM.

The Pemaco Site is a former chemical manufacturing facility occupying 1.4 acres in a mixed industrial and residential neighborhood in Maywood, Los Angeles County, California (site). A detailed description of the site is provided in the document prepared in 2006 by TN & Associates, *Work Plan, Pemaco Superfund Site*. The site location is shown on Figure 1.

At present, there are no buildings or structures on the site and the ground surface has been completely cleared of vegetation by the City of Maywood's Park Contractor. Clean fill was placed over much of the site during previous removal actions of the former warehouse foundation, underground storage tank (UST) excavation, and soil removal within the central portion of the site. The site is bounded on the east by the Los Angeles River, which is contained in a concrete channel. The entire site is surrounded by a chain-link fence with gated entrances. The site plan with locations of former environmental features is shown on Figure 2.

Directions to the nearest hospital are in Section 18.7 (page 39) and Attachment A.

This SSHP covers field activities associated with the installation and startup of a soil vapor extraction and groundwater remediation system, including all mechanical equipment, instrumentation and controls, and electrical wiring. Health and safety hazards surrounding operation and maintenance of the remediation system will be discussed in a separate SSHP, which will be submitted at a later date, as an amendment to this SSHP.

Major tasks to be performed by ERM personnel and/or ERM subcontractors include the following:

- Hoisting/rigging of equipment;
- Installation of equipment;
- Piping installation;
- Instrumentation and controls installation; and
- Electrical connection of equipment.

## 5.0 HAZARD IDENTIFICATION CONTROL

### 5.1 HAZARD IDENTIFICATION PROCESS

Prior to initiating any new project activity or when there is a change in site conditions, the SSO will assist project team members in completing a Task Hazard Analysis (THA) and include changes as amendments to this SSHP. A copy of the THA form is located in Attachment B.

### 5.2 CHEMICAL HAZARDS

Chemicals may be introduced into the body by ingestion, inhalation, and injection from contaminated sharp objects or skin contact/absorption. Since not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the risk. Inhalation and skin contact are the most common routes of entry. Chemicals can be introduced into the body by ingestion when chemicals are present on the hands and transferred to food or cigarettes through contact.

Based on historical soil and ground water sampling, the following chemicals of concern listed in Table 5-1 may be encountered at the site. Information about the chemicals of concern listed below is provided in Attachment C.

**TABLE 5-1: Chemicals of Concern**

Benzene	1,1-Dichloroethene
Ethylbenzene	1,1-Dichloroethene
Toluene	1,1,2,2-Tetrachloroethane
Vinyl Chloride	Acetone
Trichloroethene	Chloroform
Tetrachloroethene	Chloromethane
1,2-Dichloroethane	1-Chloro-2,3-dibromopropane
1,2-Dichloroethene	Methyl tert-butyl ether
Actinolite	Methyl isobutyl ketone
bis(2-Ethylhexyl)phthalate	Naphthalene
Aluminum	Arsenic
Chromium	Iron

Lead	Selenium
Thallium	Gasoline

### 5.3 *AMBIENT AIR MONITORING*

Ambient air monitoring will be conducted by the SSO when there is a question of employee exposure to hazardous concentrations of substances to assure the proper selection of engineering controls, work practices, and personal protective equipment (PPE). Additional monitoring should be conducted under any of the following circumstances.

- Work begins on a different portion of the site;
- Change in job tasks;
- Change in weather;
- Change in ambient levels of hazardous constituents as indicated by the sense of smell or changes in the physical appearance of the soil or ground water;
- When new hazardous substances are encountered; and
- During high-risk operations (e.g., working at height, drum opening, or handling of leaking drums, or when working in areas with obvious liquid contamination).

Ambient air monitoring will be conducted using direct-reading, real-time instruments as indicated in Table 5-3. If more than one instrument is listed, either instrument may be chosen. Not all work at the site will require ambient air monitoring for all contaminants. During the mobilization phase of a particular project task or activity, either the PM or the SSO will determine what contaminants may be encountered in order to have the appropriate instrumentation on-site. Decisions made regarding the sampling will be communicated to the field during the daily safety briefing. The Project Health and Safety Consultant is available to assist the PM or the SSO in determining the appropriate instrumentation.

**Table 5.2:    *Ambient Air Monitoring Instruments***

<i>Contaminant</i>	<i>Instrument</i>
Organics	<ul style="list-style-type: none"> <li>• PID such as OVM Model 580B with 10.6 eV lamp; or</li> <li>• MiniRae 2000 with 10.6 eV lamp or equivalent. If you are unsure what kind of organic vapor monitor to use based on the contaminants of concern, contact your the Project Health and Safety Consultant. Remember, straight chain hydrocarbons do not register well on PID units and a FID may be required.</li> </ul>
Dust	<ul style="list-style-type: none"> <li>• MIE PDR 1000 Personal DataRAM Aerosol Monitor</li> </ul>

Direct reading instrumentation will be calibrated daily per manufacturer's instructions and logged on the Air Monitoring Form located in Attachment D. Cylinders of the appropriate calibration gas will be required for fieldwork lasting longer than 1 day.

Under stable site conditions, ambient air monitoring will be conducted continuously in the beginning of the project and at least once every 2 hours in the workers' breathing zone and at other locations based on the professional judgment of the SSO or the Project Health and Safety Consultant. Ambient air monitoring results will be recorded on the Ambient Air Monitoring Form found in Attachment D. If site conditions become unstable or change dramatically ambient air monitoring will be conducted more frequently based on the professional judgment of the SSO or the Project Health and Safety Consultant.

Table 5-4 outlines the steps to be taken by the SSO when the action levels of the various contaminants are exceeded. Respiratory protection is selected based on occupational exposure limits of the constituents at the site and the potential for exposure to vapors and dust from site activities.



**TABLE 5-3: Action Levels and Response Action Requirements**

<b>Hazard</b>	<b>Method of Monitoring</b>	<b>Action Levels<sup>2</sup></b>	<b>Protection Action</b>
<p>Volatile organic vapors – exposure to on-site workers</p>	<p>Real-time air monitoring in breathing zone PID<sup>1</sup> equipped with 10.6eV lamp for ionization potential related to volatile organic compounds expected on site.</p>	<p>PID readings <math>\geq 1</math> ppm and <math>&lt; 10</math> ppm in the breathing zone.</p> <p>PID readings <math>\geq 10</math> ppm in the breathing zone</p>	<p>Conduct continuous and then periodic monitoring in breathing zone with PID (one minute every 30 minutes), as results indicate it is safe to do so.</p> <p>If the PID readings are <math>&lt; 10</math> ppm, no action, continue regular monitoring.</p> <p>Perform continuous monitoring in the breathing zone. If readings continue above 10 ppm for more than 15 minutes in the breathing zone, evacuate exclusion zone and notify appropriate personnel.</p> <p>Allow air to clear for 20 minutes and recheck breathing zone with PID; if <math>&lt; 10</math> ppm, resume work. If <math>\geq 10</math> ppm, repeat wait-and-check procedure.</p> <p>Additional air sampling may be performed to determine the contaminants of concern and determine appropriate action levels.</p>
<p>Volatile organic vapors – Potential exposure to off-site residents</p>	<p>Intermittent air monitoring at site perimeter PID<sup>1</sup> (same as above)</p>	<p>PID readings sustained at <math>&lt; 10</math> ppm at nearest downwind fence line to construction activity.</p> <p>PID readings <math>\geq 10</math> ppm sustained for 1 minute at fence line</p> <p>PID readings <math>\geq 10</math> ppm sustained for 15 minutes at fence line</p>	<p>No action.</p> <p>Continue air monitoring for 15 minutes. Halt operation of treatment system in accordance with O&amp;M Manual<sup>3</sup>. The SSO will consult with qualified ERM personnel to determine source of elevated VOC concentration and appropriate remedy.</p>
<p>Total Airborne Dust – on-site and potential off-site exposure</p>	<p>Visual monitoring of dust at intrusive construction sites</p>	<p>Dust visible in sunlight or dry windy conditions</p>	<p>Implement dust suppression methods (wet exposed soil surfaces with water, slow traffic, cover stockpiles). Continuously evaluate the effectiveness of dust suppression.</p>

Hazard	Method of Monitoring	Action Levels <sup>2</sup>	Protection Action
	Real-time aerosol monitor with continuous log to collect data once per minute in exclusion areas and construction areas.	Level <10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes Level ≥10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes	Monitoring will be continuous during all construction activities. Continue dust suppression methods and monitoring, but stop work.
Total Airborne Dust – fence line monitoring	Real-time aerosol monitor downwind of exclusion areas and construction areas	Level ≥10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes at construction zone	Initiate fence line aerosol monitoring. If readings at fence line persist at ≥10 mg/m <sup>3</sup> for 15 continuous minutes, halt all on-site construction activities until dust suppression is achieved.

**Notes:**

<sup>1</sup> See Section 5.3 for instrument specifications.

<sup>2</sup> All action levels are readings observed above background.

<sup>3</sup> O&M Manual to be developed at a later date.

ACGIH - American Conference of Governmental Industrial Hygienists

PID – photoionization detector

ppm – parts per million

TLV – threshold limit value

mg/m<sup>3</sup> – milligrams per cubic meter

## 5.4 *SITE-SPECIFIC AND TASK-SPECIFIC HAZARDS AND CONTROL STRATEGIES*

The hazards and control strategies associated with planned work activities are summarized in Table 5-5. During the mobilization phase of a specific work task, the project team can quickly review the hazards and control strategies by locating the task or activity to be performed on the table. Hazards that are common to all activities performed at the site are listed first. The hazards listed for a particular task or activity include the common hazards.

However prior to initiating any new project activity or when there is a change in site conditions, an additional THA will be completed and this SSHP will be amended as appropriate. All changes will be communicated to the project team at the daily safety briefing. A copy of the THA form is located in Attachment B and all completed task forms are included in Attachment B.

**TABLE 5-4: Site-Specific and Task-Specific Hazards and Control Strategies**

<b>General Construction Hazards</b>	
<i>Hazards</i>	<i>Control Strategy</i>
Accidents due to lack of training	<ul style="list-style-type: none"> <li>• All site workers engaged in intrusive work that may contact contaminated media will as appropriate have completed OSHA 40-hour HAZWOPER training with yearly updates.</li> <li>• Worker will be trained prior to performing new activities.</li> <li>• Crew will hold daily tailgate safety briefings prior to starting each day.</li> </ul>
Head Injury	<ul style="list-style-type: none"> <li>• Hard hats will be worn as appropriate around operating heavy equipment, in the manner they are designed (brim forward, no modifications, no ball caps, etc.).</li> </ul>
Eye Injury	<ul style="list-style-type: none"> <li>• Workers will wear protective eyewear with side shields in work areas as work is being performed as appropriate.</li> </ul>
Hearing Damage	<ul style="list-style-type: none"> <li>• Workers will wear hearing protection whenever voices must be raised above normal conversational speech or when noise levels exceed 85 decibels due to a loud noise source; such as working around heavy equipment and drill rigs.</li> <li>• Hearing protection will be worn by equipment operators when working in open cab equipment, or when doors/windows are open.</li> </ul>
Foot Injury	<ul style="list-style-type: none"> <li>• Workers will wear safety-toed leather work boots.</li> </ul>
Hand Injury	<ul style="list-style-type: none"> <li>• Leather gloves shall be worn when handling sharp, rough, or slippery surfaces. Chemically resistant gloves will be worn when handling chemicals or samples.</li> </ul>
Injuries resulting from manually lifting	<ul style="list-style-type: none"> <li>• Workers will be instructed in safe lifting techniques (i.e., back straight, bend at knees, load close to body, lift smoothly, and do not twist).</li> <li>• Workers will utilize material handling devices such as forklifts, come-alongs, etc. as long as workers are trained and certified in forklift operations.</li> <li>• Two workers will be required for manual lifts of over 50 pounds.</li> <li>• Workers are encouraged to get help with any lift that appears excessive or awkward.</li> <li>• Split heavy loads into smaller loads whenever possible.</li> <li>• Make sure the path of travel is clear prior to the lift.</li> </ul>
Injuries from being “caught” on equipment	<ul style="list-style-type: none"> <li>• Workers will avoid wearing loose-fitting clothing.</li> <li>• Workers will keep hands away from moving parts.</li> </ul>

General Construction Hazards	
<i>Hazards</i>	<i>Control Strategy</i>
Injuries from slips, trips, and falls	<ul style="list-style-type: none"> <li>• Walking/working surfaces will be kept free of clutter, debris, and congestion to the greatest extent possible.</li> <li>• Personnel will be briefed on the hazards of wet, muddy soil hazards and traversing uneven grades.</li> <li>• Walk or climb only on equipment and/or surfaces that are designed for personnel access.</li> <li>• Be aware of potential for poor footing while working on non-compacted backfill materials.</li> <li>• Use three-point contact when climbing onto equipment.</li> </ul>
Injuries and accidents due to equipment failures	<ul style="list-style-type: none"> <li>• Equipment will be checked for proper operation prior to starting work each shift, includes visual inspections, checking all fluid levels and hydraulic systems. Contractors must maintain and inspect their equipment and ERM must check that this is getting completed by contractors.</li> </ul>
Injuries due to contact with equipment	<ul style="list-style-type: none"> <li>• Workers on the ground will maintain visual contact with the equipment operator when heavy equipment is used.</li> <li>• Workers on the ground will not enter an equipment swing radius.</li> <li>• Equipment requiring an operator will not be permitted to run unattended.</li> <li>• All heavy equipment will be equipped with a functional backup alarm.</li> <li>• Workers must be aware of all equipment in proximity and remain away from unsafe areas where the equipment could harm the worker.</li> </ul>
Accidents due to poor lighting	<ul style="list-style-type: none"> <li>• Work at site is only expected to take place during daylight hours.</li> <li>• Proper lighting must be in place when working inside or after daylight hours.</li> </ul>
Injury due to inclement weather and earthquakes	<ul style="list-style-type: none"> <li>• Outdoor work will cease during extreme weather or seismic conditions, such as earthquakes, electrical storms, high wind, and extreme temperatures.</li> <li>• Shut all equipment down when lightening is visible and wait for “all-clear” from the SSO.</li> <li>• Workers will take cover indoors or in vehicle.</li> <li>• Supervisors will monitor local forecasts for warnings about specific weather hazards.</li> <li>• Workers will comply with all evacuation orders regarding rough weather directives and if experiencing an earthquake.</li> </ul>
Heat Stress	<ul style="list-style-type: none"> <li>• Workers will be trained in the recognition of heat stress and appropriate actions to take.</li> <li>• Workers will rotate shifts in extreme temperature conditions.</li> <li>• Workers are encouraged to increase fluid intake while working to two times the normal consumption.</li> <li>• Workers should minimize or avoid alcohol intake the night before working in heat stress situations.</li> <li>• Workers will increase the frequency and duration of rest breaks while working in heat stress situations.</li> <li>• Workers will watch each other for signs and symptoms of heat exhaustion and fatigue.</li> </ul>

General Construction Hazards	
<i>Hazards</i>	<i>Control Strategy</i>
	<ul style="list-style-type: none"> <li>• Crew will plan work in heat stress situations for early morning or evening during hot months.</li> </ul>
Cold Stress (not anticipated during this project)	<ul style="list-style-type: none"> <li>• Workers will be trained in the recognition of cold stress and appropriate actions to take.</li> <li>• Workers will watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness).</li> <li>• Take breaks in heated shelters.</li> <li>• Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.</li> </ul>
Injuries and damage due to fire	<ul style="list-style-type: none"> <li>• Smoking is allowed in designated areas <b>only</b>.</li> <li>• Flammable liquids will be kept in approved, closed containers and away from any combustible materials.</li> <li>• The site will be kept clean and free of combustible debris such as paper, vegetation, or trash.</li> <li>• Flammable and combustible materials from kept separate from ignition sources such as friction from vehicles.</li> <li>• Fire extinguishers will be supplied at all work sites.</li> </ul>
Exposure to airborne dust	<ul style="list-style-type: none"> <li>• Use wet methods (spraying) when activities occur to prevent airborne dust from being generated or when visible dust has been generated. If dust becomes a nuisance, workers will notify the supervisor.</li> <li>• Workers will monitor air for airborne soil dust (surface and subsurface soil).</li> <li>• Workers will work upwind as practicable whenever intrusive activities occur to minimize exposure (body or inhalation) to airborne dust.</li> <li>• Workers are to follow good hygiene procedures to prevent skin exposure and to prevent incidental ingestion of any contaminated materials.</li> </ul>
Controlling work areas	<ul style="list-style-type: none"> <li>• Fencing, tape or other SSO-approved boundaries will be erected to warn approaching personnel of the hazardous area.</li> <li>• Appropriate signs will be posted at the boundary to instruct personnel in entry requirements.</li> </ul>
Emergencies	<ul style="list-style-type: none"> <li>• Ensure radio or phone communications capabilities area available to contact the SSO to summon emergency response or report spills/ releases.</li> <li>• Ensure all personnel are familiar with emergency procedures and egress routes. Rally points must be communicated during the initial safety meeting.</li> <li>• Personnel who have medical conditions that may be exacerbated by working conditions should notify the SSO of these conditions.</li> </ul>
Injuries associated with insects, snakes, spiders, and poisonous plants	<ul style="list-style-type: none"> <li>• Avoid walking in areas where snakes may nest or hide.</li> <li>• Always look ahead to where walking for signs of snakes. Use extreme caution when moving or lifting objects that could be used by snakes as cover. Never reach under or behind objects, or into other areas where snakes may hide.</li> <li>• Workers will tuck pants into socks and wear long sleeves and sturdy leather boots when walking in tall grass.</li> <li>• Workers will use insect repellent, as necessary on site.</li> </ul>

General Construction Hazards	
Hazards	Control Strategy
	<ul style="list-style-type: none"> <li>Workers will use buddy system to check for signs of insect and spider bites, such as redness, swelling, and flu-like symptoms.</li> <li>Although unlikely at this site, workers will remove ticks immediately with fine tipped tweezers by grasping the tick as close to your skin as possible and gently pulling straight out. Do not squeeze the tick's body as this may inject fluids into you. Wash the bite area of skin and apply antiseptic.</li> <li>If workers have known or suspected allergies, they will carry an Epi-Pen at all times and will notify the SSO, supervisor, and coworkers of allergies.</li> <li>Workers will immediately wash any areas that were exposed to poisonous plants. Be aware that oil from the plant can be carried on boots.</li> </ul>
Chemical Exposure	<ul style="list-style-type: none"> <li>MSDSs are required for all chemicals brought to the site. Generic MSDSs will be provided for the most predominant chemicals of concern as part of the remediation.</li> <li>The MSDS book will be kept at the field office trailer and will be available to all employees.</li> </ul>
Spills	<ul style="list-style-type: none"> <li>Tools shall be carried in a safe and proper manner.</li> <li>Tools shall not be carried up a ladder by hand; tools should be raised or lowered in a tool bag.</li> <li>Defective tools shall be tagged immediately and removed from service.</li> <li>Tools shall be used correctly and only for their intended purpose.</li> <li>Hand tools will be inspected for mushroomed heads, broken or cracked handles, or loose heads prior to use.</li> </ul>
Injuries associated with power tools	<ul style="list-style-type: none"> <li>Worker will inspect tools and electrical cords before use.</li> <li>Defective tools will be tagged and removed from service.</li> <li>A GFCI will protect all electrical cords and tools.</li> <li>Portable generators of 5kW or larger will be grounded.</li> <li>Electrical tools shall be unplugged when changing attachments or performing maintenance.</li> <li>Electric tools with missing ground prongs, cut or frayed cords shall be removed from service.</li> <li>Electric tools used in highly conductive locations, such as where employees may contact water, shall be approved for use in these locations.</li> <li>Pneumatic tools shall be disconnected and air pressure released before repairs are made.</li> <li>Extension cords shall be inspected prior to and after use and must be three pronged. Damaged or severed cords will be tagged and taken out of service.</li> <li>Safety glasses will be used when operating power tools.</li> </ul>
Vehicle Safety	<ul style="list-style-type: none"> <li>All vehicles must be inspected for safe operation onsite.</li> <li>Vehicles must be placarded with contractor's name.</li> <li>Vehicle operators will be instructed in safe operations while on the site.</li> <li>Seat belts will be worn by all vehicle occupants.</li> <li>Cell phone use is prohibited while driving.</li> <li>Maintain a fire extinguisher, first aid kit, evacuation map, and route to</li> </ul>

General Construction Hazards	
<i>Hazards</i>	<i>Control Strategy</i>
	hospital map/directions in all vehicles.
Heavy equipment operations	<ul style="list-style-type: none"> <li>• Operators must know where the operations manual is kept for each piece of machinery they will use (typically in job trailer).</li> <li>• Operators will inspect machinery before use and complete the Daily Inspection Checklist.</li> <li>• All operators will be certified for equipment operation.</li> <li>• Use three-point contact when climbing onto equipment.</li> <li>• All heavy equipment will be equipped with a functional backup alarm.</li> <li>• Operators will be instructed to maintain visual contact with personnel working in the immediate equipment area.</li> <li>• Passengers will be prohibited from using equipment.</li> <li>• Seat belts shall be used in accordance with manufacturer's specifications.</li> <li>• Fire extinguishers will be mounted on all equipment.</li> <li>• Hearing protection will be worn by equipment operators when working in open cab equipment, or when doors/windows are open.</li> </ul>

Mobilization/Demobilization; Driving to/from Site	
<i>Hazards</i>	<i>Control Strategy</i>
Traffic Accidents	<ul style="list-style-type: none"> <li>• Cellular phones shall not be used by the driver of a vehicle in motion, either on site or while commuting to the site.</li> <li>• Safety belts will be worn at all times.</li> <li>• Driver must have clear directions to the site.</li> <li>• All drivers of both motor vehicles and mechanical equipment will have the appropriate and current operator's license.</li> <li>• Drivers are to have sufficient rest during long journeys.</li> </ul>
Driving On Site	
<i>Hazards</i>	<i>Control Strategy</i>
All accidents associated with operation of equipment and vehicles	<p>See General Construction Hazards plus:</p> <ul style="list-style-type: none"> <li>• Workers must have clearly defined routes of travel.</li> <li>• Review plans for all mobile equipment at the beginning of each day.</li> <li>• Ensure that heavy equipment and trucks have functional backup alarms.</li> <li>• Observe the site speed limit of 15 mph.</li> </ul>
Unloading Equipment	
<i>Hazards</i>	<i>Control Strategy</i>
Bodily Injury, Fire, Chemical Spills	<p>See General Construction Hazards plus:</p> <ul style="list-style-type: none"> <li>• Conduct visual reconnaissance of the staging area, equipment and materials prior to unfastening safety restraints.</li> <li>• Ensure SSO is aware of any loading/unloading activities.</li> <li>• Use spotters as necessary.</li> <li>• Ensure that an approved double containment spill kit is available in the event of a spill.</li> </ul>



The level of PPE selected for a task is based on the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity;
- Potential for exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done; and
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be better identified.

In addition to summarizing the general PPE requirements for tasks performed at the site, Table 6-1 also serves as the written certification that the PPE Hazard Assessment has been conducted. The signature page containing the client's name, project name and number, date and signatures of the parties responsible for the development of the SSHP also serve as part of the written certification.

**RESPIRATORY PROTECTION**

The type of respiratory protection required will be based on the results of ambient air monitoring, the results of any models used to predict ambient air concentrations, and the professional judgment of either the SSO or the Project Health and Safety Consultant. Respiratory protection requirements are outlined on Table 5-4.

As required by 29 CFR 1910.134 and 8 CCR 5144, *Respiratory Protection*, and per the ERM West respiratory protection policy, cartridges will be changed out every 8 hours or sooner based on either the results of ambient air monitoring, the results of any models used to predict ambient air concentration or the professional judgment of the Project Health and Safety Consultant and the results of the 3M Respirator Service Life Software. Although 3M respiratory protection devices may not be worn, the results generated by the Respirator Service Life Software serve as a point of reference in determining the cartridge change-out schedule.

At a minimum, new respirator cartridges must be placed on the respirator at the beginning of the 8-hour shift. If breakthrough is detected (through smell, difficulty breathing or irritation) prior to the end of an 8-hour shift, cartridges will be replaced as needed.

**TABLE 6-1: Personal Protective Equipment Requirements**

<i>PPE Level</i>	<i>Ensemble Components</i>	<i>Anticipated Use</i>
<p><i>Level D</i></p> <p>Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.</p>	<ul style="list-style-type: none"> <li>• Long pants and shirt with sleeves.</li> <li>• Safety-toed footwear (steel toed boots).</li> <li>• Safety glasses with permanent side shields.</li> <li>• Hard hat.</li> <li>• General purpose work gloves if task does not involve water or wet materials.</li> <li>• Hearing protection around heavy equipment.</li> <li>• High visibility traffic vest.</li> </ul>	<p>It is anticipated that Level D PPE will be required for all site activities.</p>

## 7.0 *THERMAL STRESS*

### 7.1 *HEAT STRESS*

Heat stress is caused by a combination of factors such as temperature, humidity, type of work being performed, and use of PPE including protective clothing. Heat stress tends to increase body temperature, heart rate, and sweating. The key to preventing heat stress is educating personnel on the hazards associated with working in the heat and implementing proper controls and work practices. Table 7-1 summarizes heat stress disorders and prevention/first aid issues.

When the temperature is above 80 degrees Fahrenheit (°F), the SSO will monitor both the temperature and the humidity throughout the day to determine the Heat Index. The National Weather Service has developed a Heat Index that combines the ambient temperature and humidity into a value that reflects how hot it really feels. This Heat Index can be used to determine the risk associated with working outdoors during the hot months of the year. To use the chart (Table 7-2), read the temperature at the left and humidity across the top, the Heat Index is where the two intersect. For example, with a temperature of 96°F and a humidity of 50%, the Heat Index is 108.

The SSO will also inform site workers when the Heat Index Risk Level, as defined on Table 7-3, reaches Danger and/or Extreme Danger, the following additional precautions may be implemented at the discretion of the SSO based on factors such as use of Tyvek coveralls and the physical activity associated with each task. The following actions or work practices will be implemented, as practical, as part of the Heat Stress Management Program.

- Designated areas will be used for site workers to take breaks and for eating.
- If possible, physically demanding and strenuous tasks may be scheduled for the cooler parts of the day.
- Site workers will be required to drink 6-8 ounces of cool water or electrolyte replacement drinks every 60 minutes. Diabetics should use caution when using electrolyte replacement drinks to replenish fluids. Electrolyte replacement drinks may have high sugar content.

- Site workers taking prescription medications should check with their doctor or other medical professional regarding the interaction between working in hot environments and their medications.
- The SSO will more closely observe site workers, especially those working in Tyvek coveralls or performing strenuous job tasks.
- Worker rotation should be implemented during strenuous or physically demanding job tasks.
- The SSO will implement a work-rest cycle.

**TABLE 7-1: Heat Stress Disorders**

<i>Disorder</i>	<i>Symptoms</i>	<i>Cause</i>	<i>Prevention/First Aid</i>
Heat Rash or Prickly Heat	<ul style="list-style-type: none"> <li>• Rash</li> <li>• Itching</li> </ul>	<ul style="list-style-type: none"> <li>• Hot, humid conditions</li> <li>• Sweat doesn't evaporate easily</li> <li>• Sweat ducts become clogged</li> </ul>	<ul style="list-style-type: none"> <li>• Ointments</li> <li>• Keep skin clean and dry</li> <li>• Good daily personal hygiene</li> </ul>
Heat Cramps	<ul style="list-style-type: none"> <li>• Sudden onset of muscle cramps usually in legs or arms</li> <li>• Hot, moist skin</li> <li>• Normal pulse</li> <li>• Normal or slightly elevated temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of water (sweating)</li> <li>• Loss of electrolytes</li> <li>• Replacing water but not electrolytes</li> </ul>	<ul style="list-style-type: none"> <li>• Move into shade</li> <li>• Loosen clothing</li> <li>• Drink tepid electrolyte drinks or water</li> <li>• Seek medical assistance if conditions persist</li> </ul>
Heat Exhaustion	<ul style="list-style-type: none"> <li>• Pale, clammy skin</li> <li>• Profuse perspiration</li> <li>• Thirst from dehydration</li> <li>• Weakness</li> <li>• Headache</li> <li>• Nausea</li> <li>• Loss of coordination</li> </ul>	<ul style="list-style-type: none"> <li>• Overexertion</li> <li>• Excessive loss of water and electrolytes</li> </ul>	<ul style="list-style-type: none"> <li>• Move into shade</li> <li>• Remove PPE</li> <li>• Loosen street clothing</li> <li>• Cool by applying damp cool compresses or ice packs</li> <li>• Drink tepid electrolyte drinks or water</li> <li>• Summon medical assistance</li> </ul>
Heat Stroke	<ul style="list-style-type: none"> <li>• Elevated temperature (&gt;103F)</li> <li>• Flushed, hot, dry skin</li> <li>• Absence of sweating</li> <li>• Delirious</li> <li>• Rapid pulse</li> <li>• Nausea</li> <li>• Headache</li> <li>• Dizziness</li> <li>• Unconsciousness</li> </ul>	<ul style="list-style-type: none"> <li>• Failure of body's cooling (sweating) mechanism</li> </ul>	<ul style="list-style-type: none"> <li>• Summon medical assistance</li> <li>• Move to shade</li> <li>• Remove PPE</li> <li>• Loosen street clothing</li> <li>• Cool by fanning or applying damp compress or ice packs</li> </ul>

**TABLE 7-2: Heat Index Chart**

Relative Humidity (%)														
Temperature (°F)		40	45	50	55	60	65	70	75	80	85	90	95	100
	110	136												
	108	130	137											
	106	124	130	137										
	104	119	124	131	137									
	102	114	119	124	130	137								
	100	109	114	118	124	129	136							
	98	105	109	113	117	123	128	134						
	96	101	104	108	112	116	121	126	132					
	94	97	100	102	106	110	114	119	124	129	136			
	92	94	96	99	101	105	108	112	116	121	126	131		
	90	91	93	95	97	100	103	106	109	113	117	122	127	132
	88	88	89	91	93	95	98	100	103	106	110	113	117	121
	86	85	87	88	89	91	93	95	97	100	102	106	108	112
	84	83	84	85	86	88	89	90	92	94	96	98	100	103
	82	81	82	83	84	84	85	86	88	89	90	91	93	95
	80	80	80	81	81	82	82	83	84	84	85	86	86	87

**TABLE 7-3: Heat Index Risk Level and Associated Health Effects**

<i>Heat Index</i>	<i>Associated Risk</i>
>130	<i>Extreme Danger</i>  Heat stroke highly likely with continued exposure
105-130	<i>Danger</i>  Heat exhaustion and heat cramps likely and heat stroke possible with prolonged exposure and/or physical activity
90-105	<i>Extreme Caution</i>  Heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
80-90	<i>Caution</i>  Fatigue possible with prolonged exposure and/or physical activity

NOTES:

- Heat Index values were devised for shady, light wind conditions. Exposure to full sun may increase these values by up to 15 degrees.
- Heat Index values were devised for the general public wearing typical lightweight summer clothing. Acclimatized workers may be able to work under conditions with a slightly higher Heat Index.
- The use of PPE, including clothing increases the heat stress load on the body.

The work-rest cycle outlined below may be implemented based on the professional judgment of the SSO and/or the Project Health and Safety Consultant.

<i>Heat Index</i>	<i>Risk Level</i>	<i>Work-Rest Cycle</i>
> 130	Extreme Danger	15-minute break every 30 minutes
105-130	Danger	15-minute break every 60 minutes
90-105	Extreme Caution	15-minute break every 90 minutes
80-90	Caution	15-minute break every 120 minutes

## 7.2 ***COLD STRESS***

Cold stress situations are included for information purposes, but are not expected and highly unlikely. Symptoms may occur from cooling down after perspiring on site in cooler months. If lower-than-normal temperatures (i.e., less than 35°F) are forecast, the following information will be utilized. Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures, or from immersion in low temperature water. The two most prominent adverse effects from exposure to cold temperatures are frostbite and hypothermia. A person qualified in first aid or a professional medical provider should administer treatment for cold-related injuries. The single-most important aspect of life-threatening hypothermia is a drop in the deep-core body temperature. Response to cold stress will be based on the Cold Stress section of the ACGIH TLV booklet.

### 7.2.1 ***Frostbite***

Frostbite occurs when the extremities do not get sufficient heat from the central body stores. The fluids around the cells of the body tissues freeze from exposure to low temperatures. This condition can result in damage to and loss of tissue. The most vulnerable areas are the nose, cheeks, ears, fingers, and toes. Damage from frostbite can occur in either the outer layers of skin, or in the tissue beneath these layers and can be serious, resulting in scarring, tissue death, permanent loss of movement, or need for amputation.

### 7.2.2 ***Hypothermia***

This is the most severe form of cold stress and results from a drop in the body's core temperature. Hypothermia can occur in relatively mild



temperatures if there is a wind and the person's clothing becomes wet. The symptoms of hypothermia are:

- First, uncontrollable shivering and the sensation of cold;
- Heartbeat slows and may become irregular;
- Pulse weakens and blood pressure changes;
- As the body's core temperature drops, other signs may include cool skin, slow irregular breathing, and apparent exhaustion;
- When core temperatures are in the mid-range, the victim may become listless, confused, exhibit severe shivering, or develop severe pain in the extremities; and
- Final signs are a significant drop in blood pressure, fatigue, and shallow respiration.

### 7.2.3 *Control Measures for Cold Stress*

Worker comfort will be monitored and increased layers of PPE or modesty clothing worn under the PPE may be required to minimize cold stress for those persons working inside a building. For those workers performing tasks outside a building when ambient temperature falls below 36°F, the following guidelines should be used:

- If wind chill is a factor, shield the work area or provide employees with an outer windbreak layer garment to reduce the cooling effect of the wind;
- Protect extremities, ears, toes, and nose from extreme cold by wearing protective clothing;
- If performing light work in a situation where clothing may become wet, wear an outer layer of clothing that is impermeable to water;
- If performing moderate to heavy work in a situation where clothing may become wet, wear an outer layer of clothing that is water repellent; and
- Wear outer garments that provide for ventilation to prevent wetting of inner clothing by sweat.

Workers who become immersed in water or whose clothing becomes wet will immediately be provided a change of clothing and be treated for hypothermia if necessary. If the clothing becomes wet from sweating, the employee may finish the task that caused the sweating before changing into dry clothes. Metal handles of tools and control bars will be covered

by thermal insulating materials when temperatures fall below 30°F. Whenever a site becomes covered with snow or ice, employees will wear eye wear providing protection against ultraviolet light, glare, and blowing ice crystals.

When conducting work in air temperatures below 35°F, the following practices shall be followed:

- If the clothing of an employee is expected to become wet, the outer layers of clothing must be impermeable to water.
- If an employee's underclothing becomes wet, it must be changed immediately. If the clothing becomes wet from sweating, the employee may finish the task that caused the sweating before changing into dry clothing.
- Employees will be provided a warm area (65°F or above) to change from work clothing into street clothing and for breaks.
- Hot liquids, such as soups, warm drinks, etc., shall be provided in the break area. The intake of caffeine-containing products shall be discouraged due to their diuretic and circulatory effects.
- If appropriate, approved space heaters may be provided in the work area to warm the hands, feet, etc.
- The buddy system shall be practiced. Any employee observed with signs of cold stress shall immediately proceed to the break area.
- Employees will be reminded to layer their clothing, i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing.
- Avoid overdressing when going into warm areas or when performing activities that are strenuous. This could potentially lead to heat stress situations.
- Auxiliary heated versions of handwear, footwear, etc., can be used in lieu of mittens, insulated socks, etc., if extremely cold conditions exist.
- Employees handling liquids with high evaporation rates (gasoline, hexane, alcohol, etc.) shall take special precautions to avoid soaking of clothing with the liquids because of the added danger of cold injury caused by evaporative cooling.
- Work shall be arranged in such a way that sitting still or standing for long periods is minimized.

- If the air temperature is 20°F or below, the hands shall be protected by mittens or gloves prior to contact with cold surfaces such as metal, etc.

Air temperature is not the only factor to be considered while evaluating cold stress situations. Wind chill cooling rate and the cooling power of air are critical factors. The higher the wind speed the greater the risk of experiencing cold-related injuries. For exposed skin, continuous exposure should not be permitted when the air speed and temperature result in an equivalent chill temperature of -25°F or less.

The client does not have any specific requirements for the work governed by this SSHP.

## **9.0           SAFE WORK PRACTICES AND STANDARD OPERATING PROCEDURES**

### **9.1           GENERAL SAFETY PROVISIONS**

#### **9.1.1       *Smoking and Eating Areas***

Smoking will only be allowed in designated areas. Upon mobilization at the site, the SSO will establish smoking areas per site-specific or client-specific requirements. Individuals caught smoking outside the designated smoking areas will be subject to disciplinary action up to and including immediate termination.

Upon mobilization at the site, the SSO will establish eating and break areas per site-specific or client-specific requirements. Eating will only be allowed in the designated areas and the areas will be maintained in a clean and sanitary condition.

Designated areas for smoking, eating and breaks will be communicated to the site workers at the initial safety meeting and daily safety briefings as necessary.

#### **9.1.2       *Sanitation and Potable Water***

Containers used for drinking water will be equipped with a tap and capable of being tightly closed. In addition, the container will be labeled as "Drinking Water" or "Potable Water." Disposal cups will be stored in a sanitary condition and a receptacle for disposing of the cups will be established nearby.

Potable and nonpotable water containers and portable toilets (if used) will comply with OSHA requirements. Portable toilets will be located to the north of the groundwater remediation building. A hand-wash station will be located near the site office trailer.

#### **9.1.3       *Temporary Facilities***

Temporary facilities on this project are being provided and maintained by the prime contractor.

## 9.2

### **STANDARD OPERATING PROCEDURES**

The following standard operating procedures will be adhered to at all times:

- All personnel entering the site must check in with the SSO.
- All individuals entering the site must demonstrate to the SSO that they have been adequately trained as defined in Section 10.
- All individuals must be familiar with emergency communication methods and how to summon emergency assistance.
- Use of alcoholic beverages before or during operations, or immediately after hours, is absolutely forbidden. Alcohol can reduce the ability to detoxify compounds absorbed into the body as the result of minor exposures and may have negative effects with exposure to other chemicals. In addition, alcoholic beverages will dehydrate the body and intensify the effects of heat stress.
- Horseplay of any type is forbidden.
- All unsafe conditions will be immediately reported to the SSO, who will document such conditions in the field log. The SSO will be responsible for ensuring that the unsafe condition is corrected as quickly as possible.
- Smoking, matches, and lighters are only allowed in the designated smoking area.
- All individuals shall avoid contact with potentially contaminated substances. Whenever possible, personnel should avoid kneeling on the ground, or leaning or sitting on trucks, equipment, or the ground. Equipment should not be placed on potentially contaminated surfaces.
- If any unknown materials or substances are discovered on site, all work will be ceased and the SSO will contact the Project Manager for further instructions prior to proceeding.

## 9.3

### **SAFE WORK PRACTICES**

#### 9.3.1

#### ***Ergonomics***

Ergonomic risk factors include repetitive motion, force, awkward posture, and vibration. The key to preventing ergonomic injuries is education of personnel relative to the hazards and risk factors and implementation of proper controls and work practices. When completing THAs, the Project

Health and Safety Consultant will assist project team members in identifying ergonomic risk factors and appropriate control methods.

Several tasks associated with this project have the potential to cause back injuries, if proper lifting techniques are not followed. Site workers should not lift objects that are beyond their physical capabilities and the use of mechanical devices such as forklifts is encouraged. Also, when shoveling site workers should not twist their backs while moving materials with the shovel. The proper technique is to move the feet.

Proper lifting techniques are summarized below:

- Place feet shoulder width apart with toes pointing slightly out;
- Bend at your knees keeping back straight;
- Get a good grip on the object and pull object close to your body;
- Tighten abdominal muscles;
- Keep your head up, looking forward, and lift with your legs while maintaining a straight back;
- Keep load close to your body and ensure your view is not obstructed;
- If one end of the load is heavier than the other, the heavier end should be closest to your body;
- Move your feet to relocate the object as opposed to twisting your back; and
- When placing the object down, bend your knees and use your leg muscles while keeping your back straight.

### **9.3.2**      *Pre-Drilling/Pre-Excavation and Probing Protocol*

Drilling or excavating activities will not be conducted as a part of this project.

### **9.3.3**      *Fall Protection*

In the event that project team members and/or subcontractors are working more than 6 feet above grade and are not protected by handrails or complete floor decking, or working on approved access ways, fall-protection equipment will be required. Fall protection training must be completed prior to any use of fall arrest systems. Contact the project manager immediately should this become necessary. All contractors must

be trained in fall protection equipment and inspections of equipment must be completed.

The distance above grade is measured from the employee's feet to the grade or approved work surface. Fall-protection equipment will consist of an ANSI-approved, full-body harness and shock-absorbing lanyard with double-locking D-rings.

Acceptable anchor points to which the lanyard may be attached include, but are not limited to, the following:

- Structural beams at least 6 inches deep for one or more persons in a completed structure;
- Pipes at least 4 inches in diameter for one person;
- Pipes at least 6 inches in diameter for two people;
- Nozzles at least 3 inches for one person;
- Nozzles greater than 3 inches for two people; and
- Permanent platform handrail post below midrail for one person.

#### **9.3.4**      *Weather-Related Events*

Weather-related events that may impact fieldwork include, but are not limited to, earthquakes, rain, thunder, lightning, flash flooding, and tornados. The SSO will be responsible for determining what site work can be performed safely in the rain and at what point work will cease due to either quality or safety issues. In the event of thunder and/or lightning, all work will be suspended until 15 minutes have elapsed from the last clap of thunder or flash of lightning. In the event of an earthquake, all work will be stopped and emergency evacuation plans will be implemented to account for all employees on site.

#### *Lightning Safety for Outdoor Workers*

Safety and productivity are not mutually compatible, so one must be chosen over the other. Easy choice: SAFETY FIRST! Lightning has visited most outdoor work environments. Anticipate a high-risk situation and move to a low-risk location.

Lightning safety awareness is a priority at every outdoor facility and operation. Education is the single-most important means to achieving lightning safety. The following steps are suggested:



1. Monitor weather conditions in the early morning hours. Local weather forecasts – from The Weather Channel or NOAA Weather Radio – should be noted 24 hours prior to scheduled activities. An inexpensive portable weather radio is recommended for obtaining timely storm data.
2. Suspension and resumption of work activities should be planned in advance. Understanding of SAFE shelters is essential. SAFE evacuation sites include:
  - Fully enclosed metal vehicles with windows up;
  - Substantial buildings;
  - Low ground – seek cover in clumps of bushes; and
  - Trees of uniform height, such as a forest.
3. UNSAFE SHELTER AREAS include all outdoor metal objects, like power poles, fences and gates, high mast light poles, metal bleachers, electrical equipment, and mowing and road machinery. AVOID solitary trees. AVOID water. AVOID open fields. AVOID high ground and caves.
4. Lightning's distance from you is easy to calculate: If you hear thunder, the associated lightning is within audible range – about 6 to 8 miles away. The distance from Strike A to Strike B also can be 6 to 8 miles. Suspend activities, allowing sufficient time to get to shelter. Of course, different distances to safety will determine different times to suspend activities. A good lightning safety motto is:  
  
*If you can see it (lightning), flee it; if you can hear it (thunder), clear it.*
5. If you feel your hair standing on end, and/or hear “crackling noises,” you are in lightning's electrical field. If caught outside during close-in lightning, immediately remove metal objects (including baseball cap), place your feet together, duck your head, and crouch down low in baseball catcher's stance with hands on knees.
6. Wait a minimum of 30 minutes from the last observed lightning or thunder before resuming activities. Be extra cautious during this phase, as the storm may not be over.
7. People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply first aid immediately if you are qualified to do so. Get emergency help promptly.

During rain, lightning, and/or thunder events, site workers should seek shelter in either a building or vehicle. In the event of a tornado, site workers should seek shelter in a building (but not in a trailer), or in a low-lying area.

### **9.3.5**      *Night Work*

This project will not involve activities being performed at night.

### **9.3.6**      *Noise*

Hearing protection (earplugs or earmuffs) is required as follows:

- For employees performing any noisy task including, but not limited to, operating heavy equipment and using power tools;
- For employees working within 20 feet of a person performing a noisy task; and
- For personnel operating a drill rig or standing within 20 feet of a drill rig during operation.

## **10.0 EMPLOYEE TRAINING**

All employees and subcontractors working on site, who may be exposed to hazardous substances, health hazards, or safety hazards, and their supervisors and management responsible for the site, will receive training that meets the requirements of 8 CCR 5192, 29 CFR 1910.120 or 29 CFR 1926.65 (as applicable), *Hazardous Waste Operations and Emergency Response* (HAZWOPER) before they are permitted to engage in any job task. Employees will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility. Once on site, all site workers will receive training covering at a minimum the following:

- Names of personnel and alternates responsible for site safety and health;
- Hazards present on the site;
- Use of PPE;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment on the site; and
- Medical surveillance requirements including recognition of symptoms and signs that might indicate overexposure to hazards.

### **10.1 SUBCONTRACTOR TRAINING**

The SSO will verify that subcontractor personnel have received all appropriate training as required by this SSHP prior to their arrival on site. Verification will consist of reviewing written training documentation such as copies of training certificates or cards issued by a Contractor Safety Council provided by the subcontractor. Copies of the written training documentation will be retained in the project file. Subcontractor personnel will not be allowed to work at the site unless said training documentation is available.

### **10.2 DAILY TAILGATE SAFETY MEETING**

A tailgate safety meeting will be conducted each morning. The daily safety meetings will address special concerns regarding health and safety, pollution prevention, or recent incidents or safety observations. Issues

such as changes to this SSHP or the THAs and comments from the project personnel will be addressed daily. The meetings will include a discussion of tasks to be completed that day and how those tasks will be conducted safely. The meetings will be documented on the Daily Safety Meeting Form found in Attachment E.

All ERM employees are enrolled in a medical surveillance program. All employees receive an initial medical examination and consultation prior to assignment to any job site. In addition, employees receive an annual medical examination, a medical examination upon termination of employment, and a medical examination when the employee exhibits signs or symptoms relating to possible overexposure to hazardous substances or when an injury or exposure above published exposure limits has occurred in an emergency situation.

Additional medical surveillance should be provided for employees who:

- Are or may be exposed to hazardous substances or health hazards at or above published exposure levels for these substances for 30 days or more a year;
- Wear a respirator for 30 days or more a year or as required by 8 CCR 5144 and 29 CFR 1910.134, *Respiratory Protection*; and
- Are injured, become ill, or develop signs or symptoms due to possible exposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

The following site control measures will be in effect:

- Signing-in/signing-out at the site, at the guard gate or at a Control Room;
- Erecting fencing/barricades around the work area; and
- Reporting of any unauthorized personnel at the site to the client contact.

Decontamination involves the orderly, controlled removal of contaminants from both personnel and equipment. The purpose of decontamination procedures is to prevent the spreading of contaminated materials into uncontaminated areas. All site personnel should limit contact with contaminated soil, ground water or equipment to reduce the need for extensive decontamination.

Equipment and materials used in the decontamination process may include the following:

- Five-gallon bucket;
- Potable water;
- Distilled water;
- Paper towels; and
- Brushes.

**13.1****PERSONNEL DECONTAMINATION**

The following minimal decontamination procedures will be followed:

- Wash hands and any skin that may have come in contact with affected soil or ground water with moistened disposable towels, such as baby wipes, or soap and water.

*Should the site activities warrant the use of Level C PPE, more rigorous decontamination steps will be implemented. Contact the Project Manager and Safety Consultant for further details. At this point, all proper washing, rinsing, doffing and equipment disposal will be implemented.*

**13.2****EQUIPMENT DECONTAMINATION**

It is not anticipated that any equipment decontamination will be required as all work is being conducted outside the contaminated area.

Entry into permit-required confined spaces is not anticipated and not allowed for ERM employees. If a project task or activity would involve entry into a permit-required confined space or if there is a question as to whether or not a job task or activity involves a permit-required confined space, the PM or SSO will contact the Project Health and Safety Consultant for assistance.



The spill containment program for this project will involve the use of preventative measures to reduce the potential for environmental releases. These preventative measures will include the following:

- Equipment inspection;
- Staging equipment on containment pads; and
- General housekeeping practices.

If project activities involve the use of drums or other containers, the drums or containers will meet the appropriate Department of Transportation regulations and will be inspected and their integrity assured prior to being moved. Operations will be organized to minimize drum or container movement. Drums or containers that cannot be moved without failure will be overpacked into an appropriate container.

More detailed spill containment information is outlined in Appendix D (Waste Management Plan) of the *Remedial Action Workplan, Pemaco Superfund Site* (ERM 2006).

Telephones and plant radios will be used for communication between the project team and the client. If cell phones are allowed, they may be used for communication; however, they cannot be used in operating process units or while driving any type of vehicle.

***COMMUNICATION AND REVIEW OF SITE SAFETY AND HEALTH PLAN (HAZARD COMMUNICATION)***

An initial review of the SSHP will be held either prior to mobilization or after mobilization, but prior to commencing work at the site. At this time, details of this SSHP will be discussed and individuals working at the site will have an opportunity to have their questions answered. Daily tailgate safety meetings will be held each morning to review work practices for the day and discuss safety issues. Any new hazard or safety information will be disseminated at the daily tailgate safety meeting or as needed throughout the day.

## **18.0      *EMERGENCY RESPONSE PLAN***

This section describes possible contingencies and emergency procedures to be implemented at the site.

### **18.1      *PERSONNEL ROLES AND LINES OF AUTHORITY***

The SSO has primary responsibility for site evacuation and notification in the event of an emergency situation. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve the evacuation of personnel from the site area and ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. If the SSO is not available, the ERM Project Geologist/Engineer will assume these responsibilities. Subcontractors are responsible for assisting the SSO in their mission within the parameters of their scope of work.

### **18.2      *EVACUATION ROUTES AND PROCEDURES***

In the event of an emergency, all personnel should proceed directly to the site egress gates and await further direction from the SSO.

In the event of an emergency, it is important to be aware of the prevailing wind direction and evacuate upwind or crosswind. The egress gates at the site are located in the predominant upwind direction.

### **18.3      *ASSEMBLY POINTS***

The primary Assembly Point is located immediately outside of the ingress/egress gates to the site, south of the site trailer. The secondary Assembly Point is located on the northeastern corner of 60th Street and Walker Avenue.

In the event of an emergency requiring evacuation to an Assembly Point, the SSO will be responsible to account for the presence of all project team members and subcontractors on site at the time of the emergency.

### **18.4      *REPORTING EMERGENCIES***

All injuries, including any late developing or aggravated injuries, must receive prompt medical attention. Call the Project Manager for ANY near

miss or loss, injury, or illness, including first aid incidents. For injuries or illnesses requiring any assistance beyond first aid, the local emergency responders should be contacted via 911.

The SSO is responsible for reporting all injuries, illnesses, fires, spills/releases, property damage or near-misses to the following individuals:

- Injured/involved employee's supervisor;
- ERM Project Manager;
- ERM Partner-In-Charge;
- ERM Project Health and Safety Consultant; and
- Client Contact.

The Project Manager and Health and Safety Consultant will assist in completing any incident forms and assisting with the incident investigation. The Project Manager is responsible for completing the incident form, with the help of the Health and Safety Consultant as needed.

## 18.5 **EMERGENCY CONTACTS**

In the event of an emergency, the SSO will contact the following as appropriate.

<i>Title/Name</i>	<i>Phone Numbers</i>
ERM-West, Inc., Partner-in-Charge Truong Mai, P.E.	Work: 714-430-1476 Mobile: 714-436-2940
Project Manager Rudy Millan, P.E.	Work: 925-279-3272 Mobile: 925-383-9517
Site Safety Officer Neil Coy	Work: 714-430-1476 Mobile: 714-848-7420
Project Engineer Rudy Millan, P.E.	Work: 925-279-3272 Mobile: 925-383-9517
Project Health and Safety Consultant Robin Woolson	Work: 714-430-1476 Mobile: 714-454-0413
Client Contact Tim Garvey	Work: 805-585-6386 Mobile: 805-290-7320
Local Emergency Responders	Phone: 911
Hospital Name: Community Hospital Address 3623 E. Slauson Avenue : Huntington Park, CA	Phone: 323-583-1931
United States Army Corp of Engineers	Work: 951-898-6182

<i>Title/Name</i>	<i>Phone Numbers</i>
Contact James Miller	Mobile: 626-298-3890
United States Environmental Protection Agency Contact Rose Marie Caraway	Work: 415-972-3158

## 18.6 ***INCIDENT INVESTIGATIONS***

An ERM Incident Form (Attachment F) will be completed and forwarded to the Project Manager within 24 hours of an incident. All incidents will be investigated in a timely manner. The SSO and/or the Project Manager will schedule the investigation and include project supervision (ERM, subcontractors, and client), the injured/involved employee(s), and the Project Health and Safety Consultant. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent recurrence. The last page of the Incident Form is used to document the investigation.

## 18.7 ***DIRECTIONS TO NEAREST HOSPITAL***

The nearest hospital is Community Hospital. A map to the hospital is presented in Attachment A.

**Directions to the hospital from the site are as follows:**

- **Proceed west on 60th Street for one block.**
- **Turn Right onto Alamo Avenue and proceed for one block.**
- **Turn Left onto Slauson Avenue and proceed for approximately 1.5 miles.**
- **Hospital is at the intersection of Slauson and Rita Avenues.**

## 18.8 ***EMERGENCY DRILLS***

In accordance with the HAZWOPER Standard emergency response plans will be rehearsed regularly as part of the overall training program for site operations. The frequency of this drill (rehearsal) is outlined on Table 18-1. All drills will be documented on the Emergency Drill Evaluation Form found in Attachment G. Drills do not need to be elaborate. A table-top scenario during the daily safety meeting is an adequate drill.

**TABLE 18-1:**        *Emergency Drill Frequency*

<i>Project Duration</i>	<i>Drill Frequency</i>
Less than 30 days	None, cover during review/sign-off of SSHP
Greater than 1 month but less than 1 year	Once
Greater than 1 year	Annually

A first-aid kit containing first-aid items for minor incidents only and a fire extinguisher is maintained in each ERM vehicle. Each piece of heavy equipment will have a fire extinguisher on board. The office trailer will also have at least one fire extinguisher mounted in a readily assessable location.

The SSO will be responsible for ensuring that all fire extinguishers are inspected monthly as required by 29 CFR 1910.157 *Portable Fire Extinguishers*. The monthly inspections will be documented on a tag attached to each extinguisher or a master list of fire extinguishers and their locations. If the project duration exceeds 1 year, the SSO will contract with an outside vendor to perform the annual maintenance on all fire extinguishers.

The eye-wash station is located immediately north of the site office trailer.

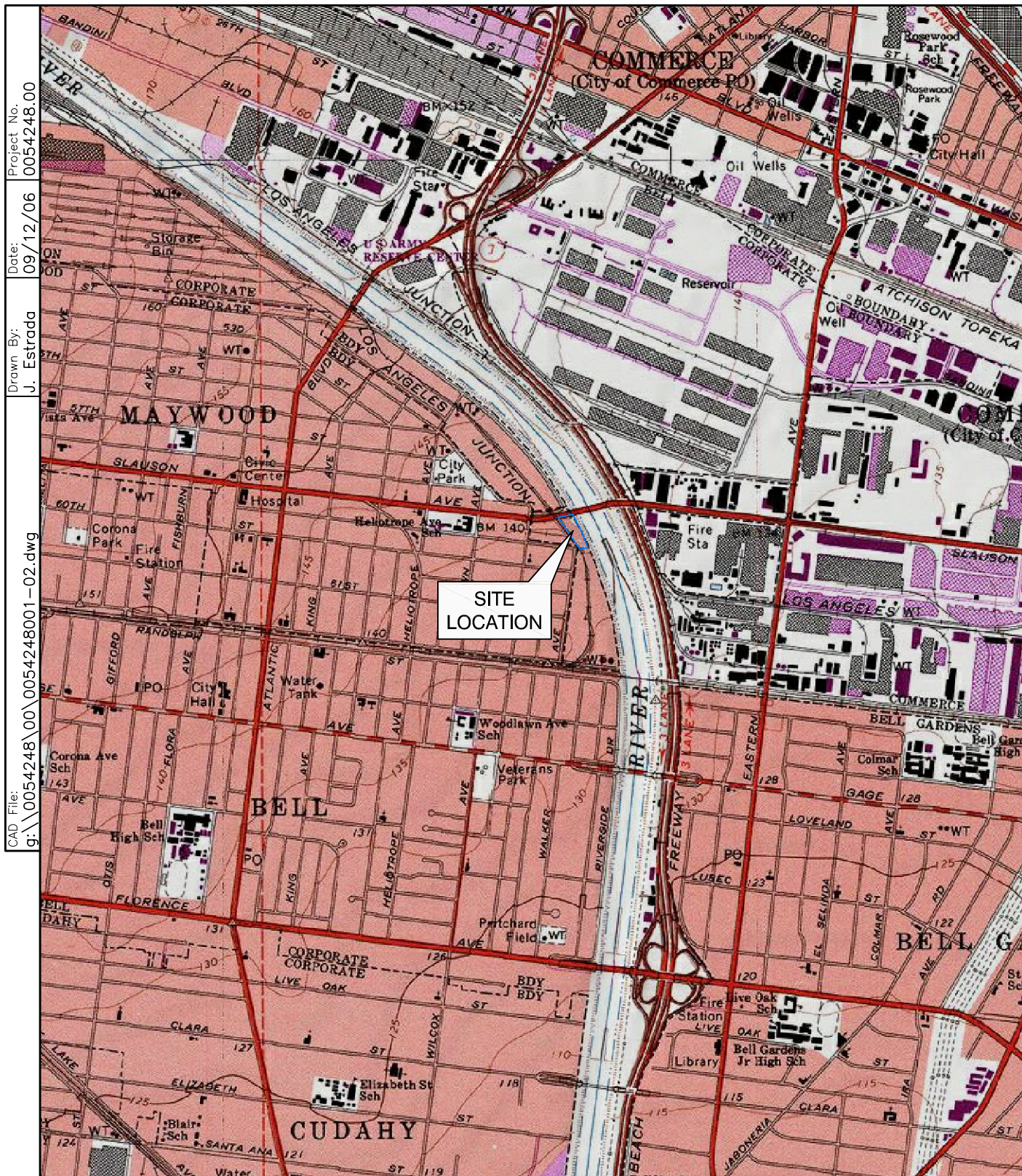


By signing below, signee certifies that they have read, understand, and will abide by the contents of this SSHP.

Name	Signature	Company	Date

## *Figures*





CAD File: g:\0054248\00\0054248001-02.dwg  
 Drawn By: J. Estrada  
 Date: 09/12/06  
 Project No. 0054248.00

References:  
 U.S.G.S. 7.5 Minute Series (Topographic) Quadrangle,  
 (Maywood, California)  
 Map Version: 1978 Map Current as of: 1981

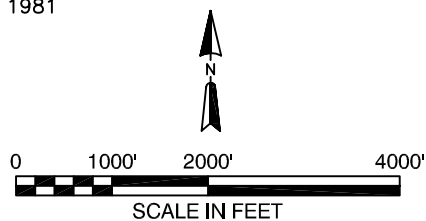


Figure 1  
*Site Location Map*  
*Pemaco Superfund Site*  
*5050 Slauson Avenue*  
*Maywood, California*



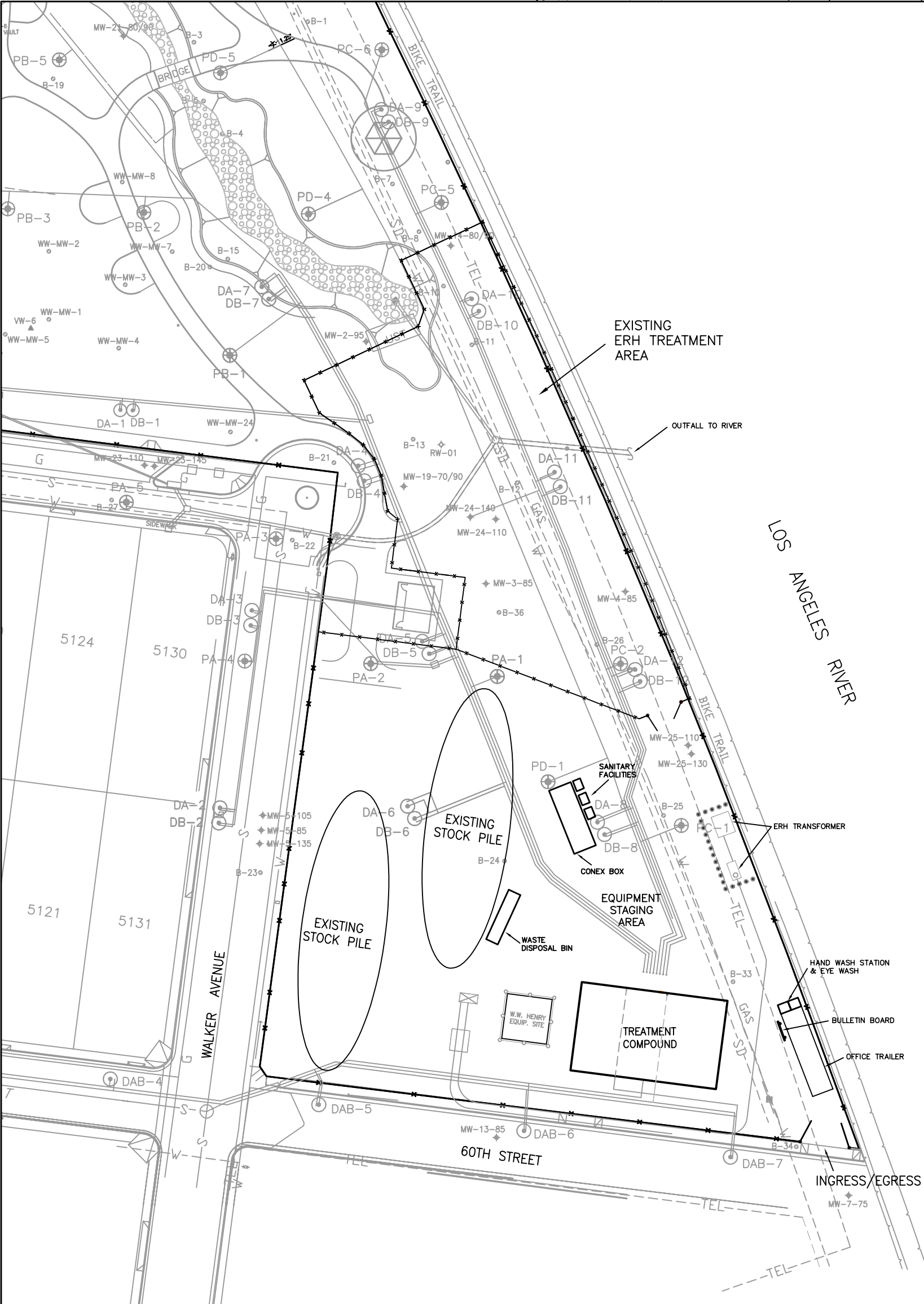
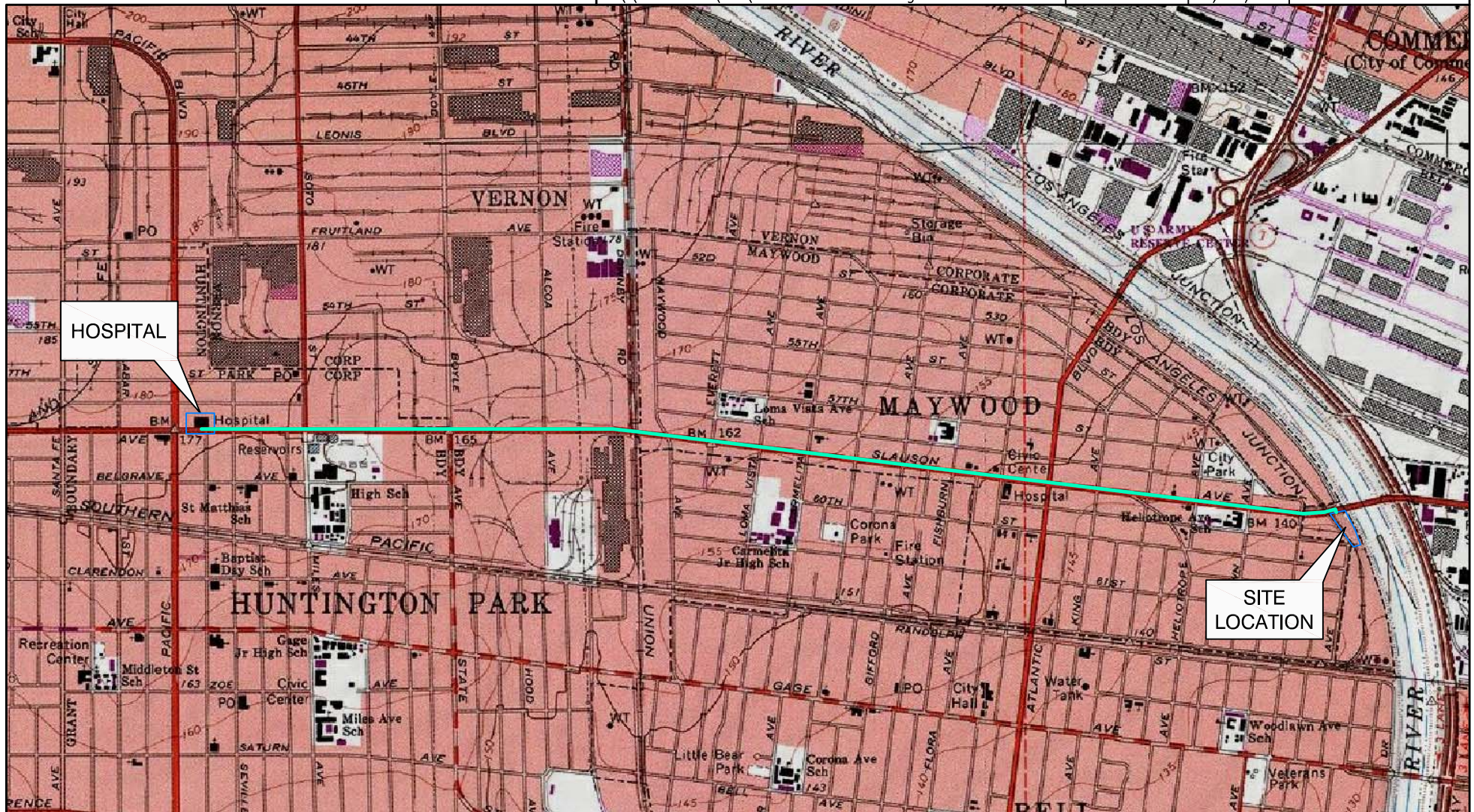


Figure 2  
Temporary Construction  
Facilities Site Plan  
Pemaco Superfund Site  
5050 Slauson Avenue  
Maywood, California

*Attachment A*  
*Map to Hospital*



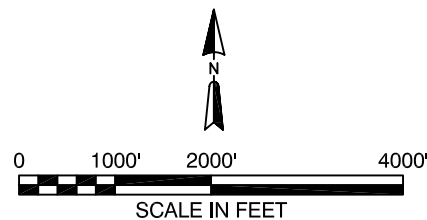


#### References:

U.S.G.S. 7.5 Minute Series (Topographic) Quadrangle,  
(Maywood, California)  
Map Version: 1978 Map Current as of: 1981

#### LEGEND

Community Hospital of Huntington Park  
2623 E. Slauson Blvd., Huntington Park, CA  
(323) 583-1931



Attachment A  
Direction Map  
Pemaco Superfund Site  
Maywood, California



*Attachment B*  
*Task Hazard Analysis Forms*

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Loading/Unloading of equipment
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input checked="" type="checkbox"/> Repellent sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input type="checkbox"/> PPE <input type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input type="checkbox"/> PPE, Eye & Face <input type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: David Collins

Date Developed: 10/17/06

Reviewed with the Following Project Employees:

Ruth Mullan



# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Vapor Extraction Condensate Sump Excavation
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input checked="" type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input checked="" type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input checked="" type="checkbox"/> PPE <input checked="" type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input type="checkbox"/> PPE, Eye & Face <input type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input checked="" type="checkbox"/> Contact with underground utilities	<input checked="" type="checkbox"/> Local Utility "One Call" service <input checked="" type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input checked="" type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition?	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/17/06

Reviewed with the Following Project Employees:

RUDY MIWAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Well completions and submersible pump installation
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input type="checkbox"/> PPE <input type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input type="checkbox"/> PPE, Eye & Face <input type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/17/06

Reviewed with the Following Project Employees:

RUDY MILAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Process pipe connection
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input checked="" type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input checked="" type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input checked="" type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input checked="" type="checkbox"/> PPE <input checked="" type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input checked="" type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input checked="" type="checkbox"/> PPE, Eye & Face <input checked="" type="checkbox"/> PPE, Arms & Body <input checked="" type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input checked="" type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input checked="" type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			X
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/17/06

Reviewed with the Following Project Employees:

RUDY MILLAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Electrical conduit connection
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input checked="" type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input checked="" type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input checked="" type="checkbox"/> PPE <input checked="" type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input checked="" type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input checked="" type="checkbox"/> PPE, Eye & Face <input checked="" type="checkbox"/> PPE, Arms & Body <input checked="" type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input checked="" type="checkbox"/> Sharp objects	<input checked="" type="checkbox"/> Guarding <input checked="" type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/17/06

Reviewed with the Following Project Employees:

RUDY HILAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Electrical wire installation and connection
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input checked="" type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input type="checkbox"/> PPE <input type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input checked="" type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input checked="" type="checkbox"/> PPE, Eye & Face <input checked="" type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input checked="" type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input checked="" type="checkbox"/> Gloves, safety shoes or boots <input checked="" type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/17/06

Reviewed with the following Project Employees:

RUDY MUMAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Electrical wire termination in control panels
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input type="checkbox"/> Repellent sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input type="checkbox"/> Electrical shock	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Testing <input type="checkbox"/> Grounding <input type="checkbox"/> Shielding on equipment <input type="checkbox"/> PPE <input type="checkbox"/> Ground Fault Interruption on cords <input type="checkbox"/> Electrical expertise on project team
<input type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input type="checkbox"/> PPE, Eye & Face <input type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input checked="" type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input checked="" type="checkbox"/> Handling equipment is designed for the job <input checked="" type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input checked="" type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input checked="" type="checkbox"/> Hazards to other working in vicinity	<input checked="" type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition?	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: DAVID COLLINS

Date Developed: 10/7/06

Reviewed with the Following Project Employees:

RUDY HILAN

# Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

## Task Description (Sequence of Steps):

1. Electrical – Main power connection
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Ventilation <input type="checkbox"/> Supplied Air <input type="checkbox"/> Air monitoring
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Decontamination/ eyewash/ shower
<input checked="" type="checkbox"/> Plant, Insect, Animal Hazards	<input checked="" type="checkbox"/> Knowledge of particular local issues <input checked="" type="checkbox"/> Repellant sprays and coatings <input checked="" type="checkbox"/> Netting, clothing covering <input type="checkbox"/> Self-inspection schedule <input checked="" type="checkbox"/> First aid kit
<input type="checkbox"/> Thermal Burns <input type="checkbox"/> Hot Surface	<input type="checkbox"/> Splash Guard <input type="checkbox"/> Isolation, Lockout/Tagout <input type="checkbox"/> PPE <input type="checkbox"/> Equipment Covers <input type="checkbox"/> Barricades
<input checked="" type="checkbox"/> Slips and Trips	<input checked="" type="checkbox"/> Ensure clean and dry surface <input type="checkbox"/> Barricade <input checked="" type="checkbox"/> Walk Carefully/ Eyes on Path <input checked="" type="checkbox"/> Use alternate route if wet or unstable situation <input checked="" type="checkbox"/> Relocate the trip hazards
<input type="checkbox"/> Falls <input type="checkbox"/> More than 4 feet	<input type="checkbox"/> Fall restraint, guardrails, barricades, short lanyard
<input checked="" type="checkbox"/> Electrical shock	<input checked="" type="checkbox"/> Isolation, LOTO <input checked="" type="checkbox"/> Testing <input checked="" type="checkbox"/> Grounding <input checked="" type="checkbox"/> Shielding on equipment <input checked="" type="checkbox"/> PPE <input checked="" type="checkbox"/> Ground Fault Interruption on cords <input checked="" type="checkbox"/> Electrical expertise on project team
<input type="checkbox"/> Airborne/Flying material	<input type="checkbox"/> Cover/Shield source <input type="checkbox"/> PPE, Eye & Face <input type="checkbox"/> PPE, Arms & Body <input type="checkbox"/> Positioning
<input type="checkbox"/> Fire/ Explosion	<input type="checkbox"/> Isolation/LOTO <input type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Control sources of ignition <input type="checkbox"/> Implement a "Hot Work" process <input type="checkbox"/> PPE <input type="checkbox"/> The correct fire extinguisher is available
<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Ventilation <input type="checkbox"/> Cooling vests, etc. <input type="checkbox"/> Task rotation, Shared tasks <input type="checkbox"/> Work/Rest regimen <input type="checkbox"/> Planned place for sheltering
<input type="checkbox"/> High Noise	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Relocate Work <input type="checkbox"/> Muffle Source
<input type="checkbox"/> Poor Visibility	<input type="checkbox"/> Illumination is adequate for task <input type="checkbox"/> Nighttime considerations if the job could extend past daylight hours

<input type="checkbox"/> Lifting, pulling, pushing	<input type="checkbox"/> A plan is in place (people, devices, carts) <input type="checkbox"/> Handling equipment is designed for the job <input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Smaller, lighter loads?
<input type="checkbox"/> Repetitive motion	<input type="checkbox"/> Proper technique known/ discussed <input type="checkbox"/> Proper tools, rather than manual <input type="checkbox"/> Get help, take breaks
<input type="checkbox"/> Rotating equipment/ Pinch Points	<input type="checkbox"/> Isolation, LOTO <input type="checkbox"/> Guarding, Barricading <input type="checkbox"/> No loose clothing <input type="checkbox"/> Positioning
<input type="checkbox"/> Sharp objects	<input type="checkbox"/> Guarding <input type="checkbox"/> Gloves, safety shoes or boots <input type="checkbox"/> Substitute safe cutter for blade
<input type="checkbox"/> Falling objects	<input type="checkbox"/> Secure objects <input type="checkbox"/> Guarding, covers <input type="checkbox"/> Hard Hat <input type="checkbox"/> Barricading
<input type="checkbox"/> Hazards from others working in vicinity (particularly heavy equipment)	<input type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Hazards to other working in vicinity	<input type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding
<input type="checkbox"/> Environmental Spill	<input type="checkbox"/> Containment <input type="checkbox"/> Waste Plan <input type="checkbox"/> Waste Containers <input type="checkbox"/> Other
<input type="checkbox"/> Chemical Storage	<input type="checkbox"/> Container labeling and MSDSs <input type="checkbox"/> Incompatibles (acids/bases, flammables/oxidizers) considered <input type="checkbox"/> Control physical damage to containers
<input type="checkbox"/> Drowning	<input type="checkbox"/> Personal Floatation Device <input type="checkbox"/> Barricading <input type="checkbox"/> Working with a partner <input type="checkbox"/> Alerting Devices
<input type="checkbox"/> Ionizing Radiation	<input type="checkbox"/> Exposure Monitoring <input type="checkbox"/> PPE <input type="checkbox"/> Distance and/or shielding
<input type="checkbox"/> Nearby Road Traffic	<input type="checkbox"/> Bright colored work vests <input type="checkbox"/> Planned avoidance of traffic areas <input type="checkbox"/> Signs and lights to alert drivers
<input type="checkbox"/> Contact with underground utilities	<input type="checkbox"/> Local Utility "One Call" service <input type="checkbox"/> Access to site maps/ experience <input type="checkbox"/> Utility Line Locating Devices <input type="checkbox"/> Utility Company Knowledge: <input type="checkbox"/> Hand Auguring before mechanical
<input type="checkbox"/> Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?		X	
If so is the client's procedure/policy supplied?			
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?	X		
Was this Hazard Analysis reviewed with the project team performing this task?			

Developed By (Individual or Team Members)

Names: \_\_\_\_\_

Date Developed: \_\_\_\_\_

Reviewed with the Following Project Employees:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Attachment C*  
*Potential Hazards of Site Soil and*  
*Groundwater Chemicals of Concern*



**Attachment C**  
**Pemaco Superfund Site**  
**Potential Hazards of Site Soil and Groundwater Chemicals of Concern**

Chemical Name & CAS Number	Chemical Name (Synonyms)	Concentration at Site (µg/L)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics
Benzene CAS-71-43-2	Benzene Benzol CAS-71-43-2	1,600	TLV: 0.1 ppm [skin] PEL: 1 ppm STEL: 5 ppm IDLH: 500 ppm	Inhalation Absorption (skin) Ingestion	ACUTE: Irritation to eyes, skin, respiratory tract; dizziness; headache; nausea; staggered gait; fatigue; abdominal pain. CHRONIC: Defatting of the skin, may have effects on bone marrow and immune system, decrease in blood cells. Carcinogenic to humans.	(FP) 12°F (VP) 75 mm (IP) 9.24 eV (UEL) 7.8% (LEL) 1.2%	Colorless to light-yellow liquid with an aromatic odor. Solid below 42°F.
Vinyl Chloride CAS-75-01-4	Vinyl Chloride Chloroethene VCM Chloroethylene CAS-75-01-4	780	TLV: 1 ppm PEL: 1 ppm STEL: 5 ppm (C) IDLH: NE	Inhalation Skin contact Eye contact	ACUTE: Irritation to eyes. Affects CNS. May cause unconsciousness. CHRONIC: Affects liver, spleen, blood and peripheral blood vessels, tissue and bones in fingers. Human carcinogen.	(FP) NA (gas) (VP) 3.3 atm (IP) 9.99 eV (UEL) 33.0% (LEL) 3.6%	Colorless gas or liquid (<7°F) with a pleasant odor at high concentrations.
Toluene CAS-108-88-3	Toluene Methylbenzene Toluol CAS-108-88-3	2,000	TLV: 100 ppm [skin] PEL: 200 ppm STEL: 150 ppm (C) IDLH: 500 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness and cardiac dysrhythmia at high-level exposures. CHRONIC: Defatting of the skin. Affects CNS. Enhanced hearing damage.	(FP) 40°F (VP) 21 mm (IP) 8.82 eV (UEL) 7.1% (LEL) 1.1%	Colorless liquid with a sweet, pungent, benzene-like odor.
TCE CAS-79-01-6	Trichloroethene TCE Trichloroethylene Ethylene trichloride CAS-79-01-6	22,000	TLV: 50ppm PEL: 100ppm STEL: 100ppm IDLH: 1,000 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to eyes and skin. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness due to exposure. CHRONIC: Dermatitis. Affects CNS, loss of memory. May damage liver and kidneys. Probable human carcinogen.	(FP) NE (VP) 58 mm (IP) 9.45 eV (UEL) 10.5% @ 77°F (LEL) 8.0% @ 77°F	Colorless liquid with a chloroform-like odor. Sometimes dyed blue.
PCE CAS-127-18-4	Tetrachloroethene PCE Perchloroethylene Tetrachloroethylene CAS-127-18-4	1,100	TLV: 25 ppm PEL: 100 ppm STEL: 100 ppm IDLH: 150 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to skin, eyes, and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness at high level exposures. CHRONIC: Dermatitis. May cause liver and kidney damage. Probable human carcinogen.	(FP) NA (VP) 14 mm (IP) 9.32 eV (UEL) NA (LEL) NA	Colorless liquid with a mild, chloroform-like odor.
1,2-Dichloroethane CAS-107-06-2	1,2 Dichloroethane Ethylene dichloride 1,2-Ethylene dichloride Ethane dichloride CAS-107-06-2	18	TLV: 1 ppm PEL: 50 ppm, 200 ppm (C) STEL: NE IDLH: 50 ppm	Inhalation Absorption Ingestion	ACUTE: Inhalation causes lung edema. May affect CNS, kidneys, and liver. Vapors cause irritation to eyes, skin, and respiratory tract. CHRONIC: Defatting of the skin. May cause kidney and liver damage.	(FP) 56°F (VP) 64 mm (IP) 11.05 eV (UEL) 16.0% (LEL) 6.2%	Colorless, viscous liquid with a pleasant chloroform-like odor. Turns dark on exposure to air, moisture and light.
1,1-DCE CAS-75-35-4	1,1-Dichloroethene 1,1-DCE VDC Vinylidene chloride CAS-75-35-4	2,000	TLV: 5 ppm PEL: NE STEL: NE IDLH: NE	Inhalation Ingestion Skin contact absorption Eye contact	ACUTE: Irritation of the eyes, skin, and respiratory tract. Dizziness, headache, nausea. Ingestion may cause chemical pneumonitis. Exposure could cause lowering of consciousness.CHRONIC: Dermatitis. May cause damage to kidneys and liver. Possible human carcinogen.	(FP) -2°F (VP) 500 mm (IP) 10.00 eV (UEL) 15.5% (LEL) 6.5%	Colorless liquid or gas (>89°F) with a mild, sweet, chloroform-like odor.
1,1-Dichloroethane CAS-75-34-3	1,1-Dichloroethane Ethylidene chloride CAS-75-34-3	410	TLV: 100 ppm PEL: 100 ppm STEL: NE IDLH: 3,000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Central nervous system depression, irritation of skin. Exposure at high levels may result in unconsciousness. CHRONIC: Defatting of the skin. Liver and kidney damage.	(FP) 2°F (VP) 182 mm (IP) 11.06 eV (UEL) 11.4% (LEL) 5.4%	Colorless, oily liquid with a chloroform-like odor.
1,1,2,2-Tetrachloroethane CAS-79-34-5	1,1,2,2-Tetrachloroethane Acetylene tetrachloride CAS-79-34-5	9	TLV: 1 ppm [skin] PEL: 5 ppm [skin] STEL: NE IDLH: 100 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of the eyes and respiratory tract. Nausea, tremors, jaundice. May affect liver, kidneys and CNS, resulting in CNS depression, liver and kidney impairment. Unconsciousness and/or death may result due to high-level exposures. CHRONIC: Defatting of the skin. Affects CNS and liver, resulting in impaired functions. Possible human carcinogen.	(FP) NE (VP) 5 mm (IP) 11.10 eV (UEL) NE (LEL) NE	Colorless to pale-yellow liquid with a pungent chloroform-like odor.
Acetone CAS-67-64-1	Acetone 2-Propanone Methyl ketone Dimethyl ketone CAS-67-64-1	20,000	TLV: 250 ppm PEL: 1,000 ppm STEL: 750 ppm IDLH: 2,500 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Vapors irritating to eyes and respiratory tract. May cause headaches and dizziness, effects on CNS, liver, kidneys and gastrointestinal tract. CHRONIC: Prolonged contact causes defatting of the skin, possibly dermatitis. Substance may affect blood and bone marrow.	(FP) 0°F (VP) 180 mm (IP) 9.69 eV (UEL) 12.8% (LEL) 2.5%	Colorless liquid, with characteristic mint-like odor.

**Attachment C**  
**Pemaco Superfund Site**  
**Potential Hazards of Site Soil and Groundwater Chemicals of Concern**

Chemical Name & CAS Number	Chemical Name (Synonyms)	Concentration at Site (µg/L)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics
Chloroform CAS-67-66-3	Chloroform Methane trichloride Trichloromethane CAS-67-66-3	41	TLV: NE PEL: 50 ppm (C) STEL: 2 ppm IDLH: 500 ppm	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: Irritation of the eyes and skin. Dizziness, headache, nausea and confusion. CHRONIC: Enlarged liver. Possible human carcinogen.	(FP) NE (VP) 160 mm (IP) 11.42 eV (UEL) NE (LEL) NE	Colorless liquid with a pleasant odor.
Chloromethane CAS-74-87-3	Chloromethane Methyl Chloride Artic CAS-74-87-3	4.6	TLV: 50 ppm [skin] TLV (as STEL): 100 ppm; [skin] PEL: 100 ppm C: 200 ppm IDLH: 2000 ppm	Absorption Inhalation Ingestion	ACUTE: The liquid may cause frostbite, dizziness, nausea, vomiting, slurred speech, convulsions, and coma. CHRONIC: The substance may have effects on the central nervous system. May have teratogenic effects and toxic effects on human reproduction.	(FP) NA (gas) (VP) 3796 mm (IP) 11.28 eV (UEL) 17.4 (LEL) 8.1	Colorless gas with a faint, sweet odor, which is not noticeable at dangerous concentrations.
1-Chloro-2,3-dibromopropane CAS-96-12-8	1-Chloro-2,3-dibromopropane DBCP Dibromochloropropane CAS-96-12-8	5	TLV: NE PEL: 0.001 ppm STEL: NE IDLH: NA	Inhalation Skin absorption Ingestion Skin contact Eye contact	ACUTE: Irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting CHRONIC: Pulmonary edema; liver, kidney injury; sterility [potential occupational carcinogen].	(FP) 170°F (VP) 0.8 mm (IP) NA (UEL) NA (LEL) NA	Dense yellow or amber liquid with a pungent odor at high concentration (pesticide)
cis-1,2-Dichloroethene CAS-540-59-0	cis-1,2-Dichloroethene Acetylene dichloride 1,2-Dichloroethylene CAS-540-59-0	14,000	TLV: 200 ppm PEL: 200 ppm STEL: NE IDLH: 1,000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of the eyes and respiratory tract. CNS depression. Exposure could cause lowering of consciousness. CHRONIC: Defatting of the skin. May cause damage to liver.	(FP) 36-39°F (VP) 180-265 mm (IP) 9.65 eV (UEL) 12.8% (LEL) 5.6%	Colorless liquid (usually a mixture of the cis and trans isomers) with a slightly acid, chloroform-like odor.
Ethylbenzene CAS-100-41-4	Ethylbenzene Ethylbenzol EB CAS-100-41-4	1,200	TLV: 100 ppm PEL: 100 ppm STEL: 125 ppm IDLH: 800 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Causes irritation of the eyes, skin, mucous membranes, and respiratory tract. Effects on CNS. CHRONIC: Defatting of the skin, narcosis, and coma.	(FP) 55°F (VP) 7 mm (IP) 8.76 eV (UEL) 6.7% (LEL) 0.8%	Colorless liquid with an aromatic odor.
Methyl tert-butyl ether CAS-1634-04-4	Methyl tert-butyl ether MTBE 2-methoxy-2-methyl propane CAS-1634-04-4	30	TLV: 50 ppm PEL: NE STEL: NE IDLH: NE	Inhalation Ingestion	ACUTE: Irritation to skin. Ingestion may cause chemical pneumonitis. Unconsciousness at high-level exposures. CHRONIC: NA.	(FP) -18 °F (VP) 202 mm (IP) NA (UEL) 15.1% (LEL) 1.6%	Colorless liquid with characteristic odor.
Actinolite CAS-1332-21-4	Asbestos Chrysotile Amosite Tremolite Actinolite CAS-1332-21-4	223	TLV: 0.1 fiber/cc PEL: 0.1 fiber/cc STEL: NE IDLH: ND	Inhalation Ingestion	ACUTE: Eye, skin, and respiratory irritation. Restricted pulmonary function. CHRONIC: Asbestosis, mesothelioma, and gastrointestinal and lung cancers.	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	White or greenish (chrysotile); blue (crocidolite); or blue-green (amosite) odorless solids. Known human carcinogen.
Methyl isobutyl ketone CAS-108-10-1	MIBK Methyl isobutyl ketone Hexone 4-methyl-2-pentanone CAS-108-10-1	223	TLV: 50 ppm PEL: 100 ppm STEL: 75 ppm IDLH: 500 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of eyes, skin, and respiratory tract. Ingestion risks chemical pneumonitis. May affect CNS at high concentrations, resulting in narcosis. CHRONIC: Dermatitis.	(FP) 64°F (VP) 16 mm (IP) 9.30 eV (UEL) 8.0% @ 200°F (LEL) 1.2% @ 200°F 1.2%	Colorless liquid with a pleasant odor.
bis(2-Ethylhexyl)phthalate CAS-117-81-7	bis(2-Ethylhexyl)phthalate DEHP Octyl phthalate CAS-117-81-7	11	TLV: 5 mg/m <sup>3</sup> PEL: TWA 5 mg/m <sup>3</sup> STEL: N/A IDLH: Ca 5,000 mg/m <sup>3</sup>	Inhalation Skin contact Eye contact	ACUTE: Irritation eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]. CHRONIC: Effects: Eyes, respiratory system, central nervous system, liver, reproductive system, gastrointestinal tract	(FP) 420°F (VP) <0.01 mm (IP) NE (UEL) NE (LEL) 474°F; 0.3%	Colorless, oily liquid with a slight odor. Class IIIB Combustible Liquid: FLP. at or above 200°F.
Naphthalene CAS-91-20-3	Naphthalene Naphthalin Coal tar White tar CAS-91-20-3	6.2	TLV: 10 ppm PEL: 10 ppm STEL: 15 ppm IDLH: 250 ppm	Inhalation Ingestion Skin contact absorption Eye contact	ACUTE: Levels above 10 ppm may cause: Inhalation - Headache, nausea, excessive sweating and vomiting; Skin - Irritation and if hypersensitive to naphthalene then severe irritation may occur; Eyes - Irritation; direct contact may cause blurred vision and damage to the cornea; Ingestion - Nausea, vomiting, abdominal pain, bladder irritation, and brown or black coloration of urine. CHRONIC: Clouding of the eyes. Chronic skin problems in cases of hypersensitivity. Liver and kidney damage.	(FP) 174°F (VP) 0.08 mm (IP) 8.12 eV (UEL) 5.9% (LEL) 0.9%	Colorless to brown solid with an odor of mothballs. Sometimes found as a crystalline white solid. Shipped as a molten solid.

**Attachment C**  
**Pemaco Superfund Site**  
**Potential Hazards of Site Soil and Groundwater Chemicals of Concern**

Chemical Name & CAS Number	Chemical Name (Synonyms)	Concentration at Site (µg/L)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics
Aluminium CAS-7429-90-5	Aluminium Aluminum metal Aluminum powder CAS-7429-90-5	52,700	TLV: 10 mg/m <sup>3</sup> [Dust] PEL: TWA 15 mg/m <sup>3</sup> STEL: NE IDLH: NE	Inhalation Skin contact Eye contact	ACUTE: Irritation eyes, skin, respiratory system. CHRONIC: Eyes, skin, respiratory system.	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Silvery-white, malleable, ductile, odorless metal. Combustible Solid, finely divided dust is easily ignited; may cause explosions.
Arsenic CAS-7440-38-2	Arsenic CAS-7440-38-2	676	TLV: 0.002 mg/m <sup>3</sup> PEL: 0.010 mg/m <sup>3</sup> STEL: NE IDLH: 5 mg/m <sup>3</sup> (as As)	Inhalation Absorption Ingestion	ACUTE: Contact dermatitis, gastrointestinal disturbances, and respiratory irritation. CHRONIC: Hyperpigmentation of the skin and cancers of the skin, lungs, and lymphatic system.	(FP) NA (VP) 0 mm (approx.) (IP) NA (UEL) NA (LEL) NA	Silver-gray or tin-white, brittle, odorless, solid.
Chromium (metal) CAS-7440-47-3	Chromium (metal) Chrome CAS-7440-47-3	72	TLV: 0.5 mg/m <sup>3</sup> PEL: 1.0 mg/m <sup>3</sup> STEL: NE IDLH: 250 mg/m <sup>3</sup>	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation to eyes, skin and lungs. CHRONIC: Skin sensitization, fibrosis (histologic).	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Blue-white to steel gray, lustrous, brittle, hard, odorless solid.
Iron CAS-7439-89-6	Iron CAS-7439-89-6	37,000	TLV: 0.5 mg/m <sup>3</sup> PEL: NE STEL: NE IDLH: NE	Absorption Inhalation Ingestion	ACUTE: Dust irritates eyes and respiratory tract CHRONIC:	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Grey crystalline powder
Lead (metal) CAS-7439-92-1	Lead (metal) CAS-7439-92-1	11	TLV: 0.05 mg/m <sup>3</sup> PEL: 0.05 mg/m <sup>3</sup> STEL: NE IDLH: 100 mg/m <sup>3</sup>	Inhalation Ingestion Skin contact Eye contact	ACUTE: Lead is a cumulative poison; however, it may cause eye and skin irritation. CHRONIC: Effects blood, bone marrow, CNS, PNS and kidneys resulting in anemia, convulsions, peripheral nerve disease and kidney impairment. Toxicity to human reproduction or development.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	A heavy, ductile, soft, gray solid. Turns tarnished on exposure to air.
Selenium CAS-7782-49-2	Selenium CAS-7782-49-2	279	TLV: 0.2 mg/m <sup>3</sup> PEL: 0.2 mg/m <sup>3</sup> STEL: NE IDLH: 1 mg/m <sup>3</sup>	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever, dyspnea (breathing difficulty). Metallic taste, garlic breath. CHRONIC: Bronchitis, , eye, skin burns; gastrointestinal disturbance, dermatitis.	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Amorphous or crystalline, red to gray solid
Thallium (metal) CAS-7440-28-0	Thallium (metal) CAS-7440-28-0	55.5	TLV: 0.1 mg/m <sup>3</sup> [skin] PEL: 0.1 mg/m <sup>3</sup> [skin] STEL: NE IDLH: 15 mg/m <sup>3</sup>	Inhalation Ingestion Skin contact absorption Eye contact	ACUTE: May affect gastrointestinal tract, nervous system, kidneys, and cardiovascular system. May cause hair loss and atrophy of nails. Ingestion may cause death. Effects may be delayed. CHRONIC: May affect nervous system, cardiovascular system and may cause hair loss.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Bluish-white, very soft metal. Turns grey on exposure to air.
Gasoline CAS-8006-61-9	Gasoline Motor fuel Petrol Natural gasoline CAS-8006-61-9	Free Phase	TLV: 300 ppm PEL: NE STEL: NE IDLH: NE	Inhalation Ingestion Skin contact absorption Eye contact	ACUTE: Irritation to eyes, skin and mucous membranes. Dermatitis, headache, and fatigue. Blurred vision and slurred speech. CHRONIC: Possible liver and kidney damage. Carcinogen.	(FP) -45 °F (VP) 38-300 mm (IP) NE (UEL) 7.6% (LEL) 1.4%	FALSE

**Notes:**

FP - Flash Point  
IDLH - Immediately Dangerous to Life or Health  
IP - Ionization Potential  
NE - Not Established (Information Not Available)  
NA - Not Applicable  
CNS - Central Nervous System  
PNS - Peripheral Nervous System  
ppm - parts per million  
mg/m<sup>3</sup> - milligrams per cubic meter  
µg/L = micrograms per liter

PEL - OSHA Permissible Exposure Limit  
STEL - Short Term Exposure Limit  
TLV - ACGIH Threshold Limit Value  
VP - Vapor Pressure  
C - Ceiling Exposure Limit  
[skin] - potential for dermal absorption  
mm - millimeters Hg (mercury)  
eV - electrovolts

*Attachment D*  
*Ambient Air Monitoring Form*

## Ambient Air Monitoring Form

Date: \_\_\_\_\_

Site: \_\_\_\_\_ Project Activity: \_\_\_\_\_

Site Safety Officer: \_\_\_\_\_

Personal Protection Level: D ☐ Modified D ☐ C ☐ B ☐ (stop work)

Task/Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Time	PID (ppm)	Aerosol (mg/m <sup>3</sup> )			Comments

Additional Comments:

---

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Prepared by: \_\_\_\_\_

*Attachment E*  
*Daily Safety Meeting Form*

**ERM-WEST**

**DAILY SAFETY MEETING FORM**

DATE:\_\_\_\_\_ TIME:\_\_\_\_\_ JOB NUMBER:\_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

SPECIFIC LOCATION: \_\_\_\_\_

TYPE OF WORK: \_\_\_\_\_

CHEMICALS PRESENT: \_\_\_\_\_

**SAFETY TOPICS DISCUSSED**

Protective Clothing/Equipment: \_\_\_\_\_

\_\_\_\_\_

Hazards of Chemicals Present: \_\_\_\_\_

\_\_\_\_\_

Physical Hazards: \_\_\_\_\_

\_\_\_\_\_

Emergency Procedures: \_\_\_\_\_

\_\_\_\_\_

Hospital/Clinic:\_\_\_\_\_ Phone: \_\_\_\_\_ Paramedics: \_

Hospital Address: \_\_\_\_\_

Special Hazards: \_\_\_\_\_

\_\_\_\_\_

Other Topics: \_\_\_\_\_

\_\_\_\_\_

**ATTENDEES**

Name (printed)

Signature

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

*Attachment F*  
*ERM Incident Form*



***SUPERVISOR'S ACCIDENT/INCIDENT INVESTIGATION REPORT***

Injured Employee:	Title:	
Date of Accident/Incident:	Dept:	
Location:	Time on this Job:	
Engaged in what work when injured:		
Nature of accident/incident:		
How did accident/incident occur?		
What can be done to prevent recurrence of the accident?		
What has been done to prevent recurrence of the accident?		
Supervisor's Signature:	Dept:	Date:
Reviewer's Signature:	Dept:	Date:
NOTE: To be submitted to the Health and Safety Manager within 2 days of the accident/incident.		

*Attachment G*  
*Emergency Drill Evaluation Form*

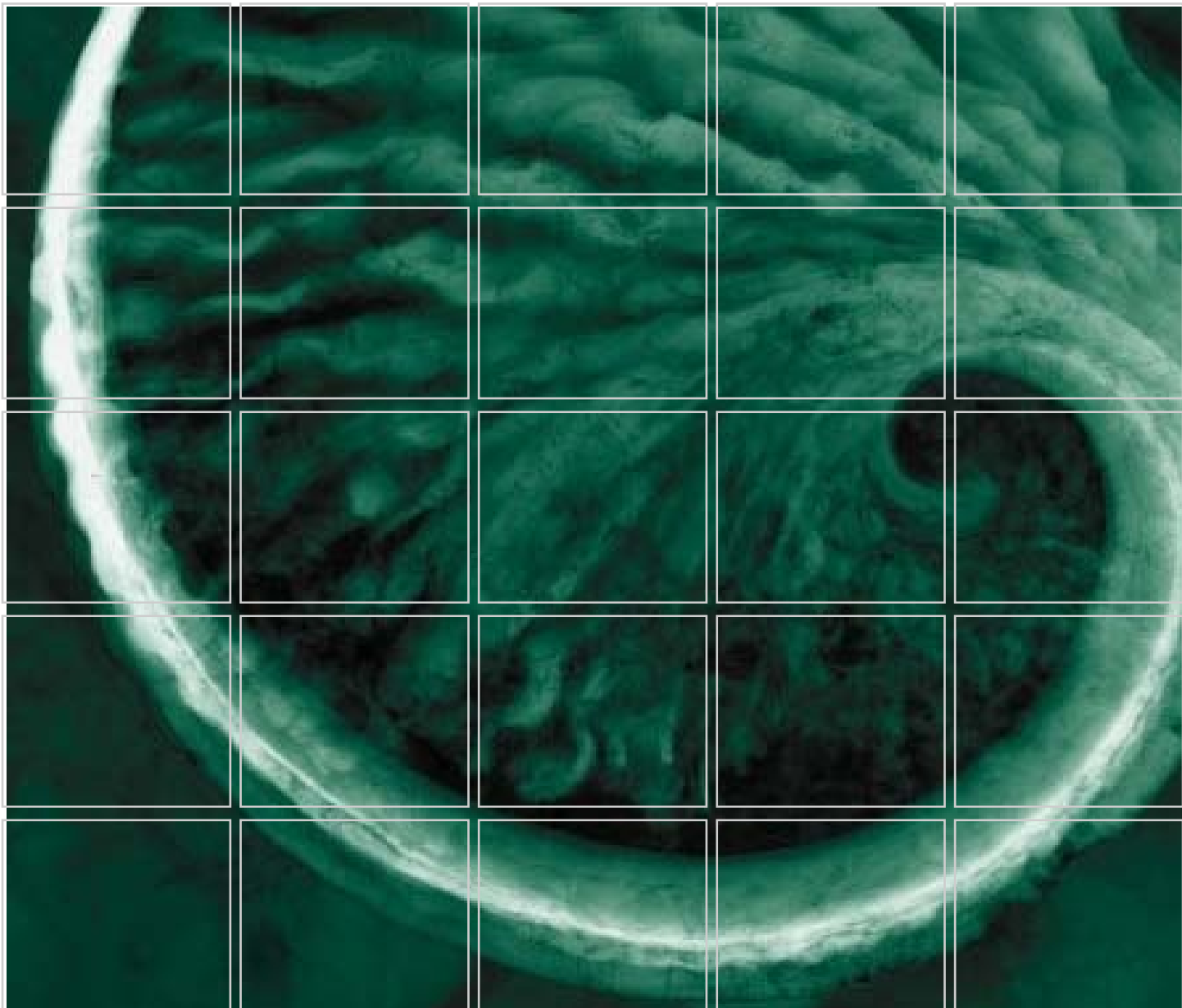
Emergency Drill Evaluation

Date of Drill	Date of Evaluation
Name of Person Conducting Drill (print)	Signature of Person Conducting Drill
Briefly describe the drill scenario	
List the positive attributes of the drill	
List the opportunities for improvement	

Emergency Drill Evaluation

Action Plan	Assigned To	Estimated Completion Date
Drill Evaluation Team Members (print names)		

*Appendix B*  
*Environmental Compliance Plan*



**Prepared for:**

TN & Associates, Inc.



## Environmental Compliance Plan

U.S. Army Corps of Engineers



October 2006

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U.S. Environmental Protection Agency



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***ATTACHMENT B – Field Atmosphere Monitoring Log***

## **1.0 INTRODUCTION**

### **1.1 PURPOSE AND SCOPE**

ERM-West, Inc. (ERM) has prepared this Environmental Compliance Plan to describe the abatement, control and mitigation measures to be used during the construction of the Remedial Design for the Pemaco Superfund Site, Maywood, California. This document also describes workplace monitoring and controls that will be used by ERM during installation and operation and maintenance (O&M) of the Pemaco soil and groundwater remediation system. This plan covers environmental protection of pertinent site features.

### **1.2 SITE DESCRIPTION**

The Pemaco Site is a former chemical manufacturing facility occupying 1.4 acres in a mixed industrial and residential neighborhood in Maywood, Los Angeles County, California (site). The site location and a detailed description are provided in the document prepared in 2006 by TN & Associates, *Work Plan, Pemaco Superfund Site*.

At present, there are no buildings or structures on the site and the ground surface has been completely cleared of vegetation by the City of Maywood's Park Contractor. Clean fill was placed over areas in the site during previous removal actions of the former warehouse foundation, underground storage tank (UST) excavation, and soil removal within the central portion of the site. Following placement of the clean fill, approximately one foot of clean soil was placed over much of the site to prevent contact with surface contaminants as part of the execution of the United States Environmental Protection Agency (USEPA) Record of Decisions. The site is bounded on the east by the Los Angeles River, which is contained in a concrete channel. The entire site is surrounded by a chain-link fence with gated entrances.

The site layout for the remedial construction phase is shown on Figure 1.

### **1.3 PROTECTION OF SELECTED FEATURES**

The planned remedial action will involve the installation and O&M of a vapor and groundwater treatment system. Surface facilities will include

the remedial treatment system, treatment building, and related utilities. Based on existing site conditions and location, the following environmental resources have been identified as requiring environmental protection during the remedial construction phase:

- **Air quality** – The presence of polynuclear aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) in subsurface soils may be released into the atmosphere as organic vapors during operation of the system. Both on-site and off-site air quality could be affected by uncontrolled emissions from the Site during operation.
- **Water quality** – Groundwater is already known to be affected by VOC contamination and is the primary subject of the remedial action. Surface water could be affected during operation activities by uncontrolled release of untreated groundwater into storm sewers and by accidental spills of chemicals or fuels.
- **Noise** – Heavy equipment noise could become a neighborhood nuisance during the remedial construction. Noise exposure is also a concern for the construction worker.

The following sections detail the action levels and activities that ERM and our subcontractors will follow to protect the selected environmental features.

## 2.0 *AIR QUALITY MONITORING PLAN*

### 2.1 *REAL-TIME VOC EMISSION MONITORING*

#### 2.1.1 *VOC Monitoring Equipment*

O&M of the vapor and groundwater treatment system may encounter VOCs in ambient vapors as a result of incomplete vapor treatment, equipment and/or piping leaks, or volatilization from accumulated waste. The designated Site Safety and Health Officer (SSHO) will perform VOC exposure monitoring in the breathing zone during on-site construction and O&M activities, as needed, in accordance with the Site Safety and Health Plan (SSHP; Appendix A to the Remedial Construction Activities Workplan).

The real-time instrument selected for real-time organic vapor measurement will be the following or equivalent:

- Minirae, Inc., organic vapor monitor, Model PGM- 7600 Monitor. This instrument uses a photoionization detector (PID) equipped with 10.6 electron-volt (eV) lamp that is capable of measuring organic vapors at a level of 0.1 parts per million by volume (ppmv) as isobutylene with a range of 0 -10,000 ppmv. The unit will have data logging and internal alarm capabilities.
- A hydrophobic filter will be used on the PID intake tip if site conditions are particularly humid or moist, which can affect instrument performance.
- Calibration gas will consist of 100 ppm isobutylene in air.

#### 2.1.2 *Workplace VOC Monitoring*

Real-time monitoring for VOCs in the work zone will consist of the following activities:

- Calibrate instrument on a daily basis before beginning monitoring. Record the PID instrument number, calibration procedures and results, and background readings and locations on the Daily Calibration Record (Attachment A).
- Take routine readings in the breathing zone during O&M activities. Routine readings will consist of a 1-minute event during every 60

minutes of activity. The SSHO may adjust the frequency of monitoring depending on site conditions.

- If monitored concentrations exceed Table 1 Action Levels, determine the proper response actions listed in Table 1.
  - Perform routine monitoring unless readings exceed the action limit, then switch to continuous monitoring in the breathing zone.
- Record the following data on the Field Atmosphere Monitoring Log (Attachment B):
  - Note location of monitoring and construction work on site map;
  - Monitoring date, time, weather conditions, wind speed and direction;
  - One-minute average contaminant concentrations (collected once every 60 minutes for routine monitoring);
  - Visual observations of site conditions including temperature, humidity/precipitation, and if potential sources of contaminated vapor (i.e., waste spills, leaking pipes/fittings/equipment, and/or improper waste storage) are present;
  - Any odors or unusual conditions observed; and
  - PID readings may be recorded by hand on the Field Atmosphere Monitoring Log, or, preferably, recorded by the instrument's data logger. The data logger will be downloaded into an on-site computer on a daily basis, and a hard-copy print-out filed in a binder in the job trailer.

One PID will be maintained for continuous monitoring in each of the active work zones (e.g., each trenching operation, each drilling location, etc.) in accordance with the SSHP (Appendix A).

### 2.1.3 *Perimeter VOC Monitoring*

Real-time perimeter (fence line) monitoring log will be performed continuously during all invasive construction activities.

- Determine wind direction and set up VOC monitoring at the nearest down-wind fence line to invasive construction activities.
- Take routine readings at the site perimeter during O&M activities. Routine readings will consist of a 1-minute event once during each day

of activity. The SSHO may adjust the frequency of monitoring depending on site conditions.

- If perimeter VOC concentrations exceed the Table 1 Action Levels, determine the proper response actions listed in Table 1. Continue monitoring until VOC air concentrations fall below the fence line action limit.

The SSHO is responsible for set-up, maintenance, performance, and documentation of the VOC monitoring program. The SSHO may delegate air monitoring activities to a qualified ERM employee (Section 6.0).

#### 2.1.4 VOC Monitoring Action Limits and Response Action

Action limits for VOC monitoring are provided in Table 1. Appropriate response actions will be taken if levels exceed the screening limit.

**Table 1** *Air Monitoring Methods and Action Levels*

Hazard	Method of Monitoring	Action Levels <sup>2</sup>	Protection Action
Volatile organic vapors – exposure to on-site workers	Real-time air monitoring in breathing zone PID <sup>1</sup> equipped with 10.6eV lamp for total ionizable organics	PID readings $\geq 1$ ppm and $< 10$ ppm in the breathing zone.	Conduct periodic monitoring in breathing zone with PID (one minute every 30 minutes).
		PID readings $\geq 10$ ppm in the breathing zone	If the PID readings are $< 10$ ppm, no action, continue regular monitoring.
			Perform continuous monitoring in the breathing zone. If readings continue above 10 ppm for more than 15 minutes in the breathing zone, evacuate construction zone and notify appropriate personnel.
			Allow air to clear for 20 minutes and recheck breathing zone with PID; if $< 10$ ppm, resume work. If $\geq 10$ ppm, repeat wait-and-check procedure.
			Additional air sampling may be performed to determine the contaminants of concern and determine appropriate action levels.

<b>Hazard</b>	<b>Method of Monitoring</b>	<b>Action Levels<sup>2</sup></b>	<b>Protection Action</b>
Volatile organic vapors – Potential exposure to off-site residents	Intermittent air monitoring at site perimeter PID <sup>1</sup> (same as above)	PID readings sustained at <10 ppm at nearest downwind fence line to construction activity. PID readings ≥10 ppm sustained for 1 minute at fence line PID readings ≥10 ppm sustained for 15 minutes at fence line	No action.  Continue air monitoring for 15 minutes. Halt operation of treatment system in accordance with O&M Manual <sup>3</sup> . The SSHO will consult with qualified ERM personnel to determine source of elevated VOC concentration and appropriate remedy.

**Notes:**

<sup>1</sup> See Section 2.1.1 for instrument specifications.

<sup>2</sup> All action levels are readings observed above background.

<sup>3</sup> O&M Manual to be developed at a later date.

PID – photoionization detector

ppm – parts per million

## 2.2 *REAL-TIME AEROSOL MONITOR (RESPIRABLE DUST)*

### 2.2.1 *Air Monitoring Equipment*

Real-time air monitoring for respirable particulates will be conducted in the work breathing zone using a portable real-time aerosol monitor. This instrument will be calibrated, maintained, and operated in accordance with the manufacturer's instructions. The real-time monitoring equipment selected for aerosols (respirable dust) will be the following or equivalent:

- MIE Inc., Portable Real-Time Aerosol Monitor, Model PDM-3. This instrument utilizes a light-scattering detector capable of measuring dust concentrations up to 200 milligrams per cubic meter (mg/m<sup>3</sup>) with a detection limit of 10 micrograms per cubic meters (µg/m<sup>3</sup>).

Additionally, on-site weather conditions will be monitored continuously and logged on an hourly basis. Weather data will be obtained from the Weather Service Station at the City of Compton via the internet which will be accessed on a computer in the job trailer. Weather parameters that will be logged include air temperature, barometric pressure, humidity, wind speed, and wind direction.

### 2.2.2 *Real-Time Air Monitoring Procedures*

Real-time air quality monitoring in the work zone will be performed to monitor the levels of aerosol emissions that may pose a potential health

concern. Real-time air monitoring stations will be positioned at one upwind location and one downwind locations of the construction activity.

Real-time monitoring consists of the following activities:

- Determine the predominant wind direction by observing the direction of windsock or vane, or by data from an on-site weather station.
- Taking routine readings once per hour and during peak construction activities and recording all readings and locations on the real-time air monitoring form.
- If monitored concentrations exceed Table 2 Action Levels, subtract the upwind measurement from the downwind concentration to determine the aerosol concentration attributable to the site activities.
- Use the site contributed aerosol concentrations to determine the response condition and record the following data on the Field Atmosphere Monitoring Log (Attachment B):
  - Note location of monitoring and construction work on site map
  - Monitoring date, time, weather conditions, wind speed and direction
  - Lowest, highest contaminant concentration readings
  - One-minute average contaminant concentrations
  - Visual observations of dust generated
  - Site conditions including moisture of excavated material, humidity/precipitation, cloud cover, etc.
  - Any odors or unusual conditions observed
- Maintain a copy of any real-time perimeter (fence line) monitoring log in the Air Monitoring Log Book.

The SSHO is responsible for setup, maintenance, performance, and documentation of the aerosol monitoring program. The SSHO may delegate air monitoring activities to a qualified TN&A employee (Section 6.0).

Three dust/aerosol air monitoring stations will be maintained at the site perimeter. The air monitoring stations will be located along the fenceline at Monitoring Station #1 at 59<sup>th</sup> Street, Monitoring Station #2 along Slauson Avenue, and Monitoring Station #3 near the intersection of Walker Avenue and 60<sup>th</sup> Street (Figure 1). These monitoring locations may be adjusted depending on where site activities are occurring and where



the nearest downwind perimeter is relative to active construction. The dust/aerosol air monitoring station will be set to record time-weighted average readings on a continuous basis and will be downloaded into an on-site computer at the end of each day.

Additionally, one dust/aerosol monitoring station will be located within the active construction zone (the "Exclusion Zone"), and one aerosol monitor will be worn by a construction worker. These instruments will be set to record time-weighted average readings and will be downloaded into an on-site computer at the end of each day.

## 2.2.2 *Aerosol Monitoring Action Limits and Controls*

Real-time aerosol data will be compared to the threshold limit value (TLV) for non-specific nuisance dust determined by the American Conference of Governmental Industrial Hygienists (ACGIH) shown in Table 2.

Appropriate response actions will be taken if levels exceed the screening limit.

**Table 2** *Aerosol/Dust Monitoring and Control*

<b>Hazard</b>	<b>Method of Monitoring</b>	<b>Action Levels<sup>2</sup></b>	<b>Protection Action</b>
Total Airborne Dust – on-site and potential off-site exposure	Visual monitoring of dust at intrusive construction sites.	Dust visible in sunlight or dry windy conditions	Implement dust suppression methods (wet exposed soil surfaces with water, slow traffic, cover stockpiles).
	Real-time aerosol monitor with continuous log to collect data once per minute in construction zone	Level <10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes Level ≥10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes	Monitoring will be continuous during all construction activities. Continue dust suppression methods and monitoring, but stop work.
Total Airborne Dust – fence line monitoring	Real-time aerosol monitor downwind of construction zone	Level ≥10 mg/m <sup>3</sup> (ACGIH TLV) for 15 continuous minutes at construction zone	Initiate fence line aerosol monitoring. If readings at fence line persist at ≥10 mg/m <sup>3</sup> for 15 continuous minutes, halt all on-site construction activities until dust suppression is achieved.

**Notes:**

<sup>1</sup> See Section 2.4.1 for instrument specifications

<sup>2</sup> All action levels are readings observed above background.

ACGIH - American Conference of Governmental Industrial Hygienists

TLV - threshold limit value

mg/m<sup>3</sup> - milligrams per cubic meter

### 2.2.3

#### *Dust Control Measures*

ERM will conduct operations and maintain the site so as to minimize the creation, dispersion, and off-site migration of dust. Aerosols/dusts will be monitored visually by the SSHO.

A visual indication of dust levels approaching the ACGIH particulate TLV of 10 mg/m<sup>3</sup> is when dust is visible in sunlight. Because of the climate and terrain at the site, significant dust exposure is not considered likely.

However, during visibly dusty and/or windy conditions, the site personnel must stop work and initiate dust suppression activities. ERM will control dust around all trenches, excavations, stockpiles, waste areas and all other work areas to avoid hazardous or nuisance conditions. ERM will control and reduce surface and air movement of dust using the following procedures:

- The period of time that disturbed or stockpiled soil is exposed will be minimized through use of temporary ground cover and other temporary stabilization techniques.
- Water will be applied as needed to maintain a wet or damp surface. Water applied for the purposes of dust control will be clear and free of oils, salt, or other dust palliatives, unless approved by the Construction Manager.
- Vehicles moving on the site will be directed to slow down to reduce dust generation.

Operation of heavy equipment in construction zones may generate excessive noise, creating health and safety issues for site workers and a nuisance for the surrounding area. An 8-hour time-weighted average of 85 decibels (dB) is the action level for construction activities. As a rule of thumb, the noise level is above 85 dB when you have to speak loudly to a person at arms' length or less away to be heard. ERM will manage site activities to comply with the provisions of the California Noise Control Regulation.

To mitigate potential nuisance levels of noise production, heavy construction activities will take place during the hours of 7:00 am and 6:00 pm only, in accordance with city noise regulations. Off-site construction in or adjacent to residential areas will take place during normal daytime work hours only. An effort will be made to minimize construction noise before 9:00 am. On Saturdays, no construction noise will be permitted until after 12 noon. Approval to perform noisy work or operate construction equipment on weekends shall be obtained from the City of Maywood.

During normal operation of the remediation systems, noise levels will be monitored on site and at the site perimeter during regular O&M visits to determine if noise levels resulting from the operation of the remediation systems exceed ambient noise limits for the surrounding area.

Hearing protection for on-site workers will follow the SSHP.

## 4.0 WATER QUALITY PROTECTION

Specific measures will be taken to protect the environmental integrity of surface water and groundwater resources at the Site. These measures include erosion and sediment controls to prevent run-off from entering surface waters, and a Spill Prevention, Control, and Countermeasures (SPCC) Plan to protect surface water and groundwater from accidental releases of chemical and fuels.

### 4.1 EROSION AND SEDIMENT CONTROL PLAN

Surface runoff from within the construction areas will be controlled within acceptable limits using erosion and sediment-control measures.

Temporary sediment barriers may be designed and constructed within the authorized work area to intercept and detain sediment from disturbed areas. The barriers will be used to intercept sheet flows and channel flows to prevent off-site transport; the same measures may be needed to prevent run-on of sediments from adjacent construction work zones not under TN&A control.

#### 4.1.1 Erosion and Sediment Control Methods

The primary concern for erosion and sediment control is prevention of run-off into on- and off-site storm sewer inlets. Surface sheet flow is directed inward from the site perimeters, except potentially at driveways. Direct run-off to the Los Angeles River is prevented by the presence of an elevated bike trail along the east boundary of the site.

Erosion and sediment control measures will include some or all of the following measures, as needed, during construction and O&M of remediation systems.

- **Mulch** – Straw mulch, placed 3 inches thick, will be used for temporary erosion protection on exposed surfaces (3 bales per 1,000 square feet).
- **Polyethylene sheeting** - All stockpiles that remain on site during installation of remediation systems and that have a slope steeper than 2:1 will be protected from inclement weather with polyethylene sheeting. Polyethylene sheeting will be ASTM (American Society for Testing and Materials) Standard D 4397, translucent, 4-mil thick, and staked to the ground with wooden stakes driven through the center of

sand bags, on 10 foot-centers. The material will be extended onto the flat at the bottom of the slope, turned under a minimum of 4 inches, and staked every 10 feet. Individual polyethylene sheets will be overlapped a minimum of 1.5 feet on adjacent sheets. Plastic sheeting will be inspected frequently to ensure that there are no holes and that the anchors are in place.

- **Sediment control mats and tubes** – Rolled erosional control products (RECP) and weed-free, straw-filled tubes may be used as needed on areas particularly prone to erosion during storm events.
- **Silt fencing and hay bales** – Control of silt run-off from sloped surfaces will be controlled using silt-fencing as necessary.
- **Storm drain inlets** will be protected using sand-bags and filter material lain beneath storm grates. Storm drain inlets are present along 59th and Walker Streets and at least one storm drain is planned on site. Sediment controls will be maintained for the duration of active construction.

The erosion and sediment control measures will be installed proactively, prior to occurrence of rainfall.

#### **4.1.2**      *Maintenance*

ERM will maintain erosion control measures during ERM construction and O&M activities. Maintenance will consist of periodic inspection, repair, and enhancement as needed of the erosion- and sediment-control measures. Sufficient supplies and materials should be stockpiled on site to allow quick repair of any deficiencies.

#### **4.1.3**      *Post-Construction Surface Repairs*

Following completion of the remedial design construction, the City of Maywood Park Construction Contractor shall be responsible for final grading and revegetation detailed in the City of Maywood's Riverfront Park Plans.

#### **4.1.4**      *Monitoring and Inspection Schedule*

Monitoring and inspections of erosion and sediment controls will be performed by the project Construction Manager or designee. The first monitoring will occur in the first week of ERM construction activities at the site. Subsequent monitoring will be done weekly for the duration of the construction phase of the project, followed by inspection during each

regular O&M visit. Erosion control and silt retention features will be visually inspected within one week following storms events of greater than 1 inch in 24 hours.

The monitoring frequency will be increased to daily after any event requiring corrective measures. Daily monitoring will continue until the corrective measure is implemented and the erosion control feature is brought into compliance with original function and design criteria.

Repairs to or replacement of erosion-control features will be performed immediately when a deficiency is identified. Erosion controls are to be maintained to match original design criteria throughout the construction activity at site.

## **4.2      *SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN***

The ERM-designated person responsible for managing, implementing, and maintaining the SPCC Plan is the Construction Manager, Mr. Neil Coy. The designated alternative is Mr. Rudy Millan, Construction Quality Control (CQC) Engineer. All personnel working on this project will be made aware of proper equipment-operating techniques and equipment-inspection procedures to minimize the risk of a spill.

### **4.2.1      *Summary of Potential Spill Sources***

#### *Anticipated Potential Spill Sources*

Anticipated potential spill sources include chemicals and fuels brought on-site for use during the construction phase. These may include but are not limited to diesel fuel, gasoline, hydraulic fluids, oils and grease, and PVC glues and primers. Additional spill sources include wastes developed during operation of the treatment systems, including groundwater collected at various points within the treatment system, activated carbon used in vapor treatment, and caustic soda used by the flameless thermal oxidizer.

### *Unknown Conditions*

Unknown conditions may include unknown buried pipelines or utilities (dead) that could be uncovered during excavation activities. Fluids contained in unknown pipelines will be managed as potential hazardous materials.

#### **4.2.2**      *Critical Protection Areas*

Site areas that may discharge directly into storm sewers are considered “critical protection areas” for the purpose of this plan. ERM will take precautions to prevent the discharge or runoff of hazardous materials into storm drains by locating hazardous material storage areas and fueling operations away from storm drains. Storm drain locations are shown on Figure C-1 of the *TN&A Work Plan, Pemaco Superfund Site* (TN&A, 2006).

#### **4.2.3**      *Designated Areas*

Storage, handling, and transferring of hazardous and potential hazardous materials will occur within areas designated by the Construction Manager. These areas may change over time as the work progresses. Designated areas are shown on Figure C-1 of the *TN&A Work Plan, Pemaco Superfund Site* (TN&A 2006).

#### *Material Staging Areas*

Pipe, fittings, drums, remedial system equipment, and other such material will be delivered to the contract-staging area designated by the Construction Manager. Construction materials will be stored within the material staging area. Primers and glues for PVC pipe and other flammable chemicals will be stored in a flammable storage locker. Bagged cement products will be covered with plastic sheeting.

#### *Equipment Staging Areas*

Construction equipment will be parked when not in use within the site fence line in the equipment-staging area designated by the Construction Manager. Equipment will be secured nightly.

Leaks and spills from fuel tanks or hydraulic systems will be immediately addressed upon discovery. Absorbent pads or floor dry will be used to contain the release. Impacted soil will be excavated and placed in drums or rollofs. Small leaks will be controlled and contained with spill-control pads. Used pads and absorbents will be placed in steel drums or roll-offs.

### *Decontamination Area*

All excavators and construction equipment come to the site already clean and will be decontaminated before leaving the site, if required. A gravel run-out will be installed prior to the equipment delivery phase and a rumble plate will be maintained by ERM at the ingress/egress to the site to prevent the transfer of site soils offsite. The gravel run-out will have dimensions of 20 feet long by 16 feet wide and will have a minimum depth of 4 inches.

### *Waste Storage Areas*

All wastes generated at the site will be managed in accordance with the Waste Management Plan (Appendix B of the Remedial Activities Workplan). Solid wastes generated on site will be placed in containers stored at the temporary waste staging area designated by the Construction Manager. All solid wastes generated from construction (including construction debris) will be disposed of in accordance with the California State Solid Waste General Provisions and local and federal regulations. Hazardous or toxic wastes will not be co-mingled with the solid wastes.

Chemical wastes generated on site will be collected in corrosion-resistant, compatible containers. All collection drums will be monitored and stored in the designated waste-storage area when full. Chemical wastes will be characterized and disposed of in accordance with federal, state, and local laws and regulations.

Hazardous wastes collected during this work will be stored in suitable containers until transportation and disposal. LNAPL collected during the construction of this facility will be considered a Resource Conservation and Recovery Act (RCRA) regulated waste. Hazardous materials will be transported off government property and disposed of in accordance with federal, state, and local laws and regulations.

#### **4.2.4**      *Spill Response Equipment on Site*

Spill response and containment materials and equipment will be kept on site at all times during the remedial construction phase. The materials and equipment will be kept in the quantities and areas as listed in the following table:



**Table 3**      *Spill Response Equipment and Materials Kept on Site*

Spill Response Equipment	Minimum Quantity	Designated Areas	Use
Spill Pads	3 bales	Fueling area and in each piece of equipment	Fuel spills
Sorbent material	100 lbs	Fueling areas	Fuel and chemical spills
Plastic Sheetting, tarps	50 ft x 200 ft x 6 ml thick	Materials storage	Temporary isolation of contaminated soil

#### 4.2.5 *Spill Response*

Initial actions and spill control are the key steps in effective spill response. Initial actions include ensuring the safety of nearby workers and the public and notifying designated spill-response personnel. During the control phase, responders organize the scene and mobilize equipment to control hazards and effect cleanup. The following sections describe these steps in further detail.

##### *Initial Actions*

If a spill occurs, immediate action must be taken to ensure the safety of nearby personnel.

Emergency services shall be immediately contacted if anyone is seriously injured. Any area contaminated by a spill must be blocked to traffic to prevent the spread or further contamination of the area and people. The SSHO should be notified immediately.

##### *Spill Control*

Worst-case scenario includes a complete failure of gasoline or diesel fuel tanks on excavation equipment (excavator, backhoe, etc.) or trucks. First response is to control all sources of ignition (flame, spark, heat sources) and assess the immediate threat to human health and the environment. Air quality monitoring will follow the SSHP for VOCs. The appropriate agencies will be notified immediately following control of the spill and implementation of containment to protect human health and the environment. The second task is to shut off fuel valves to prevent spread of fuel. The third task is to control the spread of contaminants to surface water and groundwater resources, using absorbent pads and earthen berms.

After the spill has been controlled, excavation of the impacted soil will begin. Affected soil will be placed in a bermed, lined, and covered stockpile. Soil samples will be obtained from the spill area to document that all contaminated soil is removed. One soil sample will be obtained per approximately 500 cubic yards (or according to the USEPA-approved disposal facility frequency) of the soil stockpile to profile the waste material. For small spills, affected soil will be placed in 55-gallon drums for profiling and disposal. Two empty 55-gallon drums will be stored on-site in case of potential spills.

If the fuel spill cannot be cleaned up by on-site contracted personnel without injury to workers, based on the size and nature of the spill, the following actions should be taken:

- Restrict all sources of ignition;
- Ensure that all workers shut down and secure their equipment if time permits; and
- Evacuate everyone to a location upwind of the spill, if warranted by the type of release.

#### **4.2.6**      *Notification and Reporting*

Construction Manager, Neil Coy, or his designated alternate, will contact the required federal, state, and local authorities in addition to notifying the USACE Project Manager and the USEPA Remedial Project Manager of any releases or spills requiring spill-response activities. A summary of the reporting requirements is provided below.

For flammables such as substantial fuel releases, notify the fire department (911) immediately to report the incident and give the following information to the dispatcher.

- Name, stock number, manufacturer, and amount of material spilled, location and source of spill.
- Name and phone number of individual reporting the spill, number of people injured, if any.
- Any other pertinent information (i.e., potential hazards).
- Control the source, if control measures can be performed safely. Contain the release, if control measures can be performed safely. Restrict access of unauthorized personnel.
- Notify the Contracting Officer's Representative and describe the spill.

Conduct a roll call to make sure all employees are accounted for and none are trapped in the affected area. Follow the Waste Management Plan (Appendix D) for instructions and directives for proper waste disposal.

#### *Federal Requirements*

ERM is required to report any spill of oil, petroleum product, hazardous substance, or hazardous waste that meets the following criteria:

- Violates water quality standards;
- Produces a visible sheen on surface waters;
- Causes a sludge or emulsion to form on the water; or
- Exceeds reportable quantity.

If one or more of the criteria are met the National Response Center Hotline (1-800-424-8802) must be notified immediately. The EPA Regional Administrator must also be notified within 15 days if a spill or release requires activation of the SPCC Plan or a fire, explosion, or spill of any amount reaches the navigable waters of the US. If the release of more than 1,000 gallons of oil reaches navigable waters of the US or if two spills reportable under the Federal Water Pollution Control Act occur within a 12-month period, a written report must be submitted to the EPA Regional Administrator within 60 days.

#### *California State Requirements*

Any release of oil or hazardous material or a spill or release of any material that may impose an environmental risk must be reported to the Department of Toxic Substances Control (DTSC). The DTSC can handle the following situations:

- Oil or hazardous material spills;
- Suspicious substance incidents;
- Highway accidents with spills;
- Vessel accidents;
- Air, water or land discharges from unknown sources;
- Any situation that poses a health risk;
- Any situation that poses an environmental risk; and
- Natural disasters.

### *Local Requirements*

The local emergency response number (911) should be called if a release or spill of oil or gasoline poses a fire or explosion hazard.

### *External Notification List*

#### Agency and Responsibility Phone Numbers:

- National Response Center – reporting spills to water that violate water quality 1-800-424-8802 criteria, cause a sheen, or exceed the reportable quantity.
- DTSC – reporting spills to land or water of oil or 1-800-452-0311 hazardous materials.
- Local Fire and Emergency Services – reporting spills with fire or explosion 911 potential.

A Spill/Release Form from the CalEPA, DTSC should be filled out for any reportable releases of oil, petroleum products, hazardous chemicals, or hazardous wastes.

## **5.0            *REPORTING***

### **5.1            *WEEKLY MONITORING AND INSPECTION REPORTS***

Monitoring and inspection reports will be delivered or faxed to the USACE site representative and the TN&A Project Manager. Copies of reports will be kept by the ERM Construction Manager at the site during construction activities, and by the ERM Project Manager following startup of the treatment systems. Monitoring and inspection reports will be kept on file at ERM and will be available for review by CalEPA or DTSC if requested.

### **5.2            *UNUSUAL EVENTS***

All unusual events will be reported to the on-site USACE representative or to the USACE project manager first by phone and later by fax or written hard copy delivered by hand. The written report will be sent within 24 hours after an unusual event is noted. ERM will notify the USACE project manager as soon as the nature and extent of the event can be determined. An unusual event is defined as any discharge or near-discharge of water or sediment from the site; uncontrolled dust emissions; a fuel or chemical spill. Names and phone numbers of project personnel to be contacted include:

- ERM Contact Personnel
- Mr. Rudy Millan, Project Manager (925) 946-0455
- Mr. Neil Coy, Construction Manager (714) 848-7420 (mobile)
- TN&A Project Manager
- Tim Garvey, Project Manager (805) 585-6386
- USACE Project Manager
- Mr. James Miller, Project Manager (951) 898-6182
- USEPA Remedial Project Manager
- Ms. Rose Marie Caraway, Remedial Project Manager (415) 972-3158

## **6.0            *TRAINING REQUIREMENTS***

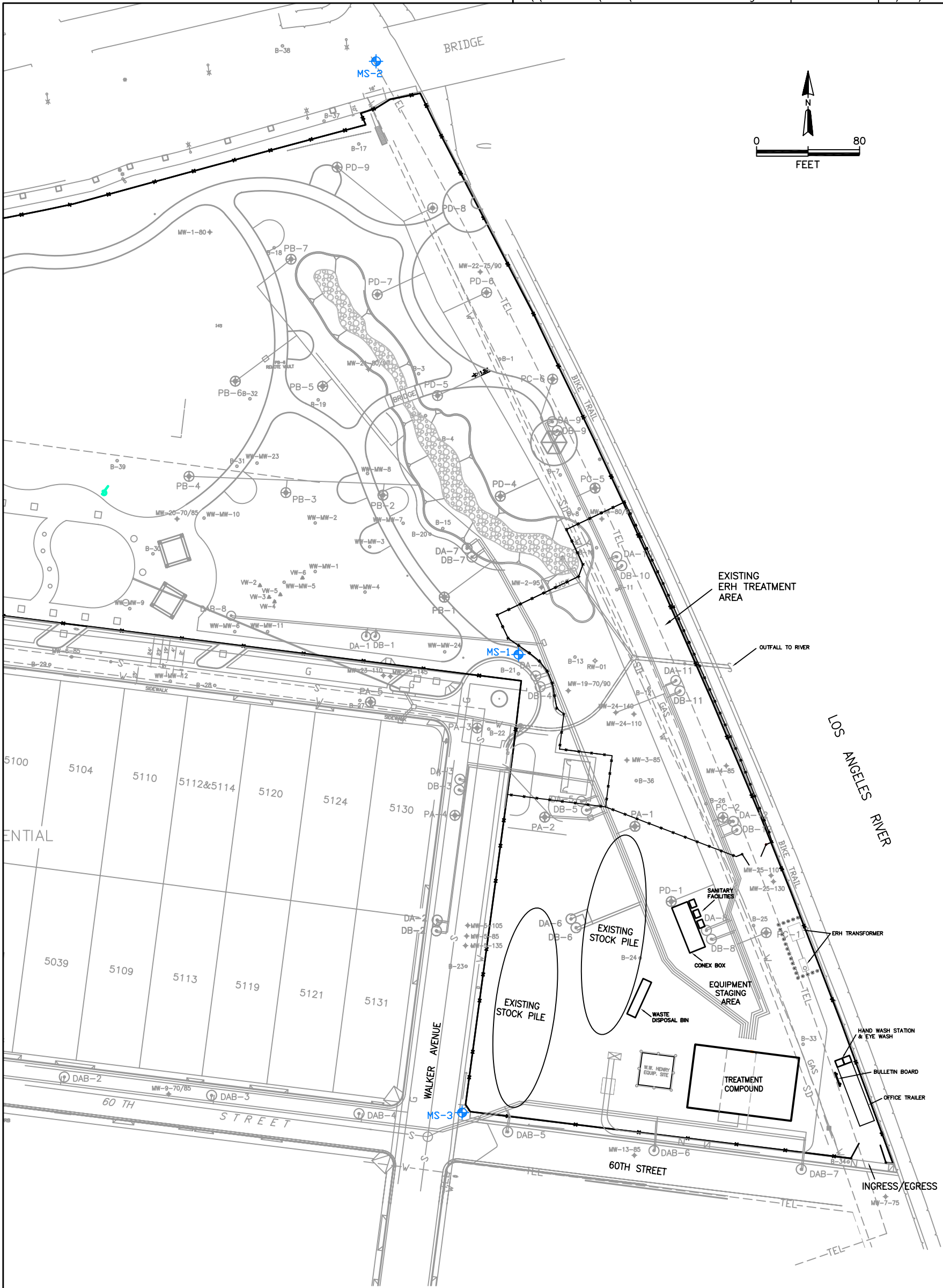
### **6.1            *SITE-SPECIFIC TRAINING***

ERM employees will be instructed on the contents of this Environmental Compliance Plan. Training will include detection and prevention of pollution on site as well as procedures for responding to potential spills or pollution on-site. Employees will also be instructed on the installation and maintenance of site erosion controls.

### **6.2            *MONITORING INSTRUMENT TRAINING***

All personnel responsible for the use and operation of real-time air monitoring instruments will be fully trained in their functions, calibration, data-logging capabilities and setup, trouble-shooting, and daily maintenance and care. Proper calibration procedures will be followed in accordance with the manufacturer's instructions. Required documentation, determining response actions, and response limits will be reviewed prior to initiation of fieldwork.

## *Figures*



LEGEND			
---	UNDERGROUND UTILITY LINES (VARIOUS)	MW-2	PEMACO WELL, MONITORING WELL, EXPOSITION AQUIFER
=====	UNDERGROUND EXTRACTION WELL TRENCHING	RW-01	PEMACO WELL, RECOVERY WELL LOCATION
-x-x-	EXISTING FENCE	WW-MW-5	W.W. HENRY WELL, EXISTING GROUNDWATER MONITORING WELL
MS-1	MONITORING STATION	VW-6	W.W. HENRY WELL, EXISTING DPE WELL - DEEP, INTERMEDIATE AND SHALLOW
DAB-5	EXTRACTION WELL SCREENED THROUGH BOTH 'A' AND 'B' ZONES		
DA-1 DB-1	EXTRACTION WELL WITH INDIVIDUAL SCREENS FOR THE 'A' AND 'B' ZONES		
P15-D	PERCHED ZONE WELL		
B-6	PEMACO WELL, MONITORING WELL, PERCHED ZONE (<35 FEET BGS.)		

Figure 1  
Temporary Construction  
Facilities Site Plan  
Pemaco Superfund Site  
5050 Slauson Avenue  
Maywood, California



*Attachment A*  
*Daily OVM/PID Calibration Record*

## DAILY OVM/PID CALIBRATION RECORD

PROJECT: \_\_\_\_\_

ACTIVITY/TASK: \_\_\_\_\_

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

STAFF PERFORMING CALIBRATION: \_\_\_\_\_

LOCATION: \_\_\_\_\_

CALIBRATION GAS TYPE: ☐ 100 ppm isobutylene in air OR ☐ other: \_\_\_\_\_

CAL GAS SUPPLIER: \_\_\_\_\_

INSTRUMENT MANUFACTURER/TYPE: \_\_\_\_\_

INSTRUMENT NO.: \_\_\_\_\_

LAMP ENERGY: \_\_\_\_\_EV

BATTERY CHECKED: ☐ YES

CALIBRATION READING WITH CAL GAS: \_\_\_\_\_ IN AIR (BACKGROUND): \_\_\_\_\_

CALIBRATION PASSED? ☐ YES ☐ NO

COMMENTS:

INSTRUMENT MANUFACTURER/TYPE: \_\_\_\_\_

INSTRUMENT NO.: \_\_\_\_\_

LAMP ENERGY: \_\_\_\_\_EV

BATTERY CHECKED: ☐ YES

CALIBRATION READING WITH CAL GAS: \_\_\_\_\_ IN AIR (BACKGROUND): \_\_\_\_\_

CALIBRATION PASSED? ☐ YES ☐ NO

COMMENTS:

INSTRUMENT MANUFACTURER/TYPE: \_\_\_\_\_

INSTRUMENT NO.: \_\_\_\_\_

LAMP ENERGY: \_\_\_\_\_EV

BATTERY CHECKED: ☐ YES

CALIBRATION READING WITH CAL GAS: \_\_\_\_\_ IN AIR (BACKGROUND): \_\_\_\_\_

CALIBRATION PASSED? ☐ YES ☐ NO

COMMENTS:

*Attachment B*  
*Field Atmosphere Monitoring Log*

## Field Atmosphere Monitoring Log

Date: \_\_\_\_\_

Site: \_\_\_\_\_ Project Activity: \_\_\_\_\_

Site Safety Officer: \_\_\_\_\_

Personal Protection Level: D ☐ Modified D ☐ C ☐ B ☐ (stop work)

Task/Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Time	PID (ppm)	Aerosol (mg/m <sup>3</sup> )			Comments

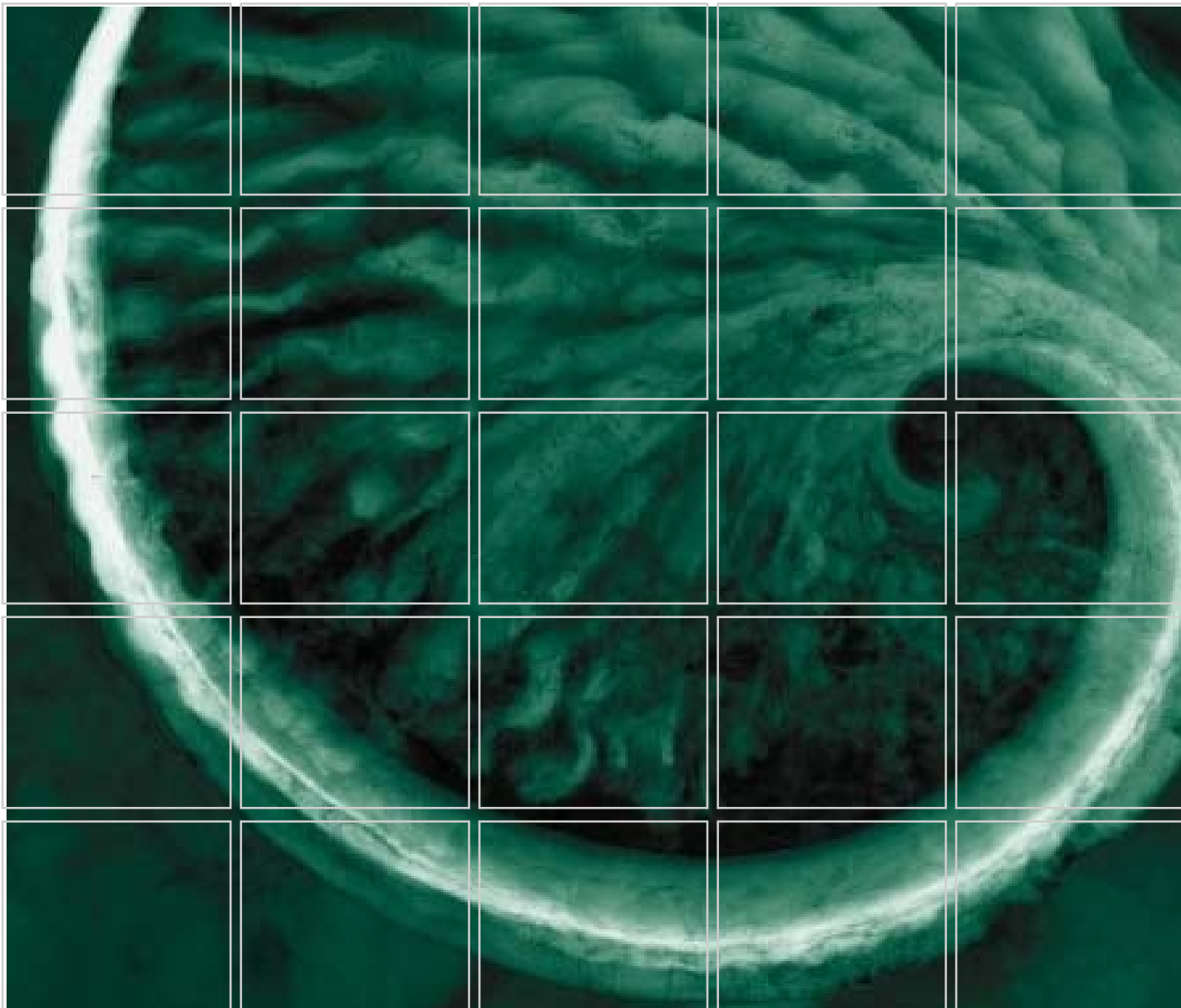
Additional Comments:

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Prepared by: \_\_\_\_\_

*Appendix C*  
*Construction Quality Control Plan*



**Prepared for:**

TN & Associates, Inc.



## Construction Quality Control Plan

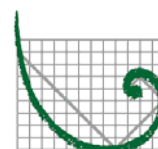
U.S. Army Corps of Engineers



October 2006

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U.S. Environmental Protection Agency



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## **1.0 INTRODUCTION**

### **1.1 NATURE AND PURPOSE OF PLAN**

This Construction Quality Control Plan (CQCP) outlines the procedures that ERM-West, Inc. (ERM) will employ to implement the United States Army Corps of Engineers (USACE) and United States Environmental Protection Agency (USEPA) three-phase Quality Assurance/Quality Control (QA/QC) System. ERM will integrate the three-phase QA/QC System into the Electrical Resistance Heating (ERH) Construction Project at the Pemaco Superfund Site in Maywood, California. The system is designed to ensure that quality standards are established and met through proper planning, inspections, and testing.

This CQCP consists of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction, and operations that meet Contract requirements. The CQCP covers all design and construction operations, both on site and off site, including work by subcontractors, fabricators, suppliers, and purchasing agents. The only off site control is the provision of adequate specs and design/scope requirements to the fabricator and through inspection and acceptance as suitable upon delivery. The CQCP also identifies personnel, procedures, control, instruction, tests, records, and forms to be used during the project to ensure that all phases of the project meet the requirements set forth in the Remedial Design.

This CQCP, prepared specifically for the construction phase of the ERH Remedial Action (RA) project, describes quality controls, site-specific CQC testing procedures, and other information required to ensure a high quality and successful project. The plan has been keyed to the proposed construction sequence and lists the definable features of work and highlights the required inspections, tests, and reporting for each definable feature of work.

The RA Construction Schedule is included in Attachment A.

## **1.2** *QUALITY CONTROL POLICY*

By adhering to this CQCP, ERM strives to obtain uniform, high-quality workmanship throughout all phases of the project. To ensure quality, we will observe the following principles:

- Apply all of the principles and practices defined in the USACE/USEPA's three-phase QA/QC System;
- Perform all work in an environmentally acceptable manner, conforming to all federal, state and local regulations;
- Maintain supervisory controls and written instruction governing quality-control procedures and practices and clearly define responsibility and authority for compliance;
- Conform to all contractual requirements, specifications, applicable military standards, and the ERM CQCP; and
- Notify TN & Associates (TN&A) project management of quality discrepancies requiring immediate correction and assure that corrective action is implemented properly and thoroughly documented.

## **1.3** *PROJECT SCHEDULE*

The Project Schedule is provided in Attachment A. This schedule is tentative, subject to updates, and will be maintained by the Project Engineer.

## 2.0

### *PLAN ADMINISTRATION*

The RA construction will be performed under USACE-Omaha District Contract DACA45-00-D-0006 Delivery Order 19. The USACE is under an interagency agreement with the USEPA to award and manage this contract/construction action. The USACE contracting officer or contracting officer's representative has authority to obligate funds on this project and direct TN&A to perform work. Additionally, USACE will provide technical management of the RA construction phase.

The current project team for the USEPA and the USACE is as follows:

- USEPA Remedial Project Manager (RPM): Rose Marie Caraway; and
- USACE Contracting Officer's Representative/Project Manager: John Hartley.

## 2.1

### *PROJECT ORGANIZATION*

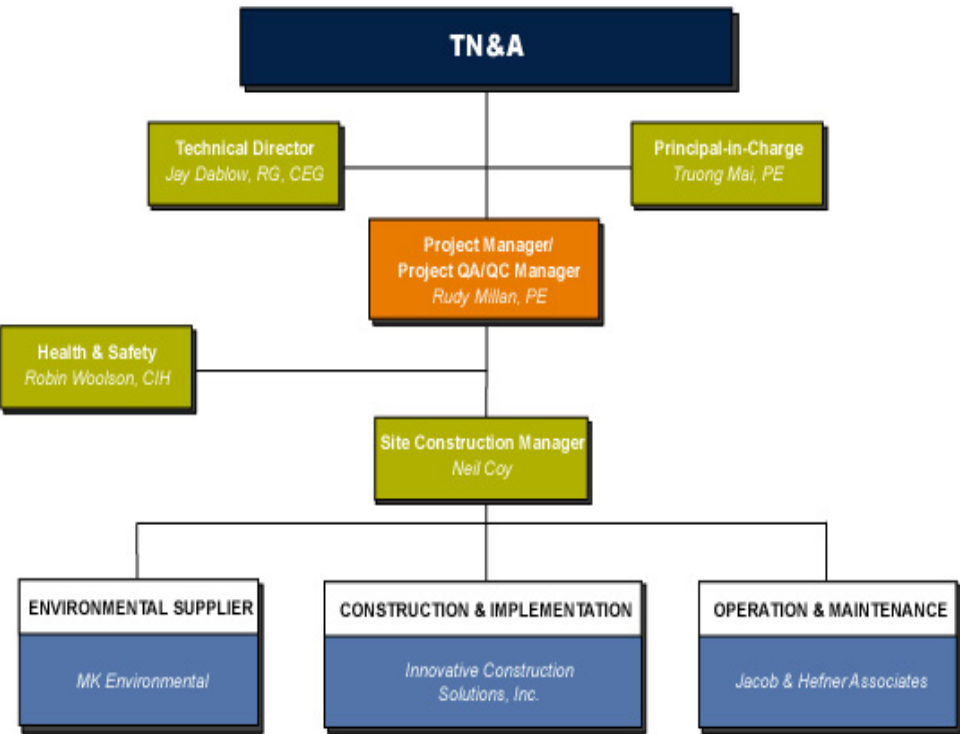
ERM will perform all project management and oversight for the construction activities. ERM's core management team is provided in Table 1.

**Table 1** *ERM Project Management Team*

Project Role	Personnel
Corporate Health & Safety Manager	Robin Woolson, CIH
Project Manager	Rudy Millan, P.E
Project Engineer and Project QC Manager	Rudy Millan, P.E
Construction Manager	Neil Coy
Construction Quality Control (CQC) Engineer	Rudy Millan, P.E
Alternate CQC Officer	Neil Coy
Principal-in-Charge	Truong Mai, P.E.
Technical Director	Jay Dablow, R.G, C.E.G

The Pemaco RA Project Team is depicted in Figure 1. The individuals listed in the Figure 1 will serve as the managers of the remedial action construction. A further description of their roles is provided in Section 2.2.

Figure 1      Project Team Organizational Chart



ERM plans to execute the project in three phases. Phase I will consist of installation of the 33 down-well pneumatic pumps in the Exposition Zone area wells. Phase II will involve construction of the condensate sumps and sanitary sewer tie-in. Phase III will include installation of the treatment compound manifolds, equipment, and piping connections.

Specialized subcontractors will be used on site for specific tasks. Potential subcontractors and their anticipated tasks are presented in Table 2 and Figure 1.

**Table 2      *Tasks and Subcontractors***

Task	Subcontractor
Environmental supplier	MK Environmental
System Construction and Implementation	Innovative Construction Solutions, Inc.
Operations & Maintenance	Jacob & Hefner Associates

## **2.2      *QUALITY ASSURANCE/QUALITY CONTROL ORGANIZATION***

ERM will maintain the QA/QC staff at strength at all times. ERM will obtain the TN&A Project Manager's acceptance before replacing any member of the assigned QA/QC Staff. Requests will include the name(s), qualification(s), duties, and responsibilities of each proposed replacement.

### **2.2.1      *Quality Assurance/Quality Control Manager***

The QA/QC Manager, Mr. Rudy Millan, oversees all ERM QA/QC activities. He will ensure that appropriate resources, training, and lines of authority are established for the CQC System to efficiently support this project. He will interface with all parties involved in the project to ensure QA/QC goals and needs are being met.

### **2.2.2      *Project Quality Control Manager***

The Project QC Manager will provide overall project quality control oversight, provide advice for implementation of construction plans, and coordinate correspondence and submittals on QC issues with the TN&A Project Manager. The Project QC Manager is an individual whose level of knowledge and experience qualifies them to determine whether the construction is being performed in compliance with the project plans and specifications.

Mr. Rudy Millan, who is also the Project Engineer and overall QA/QC Manager, will serve as Project QC Manager. Neil Coy, the ERM Construction Manager, will serve as Alternate Project QC Manager in the event that Mr. Millan is unavailable.

The Project QC Manager reports to the Principal-in-Charge and is responsible for certifying that the construction has been completed in accordance with the Remedial Action Work Plan and Remedial Design. In the event of a corrective measure being implemented, the Project QC Manager will verify that the corrective action is approved by the Project Manager, technical lead Director, and Principal-in-Charge, and that it has been implemented by the Construction Manager.

The Project QC Manager's specific duties and responsibilities include, but are not limited to, the following:

- Supervise the field CQC Engineer activities and performance;
- Receive weekly progress reports from the field CQC Engineer and resolve any conflicts outside of the ability of the CQC Engineer;
- Prepare and submit to the TN&A all required Project Submittals;
- Overseeing activities of the Construction Manager; and
- Perform periodic inspection activities required to monitor the listed work items.

### 2.2.3 *Construction Quality Control Engineer*

The CQC Engineer is the lead on-site person whose level of knowledge and experience qualifies them to determine whether the construction (removal action) is being performed in compliance with the project plans and specifications. Mr. Millan will serve as the CQC Engineer. Truong Mai, P.E., the Principal-in-Charge, will serve as Alternate CQC Engineer in the event that the Mr. Millan is unable to fulfill his duties. No work will be performed in the absence of a CQC Engineer.

The CQC Engineer will be responsible for administering and enforcing the CQCP. The CQC Engineer will be a qualified field engineer who will review and compile all testing reports, coordinate testing, perform all material receipt inspections, and perform all inspections with associated documentation.

Discipline-specific quality control representatives or qualified persons may be assigned to portions of the project as needed to ensure the highest quality of work is achieved. Discipline-specific QC representatives may be utilized during well and piping installation and treatment building and compound construction. If required, the CQC Engineer will direct other quality-control representatives outlining duties, authorities, and



responsibilities as required by the USACE/USEPA's three-phase QA/QC System. Duties of the CQC Engineer will include:

- Direct all testing, prepare and submit all required reports and quality control documentation;
- Compile, review, approve, and submit inspection, testing, discrepancy, QC reports;
- Check incoming material and fabricated items to ensure their condition and conformance to the Contract Plans and Specifications, including approved submittals;
- Direct and implement the three-phase quality control system (Preparatory, Initial, and Follow-up);
- Maintain a record of construction activities;
- Inspect completed work and documentation of such inspections;
- Review of the QA/QC results;
- Report to the Project QC Manager the results of QA/QC activities;
- Provide reports/memorandums regarding completion of the corrective actions;
- Prepare and submit to the USEPA and USACE all required Project Submittals;
- Perform field performance and system audits;
- Determine that incidents of noncompliance are reported to the Project QC Manager, Project Manager, and Construction Manager;
- Provide regular updates on inspection activities; and
- Prepare and compile the data needed to complete inspection test reports and test forms.

#### **2.2.4**      *Construction Manager*

The Construction Manager, Mr. Neil Coy, will be responsible for all construction activities at the site, including safety, quality, and production. He will maintain a physical presence at the site at all times when site work is being performed and will report directly to the Project QC Manager, Mr. Rudy Millan.

The Construction Manager has the authority to stop work for safety violations and remove personnel that fail to comply with the safety program (including subcontractors).

### **3.0 CONTROL OF ON-SITE AND OFF-SITE CONSTRUCTION**

#### **3.1 PRECONSTRUCTION CONFERENCE**

The Preconstruction Conference is administered by the USACE, and will be held after contract award and before the start of each major phase of site work. The objective of the Preconstruction Conference is to have the TN&A Project Team and major subcontractor management personnel meet with the USACE Project Manager and USEPA RPM to discuss the work plan, scheduling, safety plan, site restriction, site environmental controls, personnel requirements, and procedural matters and to establish the ground rules for administering the contract. Mr. Rudy Millan will attend the Preconstruction Conference.

#### **3.2 COORDINATING MEETING**

The Coordinating Meeting is also administered by the USACE and is held to establish the expected QA/QC goals for the project and introduce the TN&A QA/QC Staff to the USEPA and USACE Project Team. The Coordination Meeting will review the USACE/USEPA's three-phase QA/QC System and the approved CQCP to achieve a mutual understanding of the Contractor's role in quality control. This includes the forms for recording QA/QC operations, control activities, testing, administration of the system, fabrication on site and off site, and the interrelationship of TN&A and USEPA control and surveillance. Mr. Rudy Millan will attend the Preconstruction Conference.

#### **3.3 THREE-PHASE CONTROL SYSTEM**

To ensure that the project complies with contract requirements, the field quality control staff will use the USACE/USEPA's three-phase QA/QC system. ERM will adhere to the Three-Phase Control System as specified in Section 3.0 of the *Draft Final Construction Quality Control Plan, Pemaco Superfund Site, Maywood, CA* (TN&A, August 2006). Copies of the Preparatory Phase and Initial Phase forms are attached in Attachment B.

### 3.3.1

#### *Preparatory Phase*

The Preparatory Phase must be performed before each definable feature of work begins; after all required plans, documents, and materials are accepted; and after copies are at the work site. The Preparatory Phase will consist of the following:

- Review each paragraph of applicable sections of the specifications. A copy of codes and standards applicable to work to be done in the field will be made available by TN&A at the preparatory inspection. These copies will be maintained in the field;
- Review the Activity Hazard Analysis for each task;
- Review design drawings;
- Review the applicable approved submittals;
- Ensure that all required materials and equipment are on hand and have been tested, submitted, and approved;
- Ensure that provisions have been made to provide required control inspection, and testing;
- Examine the work area to ensure that all required preliminary work is complete and in compliance with the contract;
- Examine delivered materials and equipment to ensure conformance with the approved submittals or shop drawings and have been properly stored and not damaged;
- Discuss procedures for controlling work quality, including when deficiencies occur;
- Document construction tolerances and workmanship standards for that phase of work;
- Check to ensure that any subcontractors performing work have the appropriate insurance documentation and that contract paperwork has been completed, submitted, and approved; and
- Notify TN&A Project Manager via the Daily QC Report (see Attachment C) at least 48 hours before starting any of the required actions of the Preparatory Phase. This phase includes meetings conducted by the Project QC Manager and attended by subcontractors, the Construction Manager, the CQC Engineer, and the foreman responsible for the definable feature. Lead operators or other significant workers may be asked to attend as needed. The results of the Preparatory Phase actions will be documented by separate minutes

prepared by the Project QC Manager and attached to the Daily QC Report. The CQC Engineer will instruct workers on the acceptable level of workmanship required to meet contract specifications.

Copies of all required permits will be available at the job site during the Preparatory Phase.

### 3.3.2 *Initial Phase*

This phase will be accomplished at the beginning of a definable feature of work. The Initial Phase will verify that control for the work developed in the Preparatory Meeting is implemented and that the work is performed to the level of workmanship required. The Initial Phase will accomplish the following:

- Ensure that preliminary work meets contract requirements (participants will review minutes of the Preparatory Phase meeting);
- Verify full contract compliance and required control inspection and testing;
- Establish level of workmanship and verify that it meets minimum acceptable workmanship standards, and compare with sample panels if appropriate;
- Resolve any discrepancies or deficiencies;
- Check safety to ensure compliance with the Health and Safety Plan (HASP), evaluate any required upgrading/downgrading of personal protective equipment, revisions to the safety plan, and activity hazard analysis for each task being performed;
- Track deficiencies according to Section 8.3 of this CQCP;
- Notify the TN&A Project Manager at least 48 hours before beginning the Initial Phase. Separate minutes of the Initial Phase meeting will be prepared by the CQC Engineer and attached to the Daily QC Report. The exact location of Initial Phase work will be noted for future reference and comparison with follow-up phases; and
- Repeat the Initial Phase whenever specified quality standards or levels of workmanship are not being met.

### 3.3.3

#### *Follow-Up Phase*

Daily checks will be performed to ensure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks will be recorded in the Daily QC Report. Final follow-up checks will be conducted and all deficiencies corrected before starting features of work that may be affected by the deficient work. TN&A will not build on or conceal nonconforming work. QA/QC personnel should continually refer back to the standards set in the Preparatory and Initial Phases. The following should be considered during this phase;

- QA/QC standards maintained;
- Quality work standards maintained;
- Change orders adhered to;
- Work proceeding safely and in full compliance with the HASP;
- Required testing performed;
- Work performed according to the latest edition of the specifications, drawings, and trade codes;
- Deficiencies tracked according to Section 8.3 of this CQCP;
- Standards established in Preparatory and Initial Phases maintained on all features of work throughout the project;
- Invoice according to specifications;
- Pre-final and final inspection requests coordinated through the USACE Project Manager in writing at least three working days before desired inspection.

Additional Preparatory and Initial Phases will be conducted on the same definable feature of work if the quality of ongoing work is unacceptable, if there are changes in the QA/QC staff on-site production supervision or work crews, if work on a definable feature is resumed after a long interruption, or if other problems develop.

### 3.4

#### *CONSTRUCTION QUALITY CONTROL MEETINGS*

The TN&A's Project QC Manager and Construction Manager will meet with the appropriate USACE representative(s) at regular weekly or monthly intervals to assess the effectiveness of the QA/QC system. ERM

will report any QC constraints to the TN&A Project QC Manager to ensure proper communication of QC issues with USACE representatives. ERM will also commit to maintain and improve the overall QA/QC system by providing the required QA/QC related information to the TN&A's Project QC Manager. Reports will be reviewed to determine their effectiveness in the overall QA/QC system. Particular emphasis will be placed on the discussion of methods to eliminate the recurrence of problems.

### 3.5 *MATERIALS CERTIFICATION*

The CQC Engineer will inspect all construction materials received at the site. The CQC Engineer will visually inspect for the following:

- Correct material or item was shipped;
- Items and material are delivered and unloaded in an undamaged condition;
- Serial number, lot number, or other product identifier is recorded as appropriate; and
- The material or item is properly stored.

The CQC Engineer will record results of the receiving inspection on the material tracking form (Attachment D). If construction materials have identification tags, they will be removed and retained for the project file. The CQC Engineer has the authority to accept or reject materials. If material is rejected, the CQC Engineer will immediately contact the Construction Manager, who will take action to replace the unacceptable material.

Copies of all purchase orders or subcontracts requiring inspection will be provided to the CQC Engineer for receiving and record purposes. When the purchase order requires vendor certification of materials, equipment, or supplies, such certification will be verified as to accuracy and conformance and may be used in lieu of a test for those properties covered by the certification. Copies of all certifications received will be maintained by the CQC Engineer and will be available to the government upon request or submitted as provided in the contract specifications.

### 3.6

#### *COMPLETION INSPECTION*

Near the completion of all work or any increment thereof, the TN&A and ERM Project QC Manager will conduct an inspection of the work with the USACE Project Manager or on-site representative and develop a list of items that do not conform to the accepted drawings and specifications. This list will be included in the QC documentation and will estimate the date when the deficiencies will be corrected (see Attachment C for Deficiency Report Form and Deficiency Tracking Log). All deficiencies will be handled according to Inspection Deficiency Procedures (Section 8.3). The Project QC Manager or CQC Engineer will make a second inspection to verify that all deficiencies have been corrected. Operations and maintenance (O&M) manuals and warranties will be submitted to the TN&A Project Manager for acceptance. Required keys, spare parts, and materials will be sorted, identified, and shown to be usable.

TN&A and ERM QC personnel and the USACE Project Manager will perform the pre-final inspection to verify that the facility is completed and ready for occupancy/use. A pre-final list may be developed as a result of this inspection. The Project QC Manager will ensure that all items on this list have been corrected promptly before notifying the TN&A Project Manager so that a final inspection can be scheduled.

The ERM Project QC Manager, Construction Manager, and CQC Engineer, at a minimum, will accompany the TN&A Project QC Manager, the TN&A Construction Manager, and the TN&A CQC Engineer, along with the USACE Quality Assurance Representative, USEPA RPM, and other personnel on the final acceptance inspection. This inspection will be formally scheduled based on results of the pre-final inspection. Following the final inspection, final as-built drawings will be submitted.



## 4.0

## SUBMITTAL PROCEDURES

Submittals regulate the timely flow of materials to be incorporated into the work of each definable feature and demonstrate that proposed materials and equipment are in compliance with the contract plans and specifications. ERM understands that submittals are indispensable for assuring and controlling construction quality and will give them the utmost attention throughout the project. This section outlines the procedures for managing, scheduling, reviewing, and certifying submittals. These procedures have been developed in accordance with Section 01330, "Submittal Procedures," provided in the *Remedial Design Technical Specifications* (TN&A, 2005) and will be used in processing submittals.

## 4.1

## MANAGEMENT

As the Prime Contractor, TN&A has responsibility for overall management and control of submittals. The submittal process will be keyed to the project schedule through the combined efforts of the Project QC Manager and the Project Manager. Submittals requiring USEPA/USACE approval will be scheduled and made before acquisition of the material or equipment. The ERM Project Manager must:

- Integrate the submittal process into the CQCP;
- Delegate submittal responsibilities to the proper individuals within the company;
- Coordinate with subcontractors, off-site fabricators, suppliers, and purchase agents for the timely receipt of submittals required of them;
- Perform a detailed review of all submittals to ensure that they comply fully with contract specifications and code requirements;
- Check the submittal schedule requirements against the accepted construction schedule;
- Check and approve all items before submittal. Each item of the submittal must be stamped, signed, and dated. Only submittals accepted by TN&A should be submitted to USEPA/USACE;
- Regularly review the submittal register to ensure that the register reflects current information;

- Fully describe, identify, and justify all variations in the transmittal package(s); and
- Ensure that work does not begin without the properly accepted submittals.

The TN&A Project QC Manager will appoint an individual from TN&A to serve as Submittals Manager. ERM will provide all submittals to the TN&A Submittal Manager.

## 4.2 *SCHEDULING*

All required submittals will be provided by TN&A in time for the review, approval, procurement, delivery, and QC Preparatory Phase of an item before it is needed for construction. ERM personnel will provide TN&A with all submittals in a timely manner for TN&A to comply with the submittal schedule. Submittals covering interrelated items or components forming a system will be coordinated and submitted concurrently. Certifications must be scheduled for submission with the pertinent drawings. An initial Submittal Register will be prepared and submitted along with the other pre-construction submittals.

After identification and scheduling of the definable features of work for a particular project, the CQC Engineer, at the direction of the Project QC Manager, will perform the specified and appropriate tests to verify that control measures are adequate to ensure work conforms to contract requirements. The location and frequency of tests required will depend on the work performed, the uniformity and quality of the tests obtained, and the requirements of the applicable specification sections. The Project QC Manager will perform the following activities and record and provide the corresponding data:

- Verify that testing procedures comply with contract requirements;
- Verify that facilities and testing equipment are available and comply with testing standards;
- Check instrument calibration data against certified standards; and
- Verify that recording forms, including all test documentation required, have been prepared.

The Project QC Manager must notify the TN&A Project Manager at least 5 calendar days before performing any acceptance testing. The notification time for routine tests, such as pipe testing, will be 24 hours. The CQC Engineer will include advance notice of acceptance testing in the Daily QC Reports.

Advanced notice must be given for each specific test and include the test name, specification paragraph requiring the test, fixture to be tested, test frequency, and person responsible for the test. TN&A's CQC Engineer will perform or oversee all tests as shown in the contract specifications using the appropriate USACE, American Society for Testing and Materials (ASTM), or other approved test methods. Copies of each test result must include all necessary data, documentation, and computations.

Materials test reports will be submitted on industry standard forms such as American Concrete Institute, ASTM, and American Association of State Highway and Transportation Officials or with laboratory accreditation forms such as American Association for Laboratory Accreditation, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program. A sequential test identification control

number will be used for each separate test and will be recorded on the test report form. An example copy of a test report form is attached in Attachment E. ERM will procure the services of a USEPA validated testing laboratory in advance of any and all required chemical analytical testing in accordance with the project Sampling and Analysis Plan.

Results of all tests taken, both passing and failing, will be recorded on the QC daily report for the date that the test(s) was performed. Specification paragraph reference, test location, and the sequential control number identifying the test must be given. If accepted by the TN&A Project Manager, actual test reports may be submitted later with a reference to the test number and date.

All field sampling will be conducted in accordance with the approved Work Plan and all laboratory testing of collected samples will be conducted in accordance with the USEPA guidelines and methods.

The Construction Manager will be the first line quality supervisor for field sampling tasks. In addition, the CQC Engineer may audit field sampling procedures and implementation at any time during the course of the fieldwork.

The Project Manager will be the first line ERM quality supervisor for all laboratory testing. The lab project manager and QC personal will ensure that all analytical methods are being followed in accordance with standard USEPA analytical methods.

## 6.0

### *DEFINABLE FEATURES OF WORK*

A definable feature of work is a task that is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment.

The construction phase of this project has been divided into seven definable features or work. The testing requirements and quality control measures for each feature are described below. The definable features of work for this project include the following:

- Project Mobilization;
- Equipment Delivery and Assembly;
- Trenches, Pipes, Wells and Sumps Construction;
- Electrical Control Installations;
- System Start-up, Testing, and Shakedown;
- System O&M and O&M Manual; and
- Completion Report.

## 6.1

### *PROJECT MOBILIZATION*

Before construction work begins, construction equipment and minimum field supplies (i.e., water, potable restroom) will be delivered. Upon receipt of materials or equipment, qualified personal will be required to inspect them. Materials will be checked for integrity, defects, and appropriate grade or specs. Equipment will be checked for operability, up-to-date maintenance, and specs that indicate that the equipment can perform the required tasks. All material and equipment will be stored appropriately and checked daily before use. The project QC/QA will keep a record of initial QA/QC (upon arrival to the site) and daily inspections, using the forms attached in Attachment C.

## 6.2

### ***EQUIPMENT DELIVERY AND ASSEMBLY***

Equipment assembly will be performed both on and off site. For equipment assembled off-site, the qualified person will inspect that the piping, electrical connections, controls, fittings, and ensure all appropriate parts are in good condition to operate the equipment on-site. Upon delivery of equipment assembled off site, the project QA/QC or qualified person will corroborate that the equipment was build to the standards specified in all drawings pertinent to that equipment. On site assembled equipment will require final QA/QC inspections to ensure that the equipment meets the standards specified in all drawings and the proposal. The qualified person on site will perform and record the inspection. Electrical wiring of these equipments will be performed by a licensed electrician. All records will be kept on file and delivered to TN&A upon project completion. Inspection forms can be found in Attachment D.

## 6.3

### ***TRENCHES, PIPES, WELLS, AND SUMPS CONSTRUCTION***

Wells and sumps will be constructed in accordance with drawings C-3 through C-10 of the TN&A *Work Plan, Pemaco Superfund Site* (TN&A 2006). Deviation from these drawings will require approval from the ERM Project QA/QC Manager and the Project Manager. All approved changes will be documented in the Daily QA/QC Forms (Attachment C) and will be reflected in the as-built drawings.

Well pumps will be inspected and installed by the qualified ERM subcontractor. Inspection forms will be kept on file and submitted to TN&A. If any defects are found on the pumps, they will be exchanged for new ones. Electrical wires attached to the pumps are going to be insulated (waterproof) and taped every 5 feet to the pipe raiser to avoid tangled wire.

Sumps will be constructed per the corresponding design drawings. During and after sump construction, the QA/QC personal will note any changes or QA/QC issues regarding the construction of the sump, pump installation, wiring, and piping. A drainage test should be performed upon sump completion. The pump in the sump will automatically engage if water level on the sump surpasses the high limit and manual operation of the pump will also be possible through a switch. Both manual and automatic system will be tested and results recorded and kept on file.

Pipes and fittings will be installed according to drawings C-3 through C-10 of the *TN&A Work Plan, Pemaco Superfund Site* (TN&A, 2006). ERM will oversee all pipe installations and ensure they are fitted and buried to industry standards. All underground piping will be covered with sand to prevent rocks from damaging the pipes. Above ground pipes will be coated (if required) to preserve them from ultra violet damage. Overhead pipes will be put in structural racks to avoid wear due to pipe bending and to provide support for the pipe's weight. The Project QA/QC will observe/note changes in fittings, routing, valves, sampling ports, etc. and get approval from the Project Manager to leave them as is or correct them. All changes (need approval), notes, and tests will be recorded and kept on file.

Trenching must meet the requirements stated in drawings C-3 and C-12 of the *TN&A Work Plan, Pemaco Superfund Site* (TN&A, 2006). The depth of all trenches will be measured every 25 feet and stakes put for every 50 feet of trench (25 feet at bends and intersections). Daily inspections will be carried out to inspect the trenches and rod measurements will be taken and compared to the grade stakes. Excavation activities will be monitored with a photoionization detector (PID) calibrated to n-Hexane. If the PID reading exceeds 10 parts per million, the soil will be disposed of off site per the Waste Management Plan, or the soil will be reused on site. The PID readings will be taken using headspace samples every 20 feet or less (if required) of excavation. Contaminated soil will be placed on a plastic liner and covered to protect the clean soil underneath. Weekly inspections will be needed to monitor the integrity of the liner. Shorings and bracing will be required in all trenches deeper than 4 feet and ladders placed every 25 feet of trench. Nobody will be allowed in trenches that have no shoring and are deeper than 4 feet without a confined space entry permit and training. Inspection at the trenches will be daily, or at the discretion of the QC Manager.

## 6.4

### ***ELECTRICAL CONTROL INSTALLATION***

All electrical installations will be performed and supervised by a California licensed electrician. He will be responsible for proper electrical wiring, connection, grounding, wire gauging, and appropriate voltage and amperage delivery to each unit or control feature. The electrician will fill out a daily QA/QC form and submit it to the Project QA/QC Manager at the end of his shift.

All electrical systems will be tested in accordance to national and state codes and regulations. The electrical system will have a circuit breaker that will be tested as a part of its final test. A central electrical panel/box, where all system breakers are found, will have labels indicating which breaker corresponds to which system.

Transducers and electrical sensors will be tested to ensure all system alarms are operational. The results of the testing will be recorded and submitted to the Project QA/QC Manager and the ERM Project Manager. In the case of failure, immediate repair will be required and a retest of the portion the failed will be required.

## **6.5      *SYSTEM START-UP, TESTING, AND SHAKEDOWN***

During this phase of the project, the QA/QC team will inspect all aspects of the system and correct any deficient part(s). ERM will check all conveyance systems, process controllers, unit operations, and well pumps for operability. Testing of each portion of the system will be executed according to the industry standard regulations and by a qualified person. Results for all the final tests will be reviewed. If any deficiencies occur, the process described in Section 8.3 will be followed to collect it.

## **6.6      *SYSTEM O&M AND O&M MANUAL***

ERM will supervise a month of O&M of the system. During this period, the field personal will observe the behavior of the system under different constraints (weather, flow and pressure variance). All observations will be noted in a daily log and kept on file for submittal at the end of the project. An O&M manual will be developed from these notes, system operation manuals, and past experience on similar systems. The manual will be reviewed and approved by the Project Engineer and Project Manager.

ERM's subcontractor will maintain a daily O&M sheet where all systems readings are noted every morning. The field personal will note and collect any deficiencies during this month and report them on the O&M sheets. The template for the O&M sheet will be produced once the system is in place. The Project Engineer will track a set of parameters, such as flow rate, pressure, and temperature at every unit, to be monitored daily, weekly, and monthly. Every measuring point will be labeled on the field



with metal tags and will be referred to on the O&M sheet. The O&M sheet will also include the pressure, water column above the pump, and flow rate at every well. All data collected will be sent to the Project Manager for review at least once a week, unless a deficiency or anomaly in operations is found. The Project Manager will provide TN&A with weekly production reports and status updates on the system. However, if an anomaly or deficiency is found, ERM will notify TN&A within 48 hours of the event. Copies of daily reports and logs will remain on site and are subject to audits by ERM's Project Manager or Project Engineer.

## **6.7**      ***COMPLETION REPORT***

ERM will submit to TN&A a final report including as-built drawings, all QC forms filled during ERM and its subcontractors presence on site, and the O&M field sheets collected during the first month of the system's operation. The report will be reviewed by the author, the Project Manager, an editorial reviewer, and the Principal-in-Charge for the project. Attachment C shows a sample report deliverable review form.

## **7.0 CONSTRUCTION QUALITY CONTROL REPORTING**

### **7.1 RECORDS MANAGEMENT**

The Construction Manager will maintain on site current records of all control activities and tests. These will include evidence that the required control phases and tests have been performed, including the number and results, nature of defects, causes for rejection, defective features, proposed remedial action, and a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract.

### **7.2 DAILY QUALITY CONTROL REPORTS**

All field activities will be documented daily by the CQC Engineer in a permanently bound field notebook. The CQC Engineer will also complete the Daily QC Report (Attachment C). Field notes and the Daily QC Report will include field conditions, work performed, inspection notes, condition of work, safety and health issues, sample locations, and field screening results. The field notes will also include detailed, tabulated field conditions. Copies of the Daily QC report will be forwarded daily to the TN&A representative. The Daily QC Report will be used by the CQC Engineer to report the day's quality control activities of the Prime Contractor and all subcontractors. Daily QC Reports and all attachments will be submitted to TN&A in either electronic or hard format once a week.

Copies of all inspection and test reports, including data and calculation sheets, will be submitted with the Daily QC Report. The CQC Engineer's reports will contain notations defining the phase of control on each day's activities and note compliance or noncompliance with previous phases when applicable. The TN&A Project Manager will be notified 24 hours before all routine tests to be performed in the field and 5 days in advance for all acceptance tests.

The Construction Manager will be responsible for daily tracking of material removed from the site for disposal. This will include preparing all necessary chain of custody tracking sheets and other documentation required by law. Copies of all waste management records will be

included as attachments to the Daily QC Reports as they become available. Copies of all material quantity records will be included as attachments to the Daily QC Reports on the day the material is transported.

ERM will furnish to the TN&A Project Manager originals of all field notes, computations, and records relating to the quantity survey or to the layout of the work and a PC compatible version of any software required to interpret the finished data and records on the day that a progress payment request is submitted. The survey records must be updated as construction progresses, with a marked up set of record drawings showing locations of permanent features and preload stockpile configurations (see Section 8.0).

## **8.0            *QUALITY CONTROL PROCEDURES***

### **8.1            *SURVEILLANCE OF SUBCONTRACTORS OPERATIONS***

Surveillance of subcontractor operations is the responsibility of the Construction Manager. He will record major discrepancies that come to his attention on the deficiency form and notify the subcontractor concerned. Any discrepancy from a preceding operation must be resolved before the item is covered. Major discrepancies will be followed up daily. When a major discrepancy is corrected, the date corrected and the person responsible will be noted.

### **8.2            *INSPECTION ACCEPTANCE PROCEDURES***

All construction work must be according to contract plans and specifications. All rework or changes to engineering drawings or specifications must be authorized by the TN&A. All construction work will be recorded on the Project QC Manager's report. Compliance with drawings and specifications will be noted. If discrepancies or deficiencies are identified, they will be handled according to the following Deficiency Procedures.

### **8.3            *INSPECTION DEFICIENCY PROCEDURES***

Inspection Deficiency Procedures call to the attention of responsible supervisors all discrepancies in quality, workmanship, materials, equipment and supplies, and unauthorized deviations from engineering requirements or specifications. ERM will use the following tracking system to document deficiencies during the project.

The CQC Engineer will record deficiencies on the Deficiency Report Form (Attachment C). He will assign a number to each deficiency, give its location, and write a concise description on the form.

When material, equipment, supplies, or workmanship are found to be deficient, the Project QC Manager will prepare a deficiency report and immediately furnish copies to the Project Manager, Construction

Manager, and the subcontractor's job representative. The QA representative for TN&A will receive two copies of the deficiency report attached to the Daily QC Report. Upon completion of the deficiency report, the deficiency will be entered into the Deficiency Log (Attachment C) for tracking. The Deficiency Log will be available for TN&A review upon request, and a copy of the updated Deficiency Log will be attached to the Daily QC Report at least once a week.

After reviewing the deficiency report, the Project QC Manager will examine the rejected items in the presence of the Construction Manager. If, in the opinion of any of these parties, any of the rejected items can be reworked to a usable condition, the deficiency report will note this. If, in their opinion, the item cannot be reworked, either practically or economically, the item shall be removed and an entry made on the deficiency report.

Upon the completion of reworking specified items, the CQC Engineer will re-inspect the deficient item, noting the original requirement and the rework information on the Deficiency Report Form. If the work is found acceptable, it will be so noted on the Deficiency Report Form and the Deficiency Log. From this point, the item will be handled in the normal manner. If the item is still not acceptable to the CQC Engineer, ERM will inform TN&A.

The Deficiency Log will be periodically reviewed by the Project Manager with the Project QC Manager to decide how to resolve each uncorrected deficiency. They will establish timetables for resolving all deficiencies and convey the results of the periodic review to TN&A along with updated copies of the Deficiency Log.

ERM will maintain a set of marked up drawings depicting as-built conditions. A master set of record drawings will be in the possession of the Project Engineer, who will be responsible for their updating and accuracy. These record drawings will be available for inspection by the TN&A at any time. No later than 30 days after final acceptance, a complete hard copy set of final record drawings must be submitted with the accepted preliminary record drawings. At minimum, these record drawings will depict the following:

- Locations and descriptions of any existing utilities found during performance of the work, new utility lines, and other installations of any kind known to exist within the construction area. These locations will include the dimensions or survey coordinates of permanent features;
- Locations and dimensions of any changes within the building(s) or structure(s) and the accurate locations and dimensions of all underground utilities and facilities;
- Correct elevations if changes are made in site grading from the drawings;
- Changes in details of design or additional information from working drawings to be prepared or furnished by ERM, including, but not limited to, fabrication, erection, installation, and placing details; pipe sizes; insulation materials; dimensions of equipment; and foundations; and
- All changes or modifications from the original design and from the final inspection.

Where drawings or specifications allow options, only the option actually used in the construction shall be shown on the record drawings. The option not used shall be deleted.

## 10.0

## REFERENCES

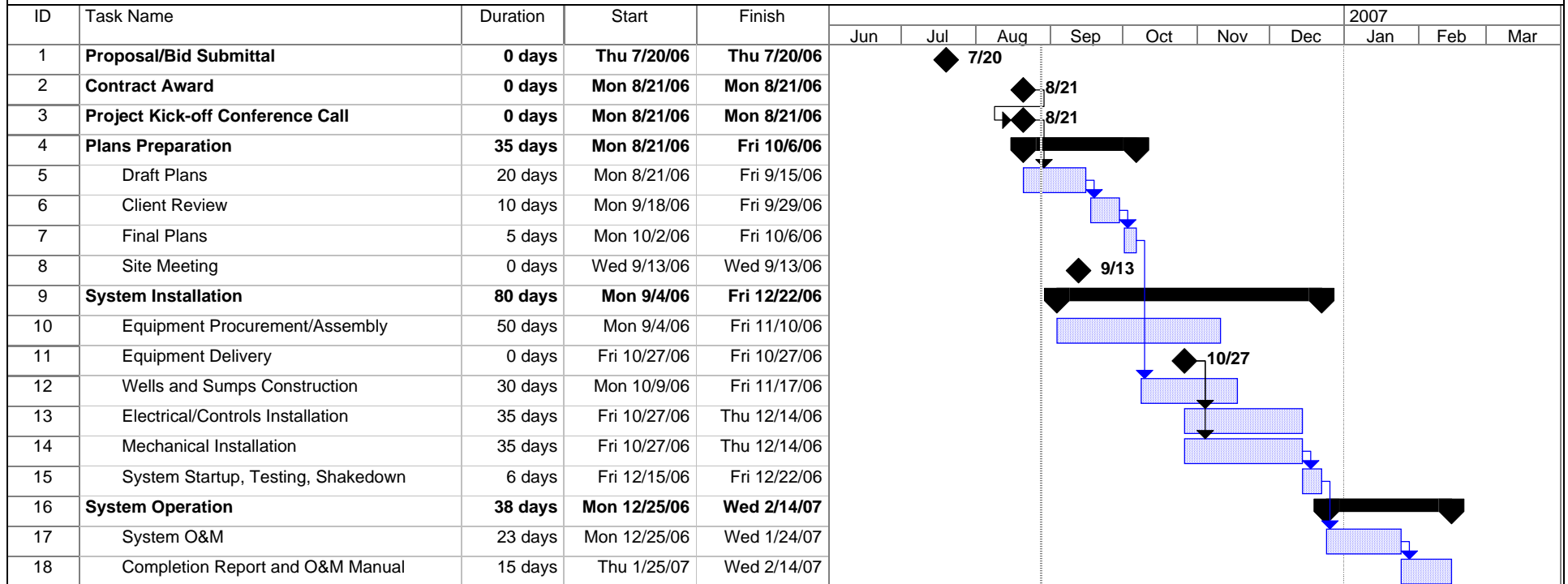
ERM. 2006. *Proposal for Installation & Implementation of a Vapor & Groundwater Treatment System, Pemaco Superfund Site, Maywood CA.*

TN&A. 2006. *Final Construction Quality Control Plan, Pemaco Superfund Site, Maywood CA.*

*Attachment A*  
*Project Schedule*



**PROPOSED PROJECT SCHEDULE  
PEMACO SUPERFUND SITE  
MAYWOOD, CALIFORNIA**



*Attachment B*  
*Checklists for Preparatory and*  
*Initial Phase*

# PREPARATORY PHASE COMPLETION REPORT

for \_\_\_\_\_  
(Definable Feature of Work)

Project: Pemaco Superfund Site, Remedial Construction

Date of Report: \_\_\_\_\_

Item Number	Applicable?	Item	Completed (initials)
1	YES <input type="checkbox"/> NO <input type="checkbox"/>	Review Contract Documents	
2	YES <input type="checkbox"/> NO <input type="checkbox"/>	Ensure that all materials and equipment are on hand and have been tested, submitted and approved.	
3	YES <input type="checkbox"/> NO <input type="checkbox"/>	Ensure that the required control testing provisions are in place.	
4	YES <input type="checkbox"/> NO <input type="checkbox"/>	Examine the work area to ensure that all preliminary work has been accomplished.	
5	YES <input type="checkbox"/> NO <input type="checkbox"/>	Review Activity Hazard Analyses.	
6	YES <input type="checkbox"/> NO <input type="checkbox"/>	Review construction permit requirements and verify that all permits have been obtained and are current.	
7	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	
8	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	
9	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	
10	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	

Comments on specific items listed above: (attach additional sheets if necessary)


\_\_\_\_\_  
ERM Construction Manager

\_\_\_\_\_  
ERM CQC Officer

\_\_\_\_\_  
TN&A Construction Manager

\_\_\_\_\_  
TN&A CQC Officer

\_\_\_\_\_  
USACE Representative

\_\_\_\_\_  
TN&A Project QC Manager

# INITIAL PHASE INSPECTION REPORT

for \_\_\_\_\_  
(Definable Feature of Work)

Project: Pemaco Superfund Site, Remedial Construction

Date of Report: \_\_\_\_\_

Item Number	Applicable?	Item	Completed (initials)
1	YES <input type="checkbox"/> NO <input type="checkbox"/>	Check preliminary work.	
2	YES <input type="checkbox"/> NO <input type="checkbox"/>	Check new work for compliance with contract documents.	
3	YES <input type="checkbox"/> NO <input type="checkbox"/>	Review control testing.	
4	YES <input type="checkbox"/> NO <input type="checkbox"/>	Establish level of workmanship.	
5	YES <input type="checkbox"/> NO <input type="checkbox"/>	Check for use of defective or damaged materials.	
6	YES <input type="checkbox"/> NO <input type="checkbox"/>	Check for omissions and resolve any differences of interpretation with the COR.	
7	YES <input type="checkbox"/> NO <input type="checkbox"/>	General check of dimensional requirements.	
8	YES <input type="checkbox"/> NO <input type="checkbox"/>	Check safety compliance.	
9	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	
10	YES <input type="checkbox"/> NO <input type="checkbox"/>	Other:	

Comments on specific items listed above: (attach additional sheets if necessary)


\_\_\_\_\_  
ERM Construction Manager

\_\_\_\_\_  
ERM CQC Officer

\_\_\_\_\_  
TN&A Construction Manager

\_\_\_\_\_  
TN&A CQC Officer

\_\_\_\_\_  
USACE Representative

\_\_\_\_\_  
TN&A Project QC Manager

\_\_\_\_\_

\_\_\_\_\_

*Attachment C*  
*CQC Forms*

# Daily Quality Control Report

Date \_\_\_\_\_

S	M	T	W	Th	F	S
---	---	---	---	----	---	---

[illegible]

# Daily Quality Control Report

Date \_\_\_\_\_

<b>USACE COR:</b> John Hartley
<b>Project:</b> Pemaco Superfund Site, ERH Construction
<b>ERM Project Number:</b> 0054248
<b>Contract Number:</b> DACA45-00-D-0006, DO 19
Quality Control Activities (including field calibrations)
Health and Safety Levels and Activities
Problems Encountered/Corrective Action Taken
Special Notes
Tomorrow's Expectations

Completed By: \_\_\_\_\_ Title: \_\_\_\_\_

On behalf of the Contractor, I certify that this report is complete and correct. Equipment and material used and work performed during this reporting period are in compliance with the contract drawings and specifications to the best of my knowledge except as noted above.

Signed \_\_\_\_\_ Date: \_\_\_\_\_

# Deficiency Report

Date \_\_\_\_\_

<b>USACE COR:</b> John Hartley	<b>Report Number:</b>
<b>Project:</b> Pemaco Superfund Site, ERH Construction	
<b>ERM Project Number:</b> 0054248	
<b>Contract Number:</b> DACA45-00-D-0006, DO 19	

## 1. DEFICIENCY DESCRIPTION

Identified by: \_\_\_\_\_ Date: \_\_\_\_\_

## 2. PROPOSED CORRECTIVE ACTION, INCLUDING INITIATION AND COMPLETION DATES (ATTACH ADDITIONAL DOCUMENTATION IF NECESSARY):

Identified by: \_\_\_\_\_ Date: \_\_\_\_\_

## 3. CAUSE:

## 4. APPROVAL FOR PROPOSED CORRECTIVE ACTION:

Project Manager: \_\_\_\_\_ Date: \_\_\_\_\_

Project CQ Manager: \_\_\_\_\_ Date: \_\_\_\_\_

## 5. CORRECTIVE ACTION TAKEN (ATTACH ADDITIONAL DOCUMENTATION IF NECESSARY):

## 6. CORRECTIVE ACTION COMPLETE:

Project Manager: \_\_\_\_\_ Date: \_\_\_\_\_

Project CQ Manager: \_\_\_\_\_ Date: \_\_\_\_\_

### Distribution List:

USACE COR  
TN&A QC PM  
Project File



*Attachment D*  
*Material Tracking Sheet*

# Materials/Equipment Receipt Log

<b>USACE COR:</b> John Hartley	Log No. _____
<b>Project:</b> Pemaco Superfund Site, ERH Construction	Prepared by:
<b>Project Number:</b> 0054248	
<b>Contract Number:</b> DACA45-00-D-0006, DO 19	

Material/Equipment Received	Date	Acceptance Inspection Results	Corrective Actions

Distribution List: USACE COR, TN&A QC PM, PROJECT FILES

*Attachment E*  
*Test Report Form*

# QC Test Results

Date \_\_\_\_\_

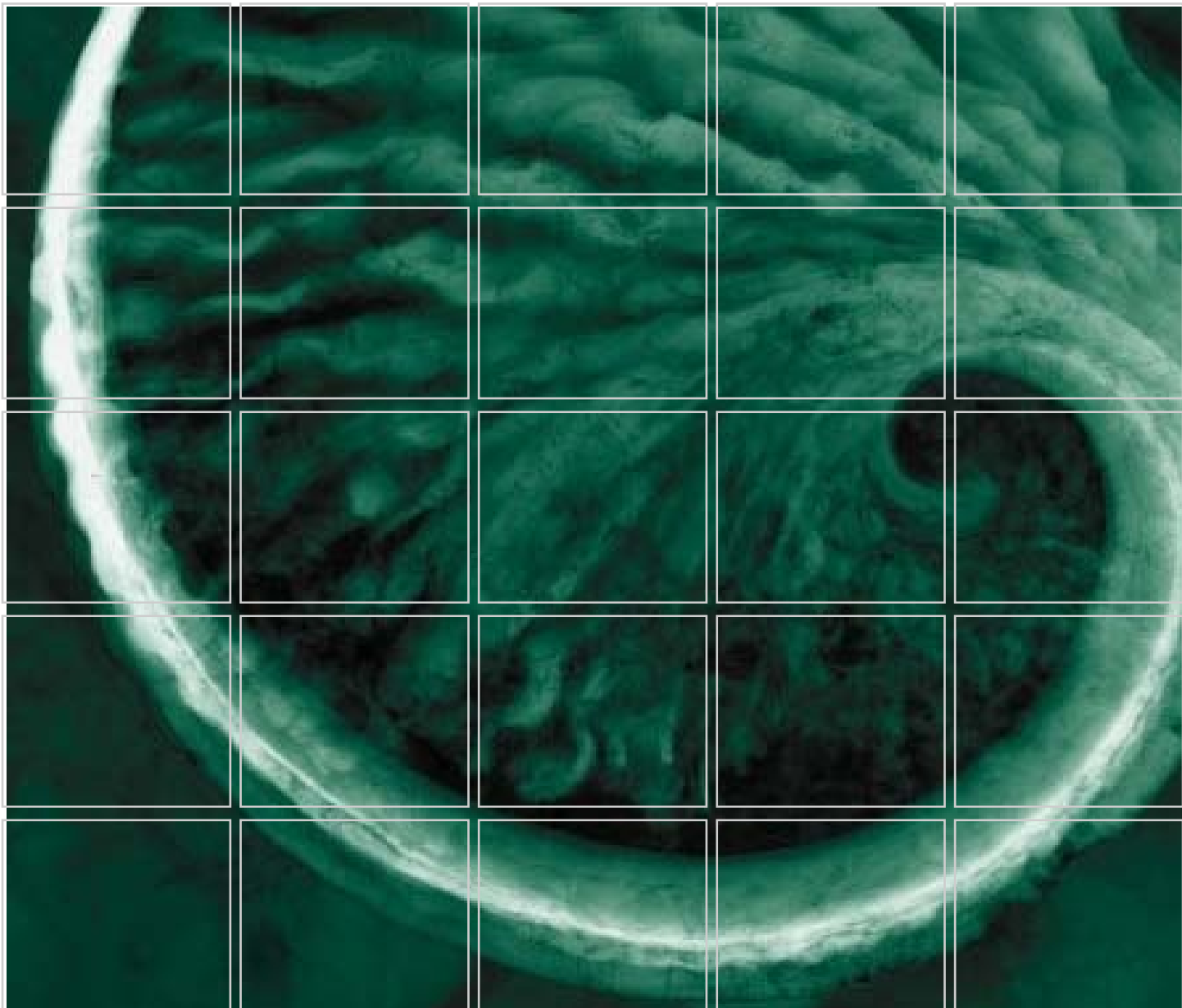
<b>USACE COR:</b> John Hartley	Technician:
<b>Project:</b> Pemaco Superfund Site, ERH Construction	Test Methods:
<b>ERM Project Number:</b> 0054248	Source of Material Used:
<b>Contract Number:</b> DACA45-00-D-0006 DO 19	Weather Conditions:

LOCATION OF TEST	TEST RESULTS	REQUIRED RESULTS

NOTES/COMMENTS:

Completed by: \_\_\_\_\_ Title: \_\_\_\_\_

*Appendix D*  
*Waste Management Plan*



**Prepared for:**

TN & Associates, Inc.



## Waste Management Plan

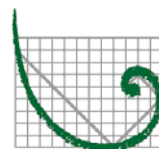
U.S. Army Corps of Engineers



October 2006

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U.S. Environmental Protection Agency



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*ATTACHMENT A — Container Identification Label*

*ATTACHMENT B — Waste Container Inventory Log*



This Waste Management Plan (WMP) describes the procedures that ERM-West, Inc. (ERM) will use to handle, transport, and dispose of wastes from the Pemaco Superfund Site, City of Maywood, California (the site) during construction of the remedial design.

This WMP is intended to address several waste streams and handling issues, including:

- Waste minimization practices;
- Storage, shipping, and disposal of general solid waste;
- Handling, transport, and disposal of non-hazardous wastes; and
- Record-keeping.

Associated with waste management are issues of spill control and response. These topics are covered in the Environmental Compliance Plan (Appendix B) that accompanies this plan as part of the overall Workplan.

This WMP covers all on-site and off-site operations, including work by subcontractors and suppliers. The plan identifies personnel, procedures, controls, records, and forms to be used during the project to ensure that all wastes generated during construction of the Pemaco remediation system are minimized, collected, and disposed of properly.

ERM will attempt to minimize the production of construction wastes and non-recyclable and non-biodegradable solid waste. The anticipated general and construction waste streams that will be generated during the conduct of work include scrap construction materials, used personal protective equipment (PPE), wastepaper, food and beverage containers, etc. ERM will minimize production of waste largely through reuse of site materials to the extent possible, and careful use of the appropriate quantity of construction materials to prevent excessive waste. Compatible liquid wastes, such as condensate collected from moisture separators, will be added to the groundwater treatment system to reduce the volume of untreated wastes.

Additional waste may be generated in the event of a spill or release, although every effort will be made to prevent such an occurrence. Care will be taken in the dispensing of fuel to reduce the chance of an accidental release. In addition, treatment system process waste that may be hazardous, such as moisture separator water and activated carbon, will be handled appropriately to prevent spillage. Absorbent pads will be kept in each piece of equipment in case of a hydraulic hose break or other spill so that the release can be minimized. Vehicle and construction equipment hose and fitting conditions will be inspected daily prior to equipment use. Treatment system piping, fittings, and other components designed to contain liquids will be inspected during regular operations and maintenance (O&M). Fluid levels will be monitored to check for the presence of unseen fluid leaks.

ERM anticipates that general solid wastes generated during construction activities will include metal and plastic pipe, electrical materials (wire, etc.) cardboard and wood waste (packing materials, etc.), used PPE, and miscellaneous wastes (trash, food containers, etc.). These general solid waste streams will be kept separate from non-hazardous wastes, as described in Section 4, generated during construction and O&M activities.

Waste management practices for these various general wastes are as follows:

- Recyclable materials will be segregated whenever possible for off-site recycling through a subcontracted disposal company; and
- Non-recyclable materials, used PPE, and miscellaneous general wastes will be combined into covered dumpsters and disposed of through a subcontracted disposal company at a licensed municipal landfill.

Waste handling and storage are discussed in Section 4.3. General solid waste and recyclables will be picked up by a local waste hauler and taken to a USEPA-approved disposal facility.

General waste solids will be disposed of at the Puente Hills landfill, located in Whittier, California, or other municipal landfill (pending USEPA approval).

## **4.0            *HANDLING, CHARACTERIZATION, AND DISPOSAL OF POTENTIALLY HAZARDOUS WASTE***

### **4.1            *ANTICIPATED POTENTIALLY HAZARDOUS WASTES***

The following types of potentially hazardous wastes are expected to be generated during construction and O&M of the remediation system designed for the Remedial Action construction phase at the site:

- Spent granular activated carbon (GAC) used for adsorption of contaminants;
- Liquid wastes generated from well purging/sampling; and
- Liquid wastes (condensate and/or extracted groundwater) generated at various locations within the treatment system.

The following sections describe how these waste streams will be managed and disposed of during the Remedial Construction activities.

### **4.2            *SPENT GAC GENERATED FROM TREATMENT SYSTEM***

GAC used for treatment of vapor and water within the treatment system will require regular removal and disposal/recharge as the removal efficiency is reduced. The removal frequency for the GAC, as well as procedures for removal and refilling will be outlined in the O&M Manual, which will be developed at a later date. The GAC will be removed by a vendor specializing in disposal with equipment designed to vacuum the GAC from the vessels and into a container for transport off-site. The GAC will be removed in a manner that will limit spillage and generation of additional waste.

Spent GAC segregated for off-site disposal/regeneration will be sampled for waste characterization purposes. Available laboratory volatile organic compound (VOC) data from the influent and effluent stream for a particular GAC vessel can be used to help with characterization. The quantity of samples collected will be sufficient to meet the receiving disposal/regeneration facility's characterization requirements. Samples will be representative of the waste. In accordance with the requirements of the licensed Treatment, Storage, and Disposal Facility (TSDF), the samples can be analyzed for the following parameters:

- VOCs (SW 846 Method 8260B);
- Herbicides (SW 846 Method 8151A);
- Polynuclear aromatic hydrocarbons (PAHs) (SW 846 Method 8270C);  
and
- Polychlorinated biphenyls (PCBs) (SW 846 Method 8082A),

Samples will be properly prepared and documented for submittal to a State of California-certified analytical laboratory. The results will be reviewed by an ERM chemist for completeness and representativeness. Waste disposal is discussed in Section 4.7.

### 4.3 *LIQUID WASTES GENERATED FROM WELL SAMPLING AND TREATMENT SYSTEM COMPONENTS*

Small volumes of liquid waste are anticipated to be generated during O&M activities at the site, including well purge water, equipment decontamination water, and condensate or untreated groundwater collected at locations within the treatment system. Liquid wastes collected from the treatment system, including the extraction network, condensate drains, or other locations within the treatment system, will be added to the water holding tank to be treated by the GAC system. This procedure will reduce the volume of potentially hazardous waste generated from regular O&M activities. All liquid wastes not added to the treatment system will be stored in tanks or drums, as described in Section 4.6.

Liquid wastes will be sampled for waste characterization purposes. The quantity of samples collected will be sufficient to meet the receiving waste disposal facility's characterization requirements. Samples will be representative of the waste. In accordance with requirements of the licensed TSDF, the samples can be analyzed for the following parameters:

- Ignitability, pH, and other waste characteristics required by the licensed disposal facility;
- VOCs (SW 846 Method 8260B);
- Herbicides (SW 846 Method 8151A);
- PAHs (SW 846 Method 8270C);
- PCBs (SW 846 Method 8082A);
- CAM 17 metals (SW 846 6010B/7000); and

- Acute Aquatic Toxicity Fish Bioassay (California Code of Regulations [CCR] Title 22).

Samples will be properly prepared and documented for submittal to a State of California certified analytical laboratory. The results will be reviewed by the ERM chemist for completeness and to be sure samples are representative. Waste disposal is discussed in Section 4.7.

If the liquid wastes are shown by laboratory analyses to have chemical levels that are within acceptable limits for discharge to the sanitary sewer, ERM will seek approval for sewer discharge from the Los Angeles Sanitary Waste District. Otherwise, liquid wastes will be removed for off-site treatment and/or disposal at a USEPA-approved waste facility.

#### 4.4

#### **WASTE CHARACTERIZATION RESULTS EVALUATION**

The waste characterization sample results will be compared to State of California regulations for the identification of hazardous waste based on toxicity as described in the California Code of Regulation (CCR) Title 22, Division 4.5, Chapter 11, Article 3. Total concentrations of constituents detected in the samples will be initially compared with the Total Threshold Limit Concentrations (TTLCs) listed in Tables II and III of CCR Title 22, Division 4.5, Chapter 11, Article 3. Concentrations that exceed the TTLC or greater than 10 times the Solubility Threshold Limit Concentrations (STLCs) will be additionally analyzed for soluble concentrations using the "Waste Extraction Test" (WET). Soluble concentrations will be compared to the STLC levels presented in Tables II and II of CCR Title 22, Division 4.1, Chapter 11, Article 3. GAC for which soluble concentrations exceed the STLC levels will be classified as California State hazardous waste. If the total concentration of any analyte exceeds 20 times the Maximum Concentration of Contaminants for the Toxicity Characteristic listed in Table I of CCR Title 22, Division 4.5, Chapter 11, Article 3, then the sample will be analyzed using EPA test Method 1311, the Toxicity Characteristic Leaching Procedure (TCLP).

Regulatory limits have not been established for the PAHs determined as COCs at the Site. Therefore, analytical results for PAHs will first be compared to the listing of acute hazardous wastes (AHW) and toxic wastes (TW) (CCR Title 22) to determine if the detected compounds are on either list.

#### 4.5

#### ***USED PPE, SAMPLING EQUIPMENT, AND OTHER WASTES***

Used PPE will be managed as a general solid waste. Used PPE and sampling equipment will be double bagged in plastic garbage bags and placed in the appropriate general waste containers (Section 3.0).

Cleanup wastes from accidental spills and releases of fuels, hydraulic fluid, untreated water, and other products will be contained and cleaned up in accordance with the Environmental Compliance Plan (see Appendix B of the Remedial Construction Activities Workplan). All such wastes will be properly contained, segregated from other soils stockpiled on-site, and characterized for off-site disposal at a USEPA-approved disposal facility. Storage and management of spill wastes is summarized in Table 1.

#### 4.6

#### ***WASTE HANDLING AND TEMPORARY STORAGE***

Waste handling and storage requirements for this project are summarized in Table 1. Soil wastes segregated for waste characterization and off-site disposal will be stockpiled on plastic sheeting and also covered with plastic sheeting to eliminate wind/water erosion or odor nuisance. Each stockpile shall not exceed 50 cubic yards. The stockpiled soil shall remain on site and undisturbed, pending laboratory results. No material shall be added to the piles or removed from the piles, pending the laboratory results.

Liquid wastes will be stored in poly tanks or Department of Transportation (DOT)-approved 55-gallon steel drums. Each container will be clearly marked to indicate the waste source. Attachment A contains an example of the identification label to be affixed to each container. The label will have black lettering on a white background and weather resistant. The labels will not be used for shipping or disposal purposes. Before disposal or shipment off-site, containers will be labeled with appropriate DOT identification and classification information by the waste disposal subcontractor. Following labeling, waste container information will be recorded on the Container Inventory Log (Attachment B). The Construction Manager will maintain the log in the field office trailer.

**Table 1**      **Waste Handling and Storage Requirements**

Waste Type	Handling and Storage Requirements
General wastes, recyclables, drilling and construction debris	<ul style="list-style-type: none"> <li>• Leased metal dumpsters with lids, kept locked at night and over weekends</li> <li>• Segregate recyclables (plastic, wire, steel, etc.)</li> <li>• Double-bag used PPE &amp; sampling equipment before placing in dumpsters</li> </ul>
Removed spent GAC pending waste characterization (if not immediately removed from Site)	<ul style="list-style-type: none"> <li>• Bulk storage in non-draining roll-off container, with water proof cover tied down with sand bags with ropes, maintain daily cover.</li> <li>• Properly label all containers (Attachment A) and document all stockpile locations, origins, and approximate volume</li> </ul>
Hazardous solid wastes (classified as such based on analytical laboratory results)	<ul style="list-style-type: none"> <li>• Same storage as above, but maximum <b>90 days</b> temporary on-site storage from day of initial waste accumulation</li> <li>• Properly label any containers with hazardous waste label</li> </ul>
Liquid wastes pending characterization (well development, purge, and decon water)	<ul style="list-style-type: none"> <li>• Store in poly tanks with secondary containment structure</li> <li>• If in drums, set drums on wooden pallets in secondary containment structure</li> <li>• Properly label all containers (Attachment A)</li> </ul>
Hazardous liquid wastes (classified as such based on analytical laboratory results)	<ul style="list-style-type: none"> <li>• Same storage as above, but maximum <b>90-days</b> temporary on-site storage from day of initial waste accumulation</li> <li>• Properly label any containers with hazardous waste label</li> </ul>
Wastes from accidental spill cleanups	<ul style="list-style-type: none"> <li>• Double-bag used spill absorbent pads, used PPE, and disposable equipment before placing in UN-approved 55-gallon drums</li> <li>• Segregate all contaminated soil from spill cleanup for characterization and disposal</li> </ul>

Waste containers used at the project site will be transported to, and stored in, a secured temporary waste storage area designated by the ERM Construction Manager. The temporary waste storage area will be identified before the field activities commence. The temporary waste storage area will be equipped with spill containment and will include a spill kit. Waste containers will be secured at night and during breaks from on-site activities.

The label shown as Attachment A is an interim identification label only and will not be used for shipping or disposal purposes. Prior to disposal or shipment off-site, the waste disposal subcontractor will label the drums with the appropriate DOT identification and classification information.



**WASTE MANIFESTING AND DISPOSAL**

The waste disposal subcontractor will dispose of wastes generally within 90 days of collection. The waste disposal subcontractor will provide services including, but not limited to, waste profiling, preparation of manifests, and transportation and disposal of wastes. All manifests will be signed by the USEPA site representative.

Solid and liquid wastes generated during remedial construction and O&M will be managed as potentially hazardous wastes under Title 40 of the Code of Federal Regulations, parts 261.31 to 261.33. Non-hazardous and hazardous wastes generated by the remedial construction will be disposed of in a USEPA-approved Subtitle C landfill. Information on the anticipated waste disposal site is provided below:

**Hazardous and Non-Hazardous Solid Wastes**

Kettleman Hills Facility  
Chemical Waste Management, Inc.  
EPA ID: CAT000646117  
35251 Old Skyline Road  
PO Box 471  
Kettleman City, CA 93239

Clean Harbors Buttonwillow Facility  
EPA ID CAD980675276  
2500 West Lokem Road  
Buttonwillow, CA 93206

**Liquid Wastes**

DeMenno-Kerdoon Facility  
EPA ID: CAT080013352  
200 N. Alameda Street  
Compton, CA

TN&A has secured approval from the USEPA for each of the above-listed waste disposal facilities. ERM will coordinate signing of manifests for all wastes with the USACE.

**OFF-SITE WASTES TRANSPORTATION AND DISPOSAL**

The USEPA will pre-approve all off-site disposal facilities during the waste profiling process. Only properly licensed waste haulers will be used for off-site transportation of non-hazardous solid wastes.

Generally, waste transport trucks will be within the Support Zone only and are not expected to become contaminated. ERM personnel will inspect the vehicle tires for soil and check that covers are properly secured for freeway hauling. Regular inspection of the truck egress routes will be performed to confirm that soil is not being spread to the roads. Road sweeping will be performed if it is determined that fugitive dust or soil is being generated.

The trucks will pass briefly through the adjacent residential neighborhood, but then travel on Slauson Avenue, a mixed commercial/industrial street before exiting to the freeway.

ERM will maintain all manifests and records of all waste materials removed from the site. The records will include the following:

- Signed waste manifests and weigh tickets for non-hazardous waste shipments (per federal and state regulations);
- Receipts and/or bills of lading for general solid waste;
- Exception reports, in the event that a manifest copy is not received within 35 days of shipment initiation;
- Land disposal restriction notification;
- Notification of PCB activity; and
- Information on labeling, packaging, marking, and placarding of waste shipments.

The ERM Construction Manager will maintain a binder at the site field office trailer exclusively for waste transfer activities and provide copies to the USEPA. Non-hazardous wastes (soil, liquids) transported, treated, stored, or disposed of must be recorded and reported. At the specified time, ERM will forward to the Remedial Project Manager or designee a submittal in the proper form and format to allow the Remedial Project Manager to file a California State Annual or USEPA biennial report. The information will contain ERM's company name, contract number and project location.

*Attachment A*  
*Container Identification Label*

**INVESTIGATIVE-DERIVED WASTE**

**SAMPLED - PENDING ANALYSIS**

**DO NOT HANDLE OR MOVE CONTAINER,  
OR OPEN WITHOUT AUTHORIZATION**

The contents of this container have been sampled and are pending analysis. State and federal law prohibits improper disposal. Questions regarding this container should be directed to one of the representatives listed on this label below.

Project:	Pemaco Superfund Site
Location:	City of Maywood
Point of Contact:	Rudy Millan, Project Manager (925) 946-0455
Site-Specific Location:	_____
Owner:	U.S. EPA Region 9
EPA Remedial Project Mgr:	Rose Marie Caraway (415) 972-3158
Container No.:	_____
Contents:	_____
Date Container Filled:	____/____/____

*Attachment B*  
*Waste Container Inventory Log*

**Inventory Date:** \_\_\_\_\_ **By:** \_\_\_\_\_

[illegible]