CAL INC

Corporate Office
2040 Peabody Road
Suite 400
Vacaville, CA 95687
707/446-7996
FAX 707/446-4806

Mailing Address
P O Box 6327
Vacaville, CA 95696-6327

Washington D.C.
4360 Montgomery Avenue
Suite 600
Bethesda, MD 20814

San Francisco
Opera Plaza
801 Van Ness Avenue
#E3-134
San Francisco, CA 94102
415/824-2966

Monterey
395 Del Monte Center
#203
Monterey, CA 93940

Sacramento
210 Estates Drive
Suite 208
Roseville, CA 95678
916/393-1221

September 25, 1996

Ms. Juliette Shin
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Room 200
Alameda. CA 94502

TRANSMITTAL OF ALAMEDA COUNTY UNDERGROUND TANK CLOSURE PLAN AND DRAFT PROJECT WORK PLAN
UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE
ALAMEDA, CALIFORNIA

GSA CONTRACT NO. GS-09P-96-KZC-0013
GSA PROJECT NO. RCA21602

Dear Ms. Shin:

On behalf of the General Services Administration, CAL INC is pleased to submit the Alameda County Underground Tank Closure Plan for Tank Nos. 3 and 4 at the Alameda Federal Center. As we discussed today, CAL INC is also submitting its Draft Project Work Plan.

Please contact either Joe Krohn or me if you have any questions regarding the submittal.

Sincerely,

G. Robert Barry
Environmental Geologist

attachments

ENVIRONMENTAL PROTECTION
96 SEP 26 AM 7:53

CAL INC

DRAFT
PROJECT WORK PLAN
UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE
ALAMEDA, CALIFORNIA

CONTRACT NO.
GS-09P-96-KZC-0013

PREPARED ON BEHALF OF:

GENERAL SERVICES ADMINISTRATION
450 GOLDEN GATE AVENUE, 3RD FLOOR
SAN FRANCISCO, CALIFORNIA 94102-3400

PREPARED BY:
CAL INC
2040 PEABODY ROAD, SUITE 400
VACAVILLE, CALIFORNIA 95687

SEPTEMBER 1996

DRAFT
PROJECT WORK PLAN
UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE
ALAMEDA, CALIFORNIA

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PREPARED BY:

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2040 PEABODY ROAD, SUITE 400
VACAVILLE, CALIFORNIA 95687

SEPTEMBER 1996

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1.0 INTRODUCTION

The Alameda Federal Center requires performance of the work described in solicitation number GS-09P-96-KZC-0013. The project objective is the removal and disposal of two 10,000 gallon storage tanks (USTs). Site operations that are required to remove the USTs will include: 1) shoring to support excavation of soils between Building 1 and Building 8, 2) the excavation of petroleum hydrocarbon contaminated soil, 3) the transportation and disposal of the contaminated soils, 4) the removal and disposal of two underground storage tanks (USTs) and their contents, 5) soil sampling, 6) excavation backfilling and compaction, 7) shoring removal, and 8) site restoration.

This document provides a description of methods and procedures which will be employed during tank removal activities and outlines health and safety and sampling and analysis requirements associated with the project. This document delineates the responsibilities and procedures for all chemical sampling activities to assure that the analytical data obtained is of sufficient quality to meet intended uses and Applicable or Relevant and Appropriate Requirements (ARARs) within the project.

1.1 Purpose and Project Scope

The primary objective of this project is to remove two USTs and associated soil that was impacted by leaking USTs. Samples will be collected and analyzed to satisfy UST closure requirements of the Alameda County Environmental Health Department -Environmental Health Division and the Tri-Regional Guidelines.

The sequence of field events will be:

- Asphalt and Concrete Demolition;
- Installation and Operation of Dewatering System;
- Installation and Operation of Groundwater Treatment System;
- Installation of Shoring;
- Tank Content Profiling and Disposal;
- Tank Excavation and Disposal;
- Sampling and Testing;
- Backfill and Compaction;
- Installation of Asphalt; and
- Materials Testing.

1.2 Plan Organization

This Project Work Plan is organized according to the following major sections. Section 1 contains the Introduction. Section 2 describes the site and gives a site background. Section 3 explains the regulatory environment. Section 4 presents the project staffing including project

organization and subcontractors. Section 5 describes field activities. Section 6 presents the Field Sampling and Analytical Testing Plan. Section 7 explains the Treatment and Disposal of Project Wastes. Section 8 presents the Site Restoration activities. Section 9 presents References. The following appendices are also included:

- Appendix 1 - Previously Reported Data
- Appendix 2 - Site Safety and Health Plan
- Appendix 3 - Spill and Discharge Plan
- Appendix 4 - Hauling Routes, Transportation Routes, and Permits
- Appendix 5 - Alameda County Underground Tank Closure Plan
- Appendix 6 - EBMUD Wastewater Discharge Permit Application
- Appendix 7 - Dewatering Plan
- Appendix 8 - Shoring Plan

2.0 SITE DESCRIPTION AND BACKGROUND

The Alameda Federal Center is located in the northwest portion of the City of Alameda, approximately 500 feet east of the San Francisco Bay shoreline (Figure 1). It is situated in a relatively flat tidal plain area which slopes gently towards the Bay (southwest). The site covers an area of approximately 10 acres. The Alameda Federal Center maintains several buildings used for administrative office and storage functions (Figure 2). The focus of the activities conducted for this project will be located southeast of Building 1 and north of Building 8, as shown on Figure 3.

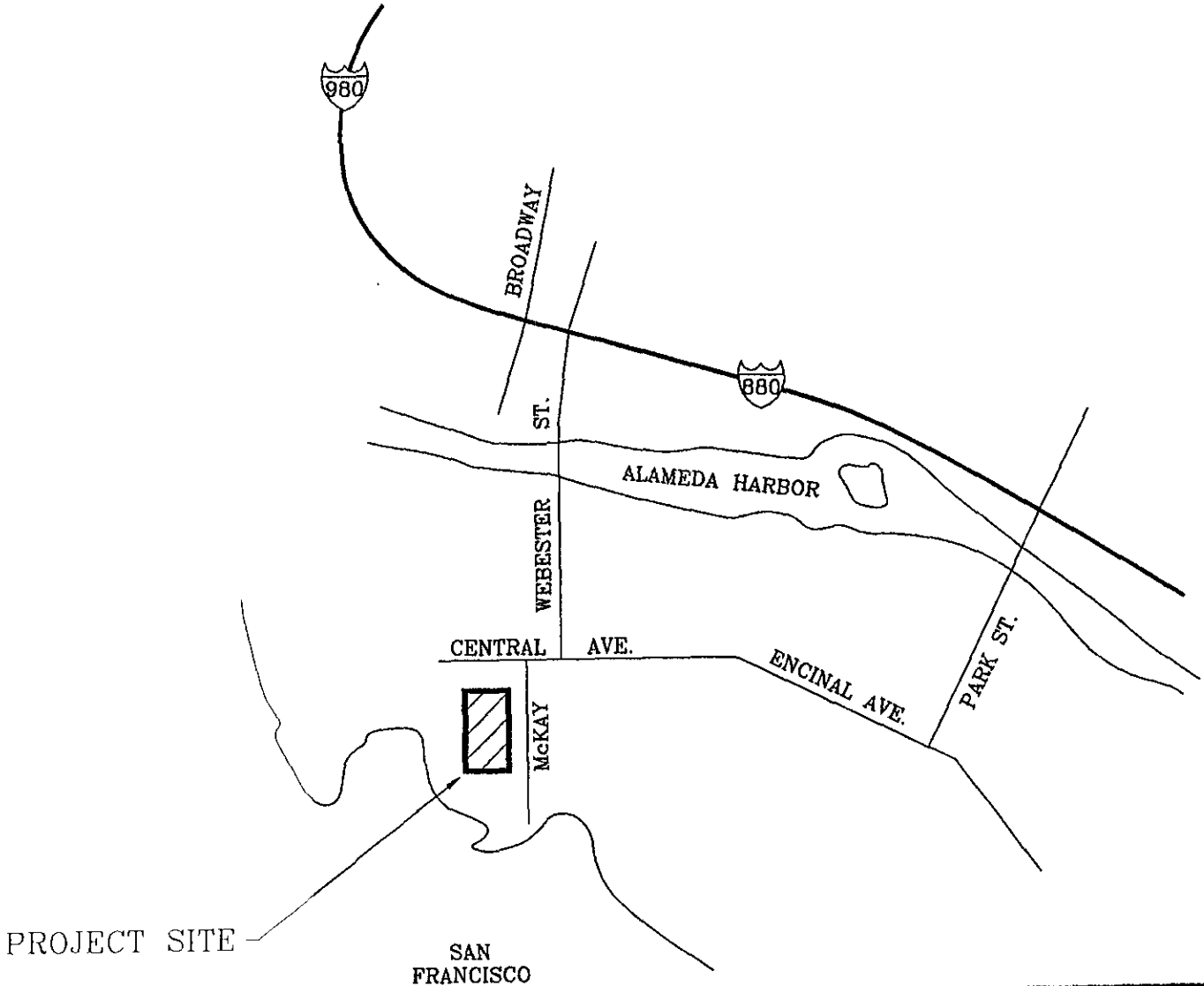
2.1 Existing Site Conditions

The USTs are currently overlain by a paved parking lot (Figure 3). Adjacent facilities include a parking area to the north, a residential recreation area to the west (including a swimming pool), Building 8 to the south, the intersection of South Cressy Drive and Richardson Avenue to the east, and Building 1 to the northwest.

It is likely that it will be necessary to cordon off the parking lot and the intersection during excavation activities.

2.2 Previous Environmental Investigations

A previous site assessment was conducted in 1995 by Cape Environmental. In its investigation, Cape found that the two USTs were reportedly decommissioned around 1950 and had been partially filled with sand. Previous investigation of tank contents indicated the presence of a approximately 4 inches of liquid (diesel and oil & grease) above approximately 8 feet of sand (Figure 4).



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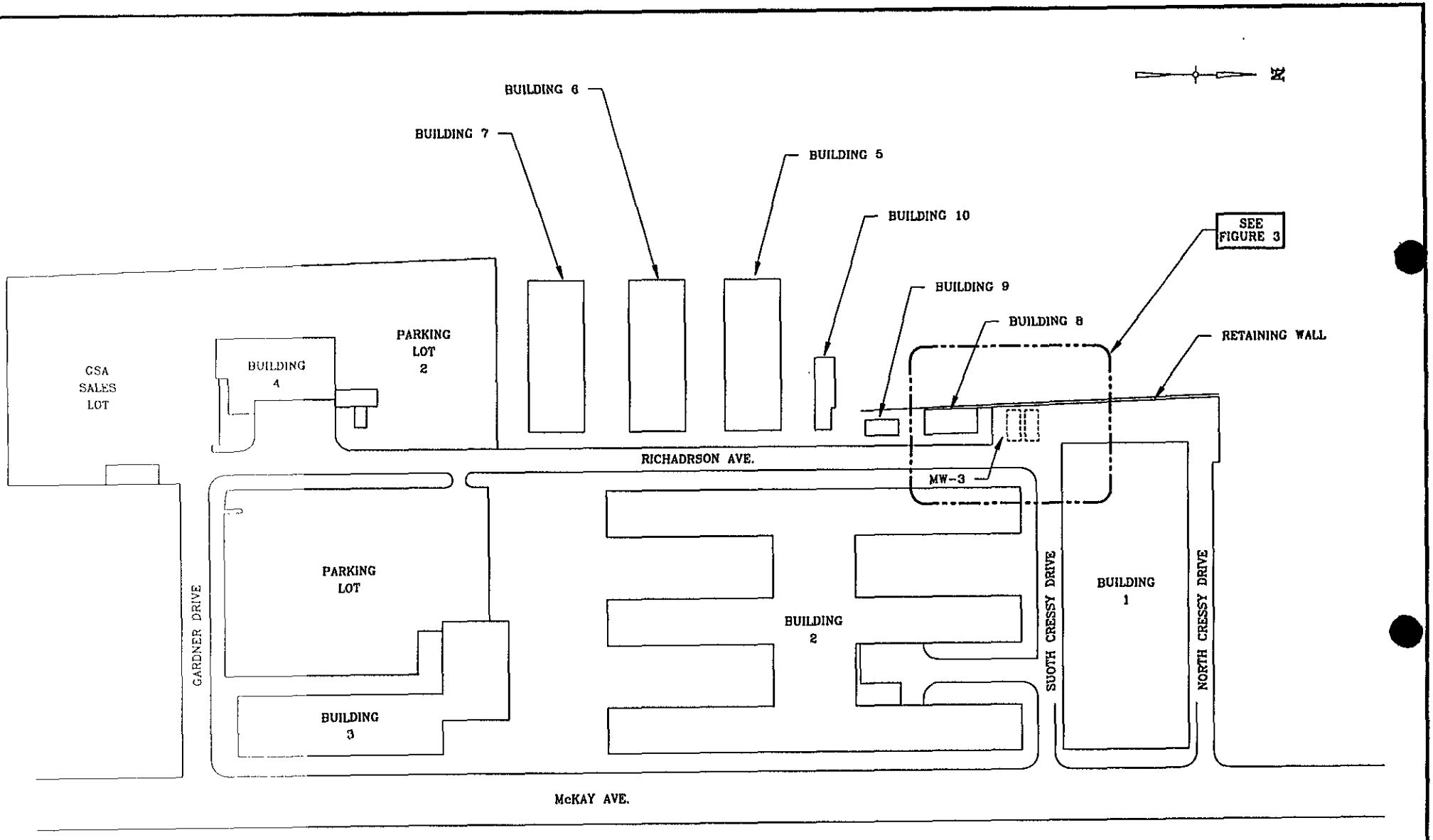
VICINITY MAP FOR THE REMOVAL OF (2) 10,000 UST's
ALAMEDA FEDERAL CENTER 620 CENTRAL AVE.
ALAMEDA, CA.

FIG 1



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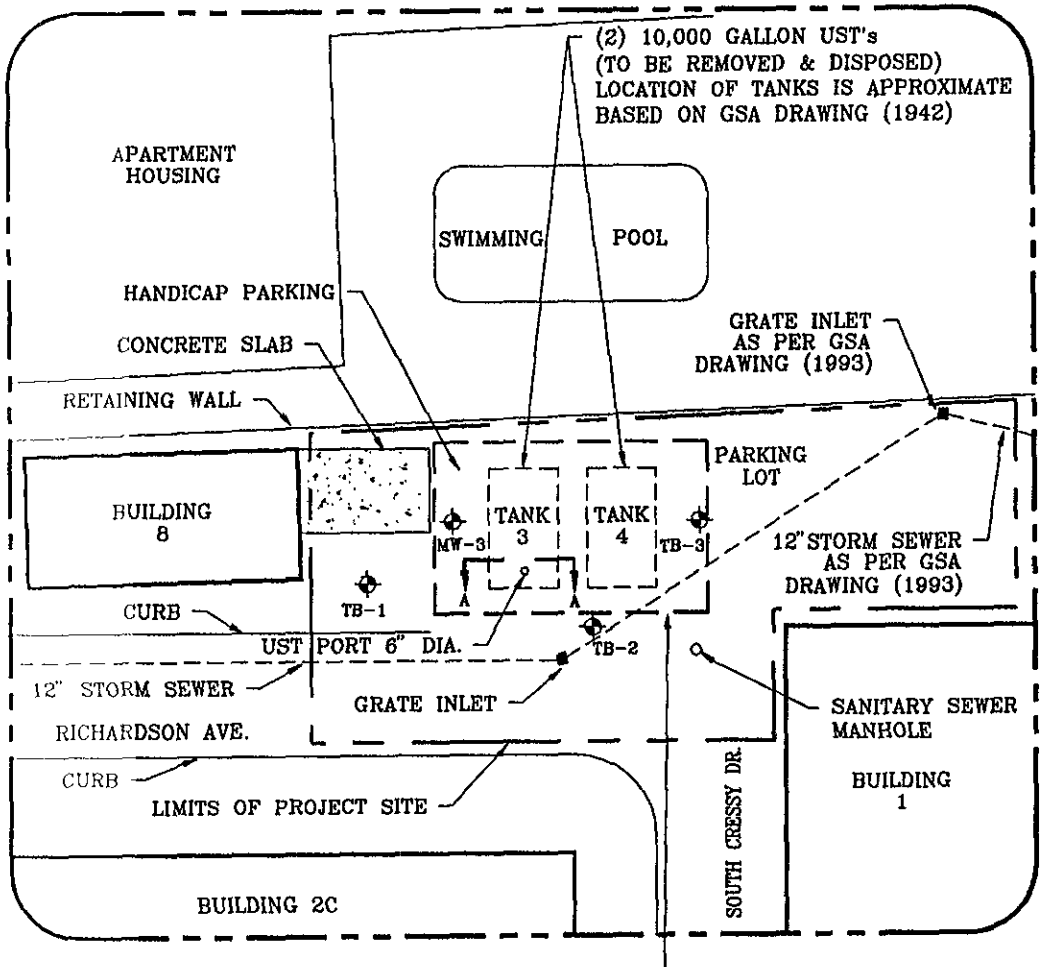
SITE PLAN FOR THE REMOVAL OF (2) 10,000 UST's
ALAMEDA FEDERAL CENTER 620 CENTRAL AVE.
ALAMEDA, CA.

FIG 2



NOTE:
CROSS SECTION A–A OF TANK #3
SEE FIGURE 4

SCALE
0' 5' 10' 15' 20' 25'

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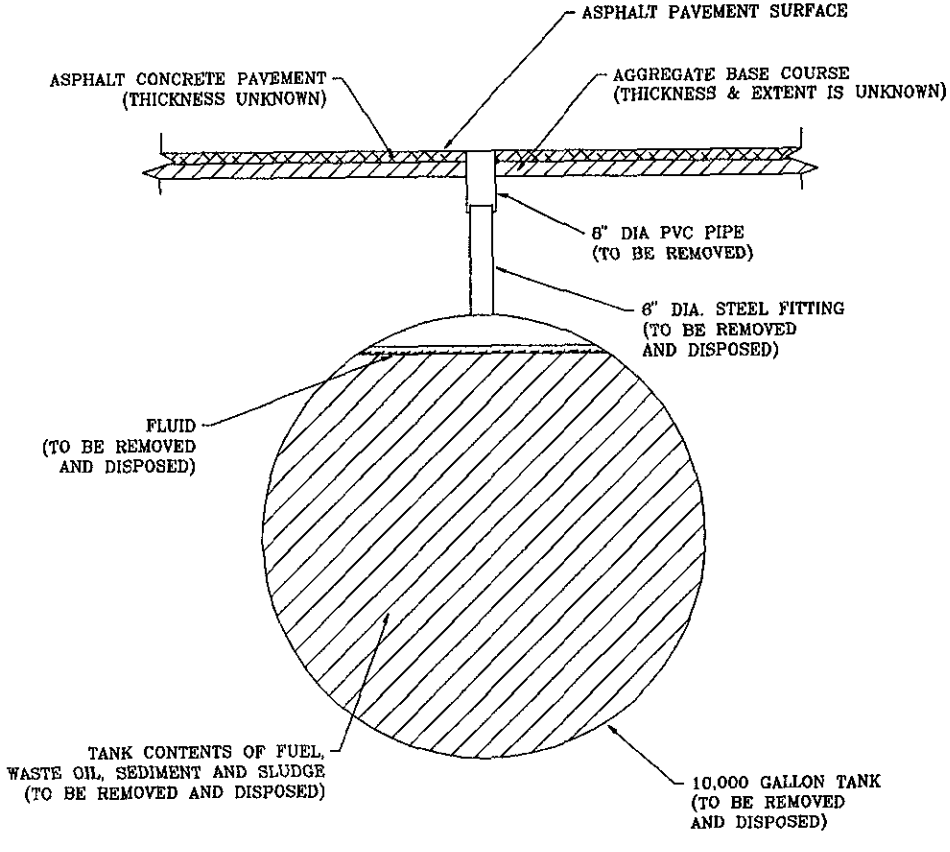
SITE MAP FOR THE REMOVAL OF (2) 10,000 UST's
ALAMEDA FEDERAL CENTER 620 CENTRAL AVE.
ALAMEDA, CA.

FIG 3



TANK # 3 CROSS SECTION A-A

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JOB NUMBER:	DRAWN BY:	DATED
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CROSS SECTION A-A OF TANK #3
ALAMEDA FEDERAL CENTER 620 CENTRAL AVE.
ALAMEDA, CA.

DWG# FIG 4

Three soil borings were completed in the area (TB-1 through TB-3). Soil samples collected from the borings were analyzed for oil & grease, total petroleum hydrocarbons (TPH), volatile halocarbons, and polynuclear aromatic hydrocarbons (PNAs). Results indicated some minor petroleum contamination of soil, consistent with a diesel source (see tables of previously reported data in Appendix 1). There was a small amount of floating petroleum product in MW-3, a down gradient well nearby. Groundwater samples collected from MW-3 indicated minor groundwater contamination, consistent with a diesel source (see tables of previously reported data in Appendix 1). The groundwater was encountered approximately 5 feet below ground surface (bgs). The groundwater gradient was 0.0025 ft/ft in the southerly direction.

Tank contents were sampled by TKS Inc. in 1994. Results indicated a small amount of liquid floating above approximately 8 feet of sand (see tables of previously reported data in Appendix 1). The liquid appears to be heavy hydrocarbon.

3.0 REGULATORY REQUIREMENTS AND PERMITS

This section identifies federal, state, and local regulations, including the issuance of permits, that govern the removal of USTs in the State of California. Regulations governing health and safety related activities can be found in the Health and Safety Plan in Appendix 2. Regulations and reporting requirements for spills can be found in the site specific Spill and Discharge Plan (Appendix 3).

3.1 UST Federal Regulations

3.1.1 UST Closure

Tank and pipeline closure will be conducted in accordance with the requirements of 40 CFR Part 280, Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks.

3.1.2 Identification of Hazardous Materials

Potentially hazardous materials including the USTs, UST liquids and sludges, contaminated soil, and contaminated rinse water will be profiled pursuant to the requirements of 40 CFR Part 261, Identification and Listing of Hazardous Waste.

3.1.3 Transportation and Disposal

Any material identified as hazardous waste will be transported in accordance with 40 CFR Part 263 and 49 CFR Part 171, Standards Applicable to Transporters of Hazardous Waste. Required

state licenses and permits and routes of transportation for hazardous wastes are included in Appendix 4.

3.2 State of California UST Regulations

In the State of California, UST closure projects are regulated under the State Water Resources Control Board and the local Regional Water Quality Control Board (RWQCB). The project is located within the Bay Area region of the RWQCB. In the City of Alameda, the UST Closure Program is implemented for RWQCB by Alameda County.

3.3 Local Requirements

Local agency implementation is conducted by the Alameda County Department of Environmental Health and the City of Alameda Fire Department. CAL INC has contacted both departments to obtain required UST removal permit applications. All permits will be completed pursuant to the local permitting agency. In general, CAL INC will notify the following local agencies prior to UST removal and sampling:

- Alameda County Department of Environmental Health - 30 days prior to UST removal
- City of Alameda Fire Department - 48 hours prior to UST removal

3.3.1 Alameda County Regulations

Alameda County requires the submission of a Underground Tank Closure Plan prior to UST removal. The Underground Tank Closure Plan submitted to Alameda County is included as Appendix 5.

3.3.2 City of Alameda Fire Department

The City of Alameda Fire Department requires approval of the Alameda County Underground Tank Closure Plan prior to conducting oversight of UST removal activities. The Fire Department also requires 48-hours notice prior to UST removal activities to begin.

3.3.2 EBMUD

During the excavation phase of the project, groundwater will be pumped from the area surrounding the USTs to dewater the excavation. East Bay Municipal Utility District (EBMUD) does not allow groundwater to be discharged to its wastewater treatment plant. However, EBMUD does allow waivers. CAL INC has requested a waiver and has applied for a discharge permit to discharge groundwater to the sanitary sewer. A copy of the Wastewater Discharge Permit Application submitted to EBMUD has been included as Appendix 6.

4.0 PROJECT STAFFING

This section discusses the organizational structure of CAL INC and all subcontractors involved in the project. The organizational structure establishes the chain of command, general responsibilities, and communication procedures that will be utilized by key individuals including quality control officers and all management personnel. A description of the responsibilities of key individuals and the procedures that will be employed to control work activities of subcontractors and suppliers has been developed and is presented in the following sections.

4.1 Project Organization

The following key management personnel were identified:

- Principal In Charge;
- Project Manager;
- Site Supervisor/Health and Safety Officer;
- Occupational Physician; and
- Laboratory Quality Assurance Officer

4.1.1 Principal In Charge - David Esparza

Principal in Charge - David Esparza, CAL INC. Mr. Esparza has managed and directed complex hazardous waste and related environmental projects for over 10 years. The primary responsibility of Mr. Esparza will be to assist the project manager with meeting the project requirements.

4.1.2 Project Manager - Joseph Krohn

Mr. Krohn has over 10 years professional experience conducting and managing remediation projects, Mr. Krohn's responsibilities will include: maintaining liaison with the GSA's project manager; keeping communication lines between the project team and regulatory agencies open and cooperative; and, ensuring the availability of the requisite CAL INC resources to meet task order needs;

4.1.3 Site Supervisor/Site Safety and Health Officer - Robert Barry

Mr. Barry brings over 5 years experience to this project in the areas of site characterization, soil and groundwater remediation, and project management. Mr. Barry's responsibilities will include, but may not be limited to, the following: providing overall direction and assistance to the CAL INC team task managers; day-to-day oversight of field activities; direct work performed under this contract and monitor compliance with applicable guidelines and/or regulations; provide

oversight and technical assistance to all subcontractors; and implementation of the Site Safety and Health Plan (SSHP).

4.1.4 Occupational Physician - Patricia Wiggins, MD

Dr. Wiggins is a licensed physician who is certified in occupational medicine by the American board of Preventive Medicine. She is familiar with the site's hazards and the scope of the project. Dr. Wiggins will be responsible for determination of medical surveillance protocols and for reviewing examination/test results in compliance with 40 CFR 1910.120 and the Specification.

4.1.5 Laboratory Quality Assurance Officer - Mr. Ed Morales

Mr. Morales will be the Laboratory's Quality Assurance Officer. He will be responsible for administration of the laboratory's QA/QC programs. These programs include sample delivery packages, PE, internal audits, QC samples and corrective action procedures.

4.2 Subcontractors

TABLE 1

Subcontractor Name	Activity
Pacific Excavators PO Box 968 Alamo, CA 94507 510 370-8783 510 939-9044 fax	Shoring Soil Excavation UST Removal Backfilling
Viking Drillers, Inc. 801 Northport Drive West Sacramento, CA 95691 916 372-4993	Dewatering
Wheelabrator Clean Water, Inc. 6611 San Leandro Street Oakland, CA 94621 800 659 1718	Water Treatment (Carbon Filtration System)
Superior Analytical Laboratory (SAL) 825 Arnold Drive, Suite 114 Martinez, CA 94553 800 521-6109 510 229-0916 fax	Analytical Testing Laboratory
Kleinfelder, Inc. 7133 Koll Center Parkway Suite 100 Pleasanton, California 94566 510 484 1700 510 484 2977 fax	Materials Testing Laboratory
To be determined	Asphalt Installation, Painting

5.0 FIELD ACTIVITIES

5.1 Introduction

This section delineates the operational sequence of field activities that will be employed in the excavation and removal of USTs. Scheduling information indicating milestones and target dates are also described in this section.

5.2 Scheduling and Operational Sequence

An operational sequence was developed based on the requirements provided in the project specification. A description of each operational sequence that will be employed during the UST removal process is presented in the sections below. A project schedule illustrating the sequence is given as Figure 5.

5.3 Asphalt and Concrete Demolition

An asphalt/concrete cutter will be used to cut asphalt and concrete, as necessary to expose the top of the USTs. The asphalt and concrete materials will be loaded into awaiting dump trucks and discarded as construction debris in the Richmond Landfill in Richmond, California.

5.4 Installation and Operation of Dewatering System

5.4.1 Well Installation

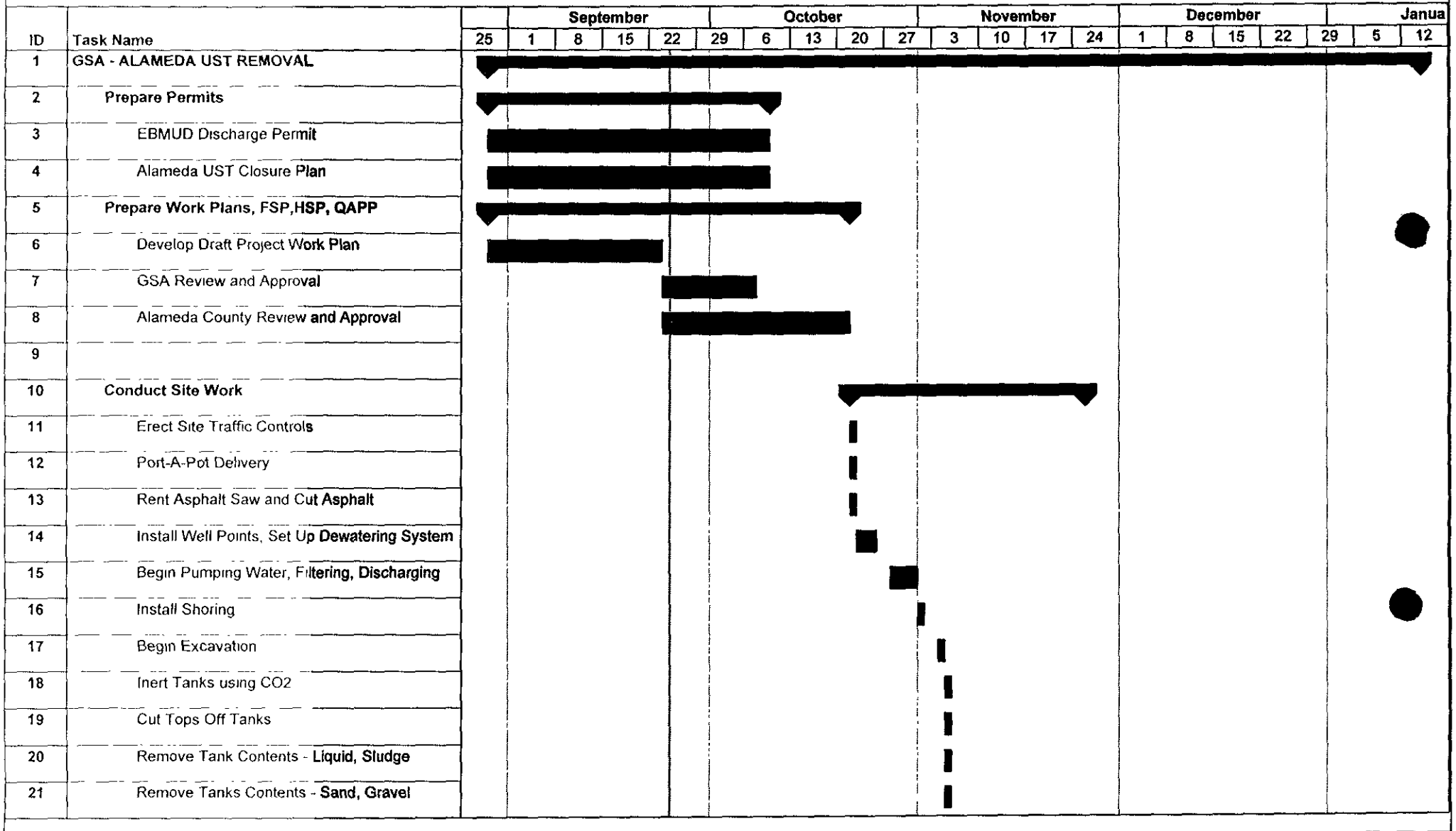
Temporary dewatering wells will be installed prior to excavation activities to lower the water table during the UST removal activities. A total of 12 two-inch diameter wells will be installed by Viking Drillers to a depth of approximately 20 feet at the locations shown in Figure 6. The wells will be installed inside a 6-inch diameter jetted borehole, and completed with a (#3) sand pack. The wells will be connected to a piping manifold and pumping system as shown on Figure 6. Appendix 7 contains details of the dewatering system.

5.4.2 Pump, Piping, Storage Tanks, and Equipment

Groundwater removed during dewatering activities will be pumped from the wells into a 20,000 gallon holding tank, as shown in Figure 6. Water from the holding tank will be pumped from the tank into a carbon filtration treatment system. The wells, tank, and treatment system will be connected together by a system of 2-inch flexible pipe and centrifugal pumps. The dewatering system will consist of:

- Twelve 2-inch diameter temporary dewatering well points
- Well point vacuum pump (25-250 gpm) system
- Two inch diameter PVC piping

FIGURE 5
PROJECT SCHEDULE



UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE, ALAMEDA, CA

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

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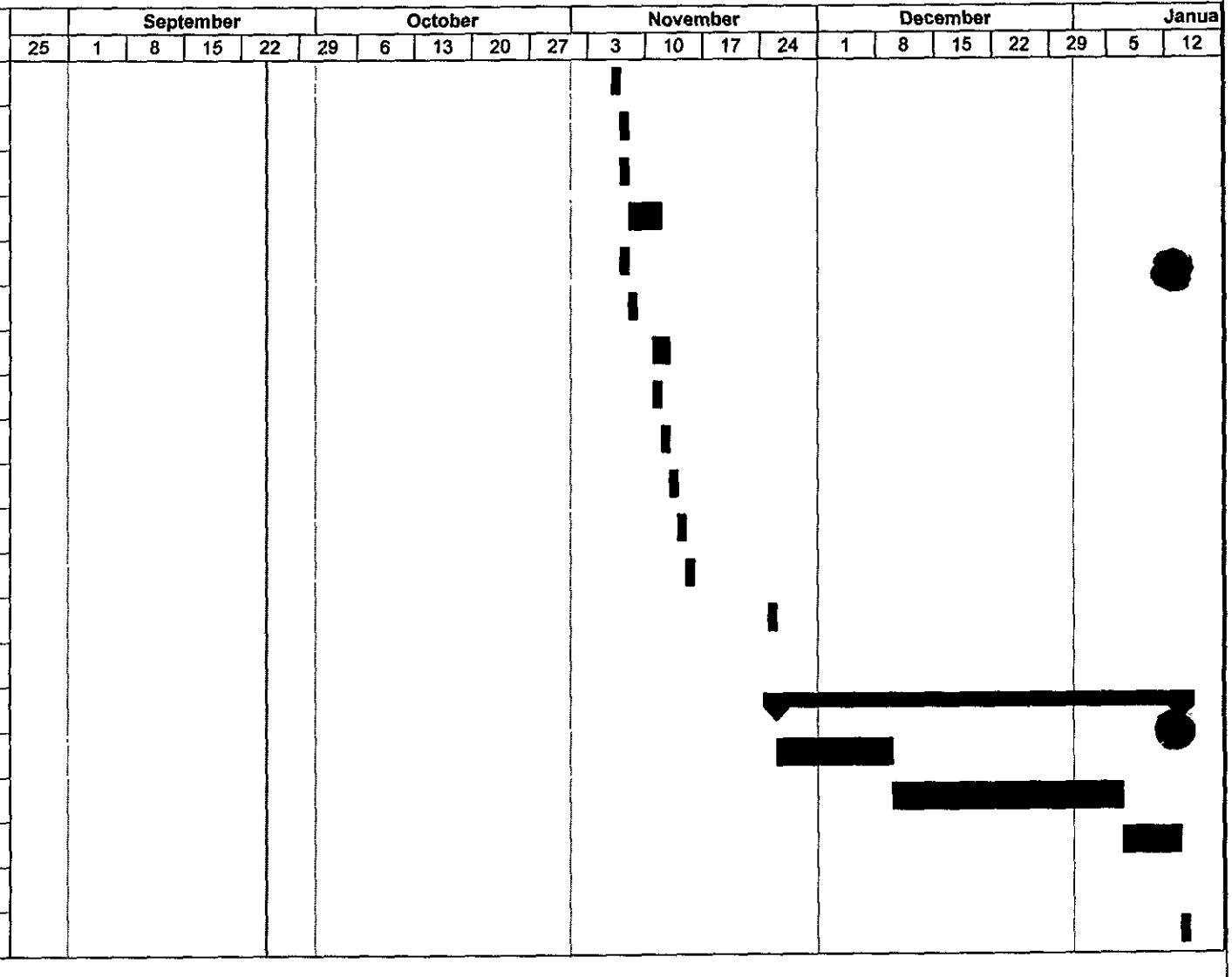
FIGURE 5
PROJECT SCHEDULE

ID	Task Name
22	Excavation for Tank Removal
23	Remove, Transport, and Dispose Tanks
24	Sampling Tank Contents
25	Analytical Results (Tank Contents)
26	Overexcavate Contaminated Soil
27	Sample Bottom of Excavation
28	Analytical Results (Excavation)
29	Remove Concrete Ballast
30	Backfill and Compaction
31	Install Aggregate Base Course
32	Install Asphalt Pavement
33	Port-A-Pot Removal
34	Install Parking Lot Striping
35	
36	Reporting
37	Develop Draft UST Closure Report
38	GSA and County Review
39	Finalize UST Closure Report
40	
41	Project Closeout



UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE, ALAMEDA, CA

Task
Progress
Milestone
Summary
Rolled Up Task
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Rolled Up Progress

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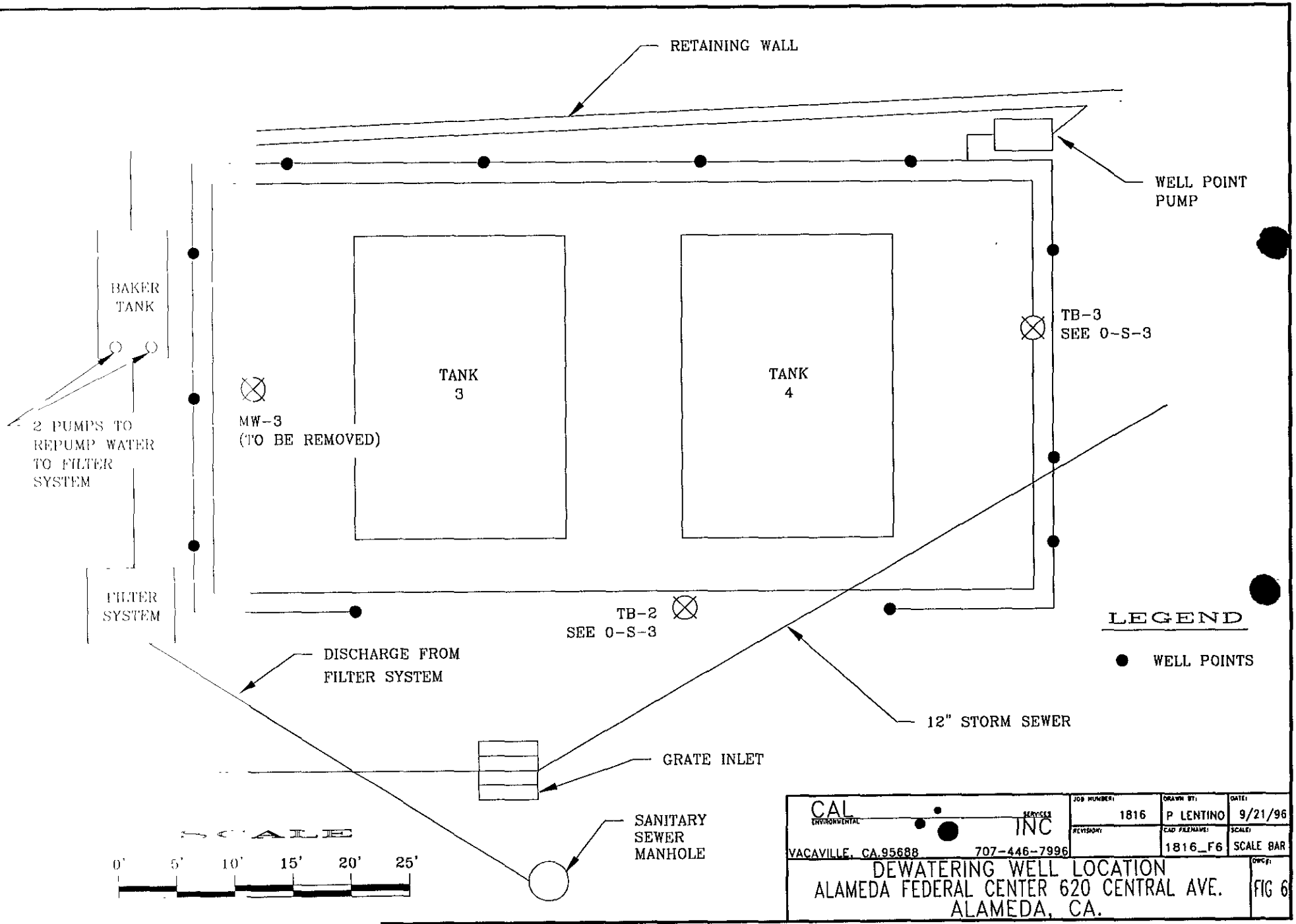

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DWG #: FIG 6

DEWATERING WELL LOCATION
ALAMEDA FEDERAL CENTER 620 CENTRAL AVE.
ALAMEDA, CA.

- 20,000 gallon temporary holding tank
- Two submersible water pumps held in holding tank (second pump is backup)
- 2-inch diameter flexible piping
- Two carbon filtration tanks linked in series
- 2-inch diameter flexible piping to discharge to the sanitary sewer manhole

5.4.3 Carbon Filtration System

The carbon filtration treatment system will be supplied by Wheelabrator Clean Water. The carbon filtration system will consist of two carbon filtration units linked in series. The water will pass from the holding tank, through the first carbon treatment unit, through the second carbon treatment unit and into the sanitary sewer. Carbon regeneration will occur after the excavation phase of the project.

5.4.4 Waste Stream Monitoring and Sampling

The groundwater treatment system will be monitored to ensure its efficient and proper functioning. Samples of water will be collected at the influent, after the first stage of filtration, and after the final stage of filtration. These samples will allow CAL INC to measure how effective the treatment system is working and whether the discharge limits established by EBMUD are being met.

A description of sampling locations and methodology is given in Section 6.

5.5 Installation and Operation of Groundwater Treatment System

5.5.1 Permits

EBMUD does not allow groundwater to be discharged to its wastewater treatment plant. However, EBMUD does allow waivers. CAL INC has requested a waiver and has applied for a discharge permit to discharge groundwater to the sanitary sewer. A copy of the Wastewater Discharge Permit Application submitted to EBMUD has been included as Appendix 6.

5.5.2 Equipment

Wheelabrator will supply all pumps, Carbon Treatment Units, and temporary holding tanks for the groundwater treatment system.

5.5.3 Carbon Reactivation

After the project is complete, the carbon treatment units will be reactivated at Westates' EPA RCRA permitted reactivation plant in Parker, Arizona. Reactivation will be conducted using a

thermal process that removes and destroys volatile and semi-volatile contaminants adsorbed onto the spent carbon. All reactivation services are concluded with the issuance of a Certificate of Reactivation, which will be included in the final report.

5.6 Installation of Shoring

As indicated in Figure 3, the limits of excavation will be adjacent to the existing buildings. As such, shoring will be installed prior to the excavation work. A detailed description of the proposed shoring is presented in Appendix 8. In general, the shoring plan will consist of the installation of sheet pile shoring to minimize sloughing and to provide support for the surrounding building and retaining wall. Shoring is not anticipated to disturb the existing storm sewer lines.

5.7 Tank Content Profiling and Disposal

5.7.1 Removal of Existing Liquids

Any liquids in the product piping in the area of the tanks will be drained into its associated tank, prior to removal. All product piping will be capped and/or removed. Caution will be taken to avoid any spillage. Any potential spillage will be addressed pursuant to the Spill and Discharge Plan (Appendix 3).

According to the Cape Report, a 4-inch thick product layer is currently located inside each UST. The tank liquids will be removed by Erickson, Inc., of Richmond, California, using a vacuum truck with a 4,500 gallon capacity. In order to ensure that the area of operation for the vacuum truck will be vapor-free, the truck will be positioned up-wind from the tanks and outside the path of probable vapor travel. Suction hoses will be grounded to the tank or otherwise grounded to prevent electrostatic ignition hazards. Vacuum exhaust gases will be discharged through a hose of adequate size and length with a minimum of 12 feet above grade.

5.7.2 Tank Inerting and Cutting

Solid carbon dioxide (dry ice) will be added to the tanks 16 hours prior to removal at the minimum rate of 15 pounds per 1,000 gallons of tank capacity. The dry ice will be added after all free liquids have been removed from the tanks as indicated in Section 5.7.1. The dry ice will be crushed and distributed evenly over the greatest possible area in the tanks. All dry ice will be evaporated before proceeding. Caution will be taken to prevent burns resulting from skin contact.

The tank atmospheres and the excavation area will be monitored for flammable or combustible vapor concentrations until the tanks are removed from the excavation and the site. A combustible gas indicator will be employed to screen for flammable/combustible atmospheres.

Both the lower explosive limit (LEL) and oxygen concentration (O2) will be less than 10 per cent prior to the tanks being cut open.

The USTs will be cut using a spark resistant saw after tank inerting is complete. The USTs will be cut and the tops removed to allow excavation of tank contents using a backhoe.

5.7.3 Removal of Tank Contents

The tank contents will be removed using a backhoe or excavator. In addition, a vacuum truck or Vactor rig may be used to remove the remaining solids from the USTs. Tank contents will be placed in bins and samples of the solid materials will be collected to evaluate disposal options. The tank contents will ultimately be transported to B & J Landfill for proper disposal (see Section 7).

5.8 Tank Excavation and Disposal

5.8.1 Tank Atmosphere Monitoring

The tank atmosphere and the excavation area will be regularly tested for flammable or combustible vapor concentrations until the tanks are removed from both the excavations and the site. A combustible gas indicator, calibrated to a hexane standard, will be employed to screen for flammable/combustible atmospheres. The inerted tanks will be monitored to ensure both oxygen and LEL readings remain below a maximum allowable percentage of 10% by volume. All monitoring will be performed at the top, bottom and middle areas of the tanks. The combustible gas indicator will be placed into the fill opening. All data will be recorded in accordance with the Site Safety and Health Plan (Appendix 2).

5.8.2 Tank Excavation

All excavation will be conducted in a manner that will limit the amount of potentially contaminated soil that could be mixed with uncontaminated soil. Excavated material which is visibly stained and which has an obvious petroleum odor will be stockpiled for sampling. Surface water diversion will be conducted pursuant to the Spill and Discharge Plan (Appendix 3).

5.8.3 Tank Lifting

The USTs will be lifted using an excavtor or crane with an adequately rated capacity. The USTs will be lifted by lifting eyes or straps (non-metallic) under the ends of the tanks. Personnel will be directed to remain away from the ends of the tanks and tanks will be positioned, whenever possible, with the ends oriented away from occupied or traveled areas.

5.8.4 UST Interior and Exterior Cleaning

In general, cleaning of the USTs will not be conducted on site. In lieu of on site cleaning, the USTs will be drained and inerted with dry ice, and transported to Erickson's TSD facility in Richmond, California for cleaning.

After the USTs are lifted from the excavation, any loose soil will be removed from the tank surface. Soil will be removed using non-sparking tools. Uncontaminated soil removed from the exterior will be segregated from soil believed to be contaminated.

5.8.5 Tank Labeling

After the tank exteriors are cleaned and prior to removal from the site, the tanks will be labeled with fluorescent spray paint in legible letters at least 2 inches in height as follows:

TANK HAS CONTAINED DIESEL FUEL
NOT VAPOR FREE
NOT SUITABLE FOR STORAGE OF FOOD OR
LIQUIDS INTENDED FOR HUMAN OR ANIMAL CONSUMPTION

DATE OF REMOVAL: MONTH / DATE / YEAR

5.8.6 Equipment Decontamination

All sampling equipment and tools that will come in contact with sample media will be decontaminated. All heavy equipment that comes in contact with contaminated media will be decontaminated. The decontamination process will be recorded in the field log book.

5.9 Excavated Soils Handling

All soil excavation work will be conducted using either a backhoe or excavator. In general, the excavation work will consist of the removal, stockpiling, and testing of clean overburden soils, and the removal, stockpiling, and testing of contaminated soil. A discussion of the procedures used during the excavation activities is presented in the following sections.

5.9.1 Soil Staging Area and Equipment

A staging area for the stockpiling of excavated soils will be identified prior to excavation activities. The excavated soils will be held in 20 cubic yard storage bins. It is anticipated that the staging area will be located in the parking lot south of Building 4 (GSA Sales Lot). However, the actual location will be determined by the CO during the field activities. Soil removed during the excavation activities will be stockpiled in the staging area. Contaminated soil will be

segregated from uncontaminated soil. Unwanted run on/runoff of water will be prevented as described in the Spill and Discharge Control Plan (Appendix 3).

5.9.2 Excavated Soils Monitoring

Excavated soils will be segregated into "clean" and contaminated piles based on field screening. Personnel performing monitoring operations will possess valid 40 hour training per 29 CFR 1910.120 with sufficient training in OVA/OVM equipment. The equipment to be used consists of Thermo Environmental photoionization detector (PID) equipped with a 10.2 eV lamp for OVA monitoring. Oxygen deficiency and explosive conditions are to be monitored with a Gastech combustible gas indicator. In general, soils exhibiting concentrations of 10 ppm or greater will be considered contaminated, and will be stockpiled separately.

In addition to the above instrumental monitoring, the excavated soil will be continuously observed for soil staining, color changes, petroleum type odors, etc. Primary screening of soils exhibiting unusual coloration, staining or odors but do not register readings on the PID will be immediately brought to the attention of the Contracting Officer.

5.9.3 Clean Soils

Soils indicated to be "clean" by the field screening will be stockpiled separately from those soils indicated to be contaminated (PID concentrations greater than 10 ppm). Clean soils, soils with no detectable concentrations of TPH-D or BTEX will be used as backfill material in accordance with Section 02088 of the project specifications. All backfill will be compacted mechanically and tested for compaction percentage based on tests using a nuclear gauge.

5.9.4 Contaminated Soils

Contaminated soils will be temporarily stockpiled in the staging area. As previously indicated, contaminated soil will not be used as backfill material. Contaminated soil will be hauled to the B & J Landfill upon authorization from the Contracting Officer.

Contaminated soils will be handled in such a manner as to minimize the release of volatile organic compounds. This will include carefully placing the soil in storage bins after excavation, protection from high winds, etc.

6.0 FIELD SAMPLING AND ANALYTICAL TESTING PLAN

This section provides a description of methods and procedures which will be employed for sampling and analysis associated with the project. This section delineates the responsibilities and procedures for all chemical sampling activities to assure that the analytical data obtained is of sufficient quality to meet intended uses and data quality objectives (DQOs) for the project.

6.1 Data Quality Objectives

The purpose of DQOs is to guide decisions and processes for collecting, analyzing, and evaluating data to satisfy the overall project objectives. Some general considerations used to establish DQOs are:

- Reasons environmental data are needed and how they will be used;
- Consequences of an incorrect decision attributable to inadequate or invalid environmental data; and
- Level of uncertainty in the results derived from the environmental data that the decision maker is willing to accept.

Additionally, the appropriateness of DQOs is essential to the field sampling and analytical testing plan development process and includes, but is not limited to, specifying these items:

- Sample locations and frequency;
- Sample collection procedures;
- Sample handling procedures;
- Chemicals to be measured; and
- Analytical methods to be used to measure the chemicals.

The following subsections define the overall DQOs for the field investigation including data types and uses, data quality needs, and data quality indicators.

6.1.1 Project Objectives

The objective of this project is the removal and disposal of two 10,000 gallon storage tanks (USTs). Samples will be collected and analyzed to satisfy UST closure requirements of the Alameda County Department of Environmental Health. In addition, samples will be collected from waste products including contaminated soil and liquids to determine appropriate disposal options.

6.1.2 Data Quality Needs

The components for defining data quality needs include:

- Identification of contaminants or classes of contaminants of concern;
- Determination of appropriate analytical levels;
- Identification of levels of concern, such as DQOs, and associated detection limit requirements

6.1.2.1 Identification of Site Contaminants

Soil and groundwater contamination has been detected in soils and groundwater in the vicinity of Tanks 3 and 4. Appendix 1 contains tables of previously reported data. Samples from soil borings contained TPH-D, polynuclear aromatic hydrocarbons (PNAs), and oil and grease (O&G) at moderate concentrations. O&G was detected in soil boring TB-2 at 520 mg/kg at the 10 feet level. TPH-d was detected in soil boring TB-3 at 42 mg/kg at the 10 foot level. The maximum concentration was 2600 µg/kg pyrene in soil boring TB-3 from the 10 foot level. O&G was detected in soil boring TB-3 between 120 and 150 mg/kg from each of 3 samples between 5 and 15 feet below ground surface. Based on these data, the primary contaminants of concern at the site are constituents of diesel including TPH-D, PNAs, and O&G.

In 1995, groundwater near the USTs contained a very thin layer of free floating product (0.005 feet) in MW-3, a down gradient well nearby. Groundwater samples collected from MW-3 contained TPH-D, at a concentration of 92 µg/L. Groundwater was encountered approximately 5 feet bgs. The groundwater gradient was 0.0025 ft/ft in the southerly direction.

6.1.2.2 Appropriate Analytical Level

The intended use of the data will dictate the appropriate data category: screening or definitive. Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Screening data provide analyte identification and quantitation, although the quantitation may be relatively imprecise. Definitive data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration.

Definitive data was identified as the appropriate level for all laboratory analytical data for this project. According to the USEPA (1987), this analytical level measures organics and inorganics using USEPA procedures and should produce data that can be used in the following tasks:

- Risk assessment
- Site characterization
- Alternative evaluation
- Engineering design
- Monitoring during implementation

If DQOs change or evolve, an alternative analytical method may be used after it has been approved by the GSA. Any change in DQOs will be documented in the project record.

6.1.2.3 Levels of Concern and Analytical Detection Limits

According to the USEPA (1987): "The level of concern specifies a concentration range above which some action may need to be taken. The level of concern is intimately linked with the

action level, which defines the 'level of cleanup' for remedial activities under Superfund Amendments and Reauthorization Act (SARA) of 1986. In general, levels of concern are site-specific issues and relate to site characterization and assessment. The ARARs as mandated by SARA, are related to defining remedial design criteria and legal requirements.

The level of concern selected directly affects data quality requirements. The sampling and analysis methods used must be accurate at the level of concern. Since sampling accuracy is hard to evaluate or control, it is extremely important that the analytical technique chosen has a detection limit well below the level of concern.

6.2 Sampling Plan

This section presents CAL INC's proposed sample collection plan. All samples will be collected in accordance with state and Federal LUST guidance and with Alameda County Environmental Health. All work conducted during this project will be conducted in accordance with the site specific health and safety plan, presented in Appendix 2. A detailed description of the proposed sampling program is presented in the following sections.

6.2.1 Sample Collection

6.2.1.1 Excavation Soil Sampling

The purpose of soil sampling is to evaluate the presence or absence of soil contamination associated with the USTs, evaluate disposal options for potentially contaminated soil, and to conform with regulations. The proposed soil sampling locations and frequency at the USTs are consistent with RWQCB and Alameda County tank closure sampling criteria.

In general, the soil sampling program will consist of collecting two samples per tank; one sample collected from each end of each tank. The soil samples in the UST excavation will be collected just below the concrete ballasts. One sample per 20 feet of piping will also be collected. Undisturbed samples will be collected for potential laboratory analysis using a slide hammer sampler with brass or stainless steel tubes. Additional samples may be collected if evidence of notable contamination is found during excavation.

A summary of the proposed analytical program is presented in Section 6.3. Samples will be analyzed for TPH-G (EPA 8015 M); TPH-D (EPA 8015 M), BTEX (EPA 602), SVOCs (EPA 8270), VOCs (EPA 8240), O&G (SMWW 5520); and the California Assessment Metals (CAM 5 Metals) Cadmium, Chromium, Lead, Zinc, and Nickel.

The soil samples will be collected into 2-inch diameter, 6-inch long brass tubes using a stainless steel barrel sampler. The sampler will be driven by hand or by using a slide hammer into the soil. Upon collection, the sample container will be sealed with Teflon tape and plastic end caps.

The sample will be appropriately labeled, and placed in a cooler of ice with an appropriate chain of custody form.

6.2.1.2 Stockpile Soil Samples

Samples of stockpiled soil will be collected to determine if the soil is suitable for backfill. Stockpile samples will be collected from stockpiled soils resulting from excavation. Samples will be collected in accordance with the Tri-Regional Guidelines and with those of Alameda County Environmental Health. Composite samples will be collected for potential laboratory analysis using a slide hammer sampler with brass or stainless steel tubes, as described above.

One sample per 50 cubic yards will be collected and submitted for chemical analysis. A summary of the proposed analytical program is presented in Section 6.3. Samples will be analyzed for TPH-G (EPA 8015 M); TPH-D (EPA 8015 M), BTEX (EPA 602), SVOCs (EPA 8270), VOCs (EPA 8240), O&G (SMWW 5520); and California Assessment Metals (CAM 5 Metals). Four sample locations will be selected randomly from within each 50 cubic yard stockpile.

The sampler container will be driven by hand or by using a slide hammer into the stockpiled soil. Upon collection, the sample container will be sealed with Teflon tape and plastic end caps. The sample will be appropriately labeled, and placed in a cooler of ice with an appropriate chain of custody form.

6.2.1.3 Groundwater Samples

Groundwater samples will be collected from various points throughout the treatment system to evaluate the effectiveness of the treatment process. Groundwater generated during the dewatering will be pumped into a 20,000 gallon temporary holding tank. The groundwater will then be pumped through two carbon treatment units to remove any residual petroleum contamination. Groundwater samples will be collected prior to treatment from the temporary holding tank using a disposable bailer. Post-treatment groundwater samples will also be collected from "downstream" of each of the carbon treatment units. Samples will be collected from sampling ports installed in the piping between the treatment units. It is anticipated that the treatment system will be monitored at least once per week. Groundwater samples will be analyzed for TPH-D (EPA 8015 M), BTEX (EPA 8020), and O&G (SMWW 5520).

6.2.1.4 Tank Contents Samples

Samples of the contents from Tanks 3 & 4 will also be collected, as necessary, to evaluate disposal options. The tanks reportedly contain approximately 8 feet of sand and sludge on the bottom (approximately 200 cubic yards), and approximately 4 inches of liquid (approximately 32 gallons) floating above the sand (Cape Environmental). The liquids can be disposed of without profiling. However, the remaining solids and sludges will require analytical testing prior to

disposal. The solids from the tanks will be sampled and analyzed for TPH-G (EPA 8015 M); TPH-D (EPA 8015 M), BTEX (EPA 602), SVOCs (EPA 8270), VOCs (EPA 8240), O&G (SMWW 5520); and California Assessment Metals (CAM 5 Metals)

6.2.1.5 Calibration and Maintenance of Field Equipment

All field equipment will be calibrated prior to use. Calibration information will be recorded in the field log book. Measurement equipment to be used during field activities includes a PID and a combustible gas indicator (CGI). Calibration procedures for each piece of equipment are described below.

Photoionization Detector. Calibration of each PID with standard calibration gas will be conducted by CAL INC. personnel at least once a day. The type of gas used in the calibration of the PID will be recorded and submitted with any PID data. The PID will be used to measure the deviation of atmospheric concentration from background levels. At each site the upwind areas will be selected for a background measurement on a daily basis.

Combined Combustible Gas Indicator/Oxygen Meter. The combined combustible gas indicator/oxygen meter (CGI/O2) will be used during drilling operations at petroleum hydrocarbon contaminated sites that may contain potentially explosive atmospheres. Calibration of the CGI with standard calibration gas will be conducted by CAL INC. personnel on a bimonthly basis.

Detailed information regarding maintenance and servicing is available in the operation manual for each meter used. Servicing and maintenance information will be recorded in field log books.

6.2.2 Sample Containers and Cleaning Procedures

Sealed samples will be labeled to identify the location, time and date of sampling, nature (grab or composite), sample number, depth, analyses to be performed, and the sampler's initials. The soil samples will be collected in new, wide-mouth glass jars or clean brass or stainless steel tubes, which will be sent to the laboratory for chemical analyses. All groundwater samples will have Teflon-lined lids. Superior Analytical Laboratory (SAL) purchases clean sample containers from I-CHEM Research or Eagle-Pitcher.

6.2.3 Decontamination and Cleaning

The purpose of decontamination and cleaning procedures during excavation and sampling is to prevent foreign contamination of the samples and cross contamination between sampling sites. Excavation and sampling equipment will be decontaminated using a non-phosphate detergent such as Liquinox or its equivalent. A tap water rinse will follow to remove any remaining detergent solution. A double distilled water rinse will be performed to remove any residual

chemical on the sampling equipment. The following item-specific decontamination procedures will be observed:

Excavation Equipment--Steam clean after all excavation work is complete.
Samplers--Detergent wash followed by a double distilled water rinse between each use.

Fluids and solids generated from the decontamination processes will be properly labeled and handled.

6.2.4 Sample Preservation

As each sample is collected, it will be stored in an appropriately sized, durable ice chest containing "wet" ice or synthetic ice. All "wet" and synthetic ice will be sealed in double plastic bags to prevent leakage. A maximum/minimum thermometer and a temperature blank, will be placed inside the cooler prior to sample collection to monitoring the cooler temperature until it arrives at the laboratory where the temperatures will be recorded and submitted with QA/QC data. Chemical preservatives will be added to the water sample bottles as appropriate at the laboratory prior to shipment.

6.2.5 Sample Transportation and Custody

At the end of each day of sample collection, all samples will be repackaged with fresh ice and packing material. Ice chests used for transporting samples will be waterproof and will be made of metal or plastic. Before packing samples, approximately 3 inches of inert cushioning material will be placed on the bottom of the ice chest. Samples will be packed upright and in such a way that they do not and will not touch during shipment. The ice chests will be filled completely with packing material and ice. Chain-of-custody forms will be signed and sealed in "zip-lock" plastic bags and affixed to the top, inside lid of the ice chest. The ice chest will be secured by wrapping strapping tape around both ends. If there is a drain in the ice chest, it will be taped shut. A shipping label will be affixed to the top of the chest. Labels indicating "This Side Up" and "Fragile" will also be affixed to the top of the chest. Custody seals will be affixed to the right front and back left side of the cooler at the crack along the lid. The seals will be signed and dated and covered with clear tape.

All samples collected will be shipped via an overnight courier service (e.g., UPS Next Day Air) to the appropriate laboratory. No samples will be held on site for more than 24 hours except during weekend field activities or on holidays when overnight shipment is not available. Samples collected on the weekend will be stored under refrigeration between temperatures of 2 degrees C and 6 degrees C and shipped the following Monday. These samples will be locked in a secure area. A thermometer will be kept inside the refrigerator to monitor the temperature. Samples will not be collected on the weekend if they require analyses with holding times of 48 hours or less. CAL INC will notify the laboratory receiving samples one week prior to the first delivery of samples and at least 24 hours prior to any Saturday delivery.

6.2.6 Chain of Custody Procedures

Chain-of-custody procedures will allow for the tracing of possession and handling of individual samples from the time of field collection through laboratory analysis. Documentation of custody is accomplished through a chain-of-custody record, that lists each sample and the names of individuals responsible for sample collection, shipment, and receipt. A sample is considered in custody if it is:

- In a person's possession.
- In view after being, in physical possession.
- Locked or sealed so that no one can tamper with it after having been in physical custody.
- In a secured area, restricted to authorized personnel.

Sampling personnel will ensure their activities and procedures comply with the above points to maintain custody of the samples.

Samples submitted to SAL will include the chain-of-custody records. The chain-of-custody record will be properly signed and the date of collection and shipment recorded, along with the sample site identifications and requested analyses for each sample. The laboratory will also use a cooler receipt form to document the condition of samples on arrival at the laboratory. Examples of the chain of custody and cooler receipt forms are presented as Figures 7 and 8, respectively.

6.2.7 Sample Information Documentation

Sample documentation includes project log books. Additional documentation associated with laboratory activities is described later in this section.

A label will be affixed to all sample bottles, jars, and sleeves. The sample label will be marked in indelible ink with the field sample number and other required information. All labels used on the containers will be of a permanent type that will remain intact and affixed even if the label gets saturated due to condensation or if an ice bag leaks. The sample register will be filled out with the appropriate information.

A sample label will be affixed to all sample containers, and completed with the following information written in indelible ink:

The sample labels will identify the sample location, sample identification number, depth, analyte, date, time of sampling, and sample preservation methods. Time of sampling and depth will be added after the sample is collected.

CAL INC

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CHAIN OF CUSTODY

PROJECT NAME AND DESCRIPTION _____

PROJECT LOCATION _____

SAMPLING CREW _____

Matrix				Number of Containers and Preservative Information									Date				Sample Number
Water	Soil			Glass Jar	2-inch Brass Tube	VOA - HCL	1 Liter Amber Unpreserved	1 Liter Amber - HCL	1 Liter Plastic - HNO3	1 Liter Plastic - Unpreserved			Year	Month	Day	Time	Sample Description

Analyses																			
EPA 418.1	EPA 8010	EPA 8015M	EPA 8020	EPA 8080	EPA 8240	EPA 8270	TPH-G + BTEX	TTLC Metals	STLC Metals	STLC Lead	TTLC Lead	pH	Specific Conductance		24 Hour TAT	48 Hour TAT	Regular Lab TAT	Other TAT ( )

LABORATORY NAME AND ADDRESS

_____

_____

_____

_____

CHAIN OF CUSTODY RECORD

Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time
Airbill Number:	Date/Time	Received By Lab:	Date/Time

Please Deliver Analytical Results to:

Project Manager _____

CAL INC

2040 Peabody Road, Suite 400

Vacaville, California 95687

(707) 446-7996

(707) 446-4906 facsimile

SPECIAL INSTRUCTIONS

Figure 7

COOLER RECEIPT FORM

DELIVERY OF ORIGINAL REPORT

Date Checked_____
Lab Number _____

SAMPLE CONDITION UPON RECEIPT

Yes	No	
—	—	Is chain of custody form provided?
—	—	Are sample container custody seals intact?
—	—	Do number of sample containers agree with COC? If no explain.
		_____
—	—	Measured temperature 4 ± 2 °C? _____was temperature on arrival.
—	—	Are there any leaky or broken containers? If so, which ones?
		_____
—	—	Bottles labelled
—	—	Labels agree with COC form
—	—	Bottles correct for type of sample
—	—	Sample volume adequate for required tests
—	—	Preservatives added where required
—	—	Check sample I.D. spelling
—	—	Check date sampled
—	—	Cross check ID and requested test
—	—	Check to see if correct matrix is printed
—	—	Make sure C.O.C. is signed and dated
—	—	Check billing address
—	—	Check report address
—	—	Make sure all rushes and expedites are stamped
—	—	Check date received
—	—	Check due date
—	—	Make sure matrix and reagent spike are present
—	—	Insert any QA/QC or contract summary sheets
—	—	Include sample custodian C.O.C. checklist an shipping receipts on clipboard
—	—	COC number assigned and entered
—	—	Site ID/field number assigned and entered in logbook
—	—	Label on bottle annotated with COC number
—	—	pH of all non-volatile preserved liquid samples

SUPERVISOR OR PROJECT MANAGER SIGN BELOW

_____ Verify information correct

Corrective Action to be taken

_____
_____
_____
_____

Figure 8

6.3 Laboratory Analytical Procedures

The following section outlines the project laboratory and analytical requirements for this project. Analytical methods that may be used to analyze samples include TPH-G, (EPA 8015 M), TPH-D (EPA 8015 M), BTEX (EPA 602/8020), SVOCs (EPA 8270), VOCs (EPA 8240), CAM 5 Metals, and O&G (SMWW 5520). Analytical methods to be used are described in the following documents: Test Methods for Evaluating Solid Waste SW-846 (SW-846), third edition (USEPA, 1986); USEPA Methods for Chemical Analysis of Water and Wastes (USEPA, 1983); Standard Methods for the Examination of Water and Wastewater (SMWW), 17th edition (APHA, 1989); EPA 600/M4-82020, December 1982; Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039 (USEPA, 1988).

Actual sample reporting limits may be higher due to sample dilutions or matrix interference. Samples requiring dilutions are typically due to high concentrations of target compounds or to bring detected levels within the range of calibration. In these instances, the reason for the raised reporting limit will be described in the case narratives. Results of the original and diluted runs will be reported.

6.3.1 Analytical Methods

All soil and groundwater samples will be analyzed by Superior Analytical Laboratory (SAL), Martinez, California. SAL is certified by the State of California Department of Health Services (DHS) to conduct the analyses included in the analytical program. The soil and/or groundwater samples collected during the investigation will be analyzed for the following:

- Total Petroleum Hydrocarbons (TPH)-Gasoline (EPA 8015M);
- Total Petroleum Hydrocarbons (TPH)-Diesel (EPA 8015M);
- Benzene, toluene, ethyl benzene, and total xylenes (BTEX - EPA 602/8020);
- Semi-Volatile Organic Compounds (EPA 8270);
- Volatile Organic Compounds (EPA 8240);
- CAM 5 Metals (Cadmium, Chromium, Lead, Zinc, Nickel);
- Oil and Grease (SMWW 5530);

The analytical program described above was designed to meet requirements of Alameda County for clean closures of USTs. Table 2 below presents a summary of the proposed analytical program for the investigation.

TABLE 2
SAMPLING AND ANALYTICAL PROGRAM

Sample Location/Type	Matrix	Number of Samples	Analysis
Excavation Bottom	Soil	4	TPH-G (EPA 8015 M) TPH-D (EPA 8015 M) BTEX (EPA 602) SVOCs (EPA 8270), VOCs (EPA 8240) CAM 5 Metals O&G (SMWW 5520)
Stockpiled Soil	Soil	6 composite	TPH-G (EPA 8015 M) TPH-D (EPA 8015 M) BTEX (EPA 602) SVOCs (EPA 8270), VOCs (EPA 8240) CAM 5 Metals O&G (SMWW 5520)
Groundwater Treatment System	Water	3 per week	TPH-D (EPA 8015 M) BTEX O&G
Tank Contents	Soil or Sludge	2	TPH-G (EPA 8015 M) TPH-D (EPA 8015 M) BTEX (EPA 602) SVOCs (EPA 8270), VOCs (EPA 8240) CAM 5 Metals O&G (SMWW 5520)

6.3.2 Rationale

The project objective is the removal and disposal of two 10,000 gallon storage tanks (USTs). An additional objective is to evaluate whether soil and groundwater beneath the site has been impacted by the USTs and, if impacted, to evaluate disposal options for contaminated soil. Based on the Preliminary Assessment conducted by Cape Environmental diesel fuel was the most likely product stored in the tanks. However, since the actual tank contents are unknown, the analytical program was designed to meet requirements of the RWQCB Tri-Regional Guidelines for closure of diesel, waste oil, and unknown tanks.

The analytical program proposed herein is consistent with the Specification under Solicitation number GS-09P-96-KZC-0013. In addition, the analytical program also meets RWQCB and Alameda County requirements for closure of diesel and waste oil USTs.

6.4 Laboratory QA/QC Procedures

The laboratory QA/QC program will consist of calibration and analyzing duplicate samples, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and evaluating surrogate recoveries. The laboratory QA/QC program is summarized in Table 3 below.

TABLE 3
LABORATORY QA/QC CRITERIA
TPH-G, TPH-D, BTEX, SVOCs, CAM 5 Metals, O&G

Analyte	Quantitation Limit		Surrogate Recovery Range	QA/QC Samples
	Soil (mg/kg)	Water (mg/L)		
TPH-G (EPA 8015M)	1	0.05	50-150%	Method Blank, MS/MSD
TPH-D (EPA 8015M)	1	0.05	50-150%	Method Blank, MS/MSD
Benzene(EPA 602/8020)	0.003	0.3	50-150%	Method Blank, MS/MSD
Toluene (EPA 602/8020)	0.003	0.3	50-150%	Method Blank, MS/MSD
Ethyl Benzene (EPA 602/8020)	0.003	0.3	50-150%	Method Blank, MS/MSD
Xylenes (EPA 602/8020)	0.003	0.3	50-150%	Method Blank, MS/MSD
SVOCs (EPA 8270), VOCs (EPA 8240),	0.03	1.0	50-150%	Method Blank, MS/MSD
CAM 5 Metals Cadmium Chromium Lead Nickel Zinc	 0.25 0.50 0.25 1.0 1.0	 0.005 0.01 0.001 0.02 0.02	NA	Method Blank, MS/MSD
O&G (SMWW 5520)	50	5	NA	Method Blank, MS/MSD

Descriptions of the method blanks, MS/MSD, surrogate recovery, and other pertinent laboratory protocol are presented below.

Method Blanks — The method blanks are analyzed a frequency of one per analytical batch per matrix type. Method blanks demonstrate the cleanliness of the analytical system prior to the analysis of samples. Results of the method blanks are compared to specific criteria to determine data acceptability.

MS/MSD — Matrix spikes are target compounds that are spiked into actual environmental samples. MS/MSDs are analyzed a frequency of one per analytical batch per matrix type. Percent recoveries of the MS/MSD and the relative percent differences are calculated and compared to statistically

driven control limits to ensure that the data set is of acceptable quality and precision.

Surrogate Recovery — Surrogate spikes are compounds very similar in behavior to the target analytes, but are not normally found in environmental samples. Surrogates are spiked into every method blank and MS/MSD. Percent recoveries are compared to statistically derived (or method specific maximum) control limits.

Calibration — Multi-point calibrations are performed for all analyses. Depending on the method, multi-point calibrations consist of either three or five concentrations, the lowest of which is near the method detection limit.

6.5 Data Analysis and Reporting

6.5.1 Data Documentation

Data documentation by the laboratory occurs upon receipt of the samples. The log-in clerk will inspect each sample for container integrity, inverted septa, inappropriate caps or bottles, air bubbles in volatile organic samples, incomplete sample labels, missing or broken sample seals, incomplete paperwork, or discrepancies between the sample labels and the paperwork. If the samples pass this initial inspection, they will be logged into the sample management system. If a problem is discovered, the log-in clerk will immediately notify the laboratory PM. Additionally, the laboratory project manager will be contacted, if warranted. All problems with the samples or the paperwork are recorded on the chain-of-custody record. The severity of a problem and the complexity of a corrective action will determine the extent of the notification procedure. Chain-of-custody paperwork accompanying the samples is signed and returned to the CAL INC project manager and a copy is maintained in a chain-of-custody file.

If the samples pass initial inspection, they are logged into the computer system and assigned to a laboratory PM; the computer program keeps track of samples from the time they arrive at the laboratory until the time they are transmitted to CAL INC. The computer system provides three main functions: (1) it provides ready access to information on sample status; (2) it allows analysts to schedule analyses efficiently by sorting all samples requiring a particular test; and, (3) facilitates data manipulation and data management.

At the time of log-in, a header is created for each set of samples received at the laboratory that gives the following information:

- Client name;
- Job number, work order number, and report number;
- Name of individual to receive final report;
- Date of sample collection;

- Date of sample receipt;
- Type of sample matrix;
- Sample base identifications; and
- Test parameters required for analysis assigned by number.

Analysts use the computer system to determine which samples require a particular parameter by logging into and running a backlog of sample numbers for the test number representing that parameter. The group leaders and the laboratory PM also use the computer system to keep track of analyses by periodically checking sample status to determine whether data is being entered in a timely fashion. Additionally, the computer system allows the senior staff to rapidly examine data for consistency among samples and institute appropriate QA measures.

Unused or remaining samples will be held under appropriate storage for 30 days after a final report has been issued. The laboratory will maintain report files and supporting raw data for the current and previous years on the premises. Reports and raw data are maintained for a total of five years, with data being stored off site after project completion in a secured storage facility.

6.5.2 Data Reduction

Data reduction involves the mathematical and/or statistical calculations used by the laboratory to convert raw data to the reported data. Reduction of analytical data will be performed by the laboratory as specified in each of the appropriate analytical methods. For each method, all raw data results are recorded on method-specific forms or in a standardized output from each of the various instruments. Units will be reported in micrograms per liter (µg/L), milligrams per liter (mg/L), micrograms per kilogram (µg/kg) or milligrams per kilogram (mg/kg). All data calculations are initialed by the person(s) generating and approving them. Results for soil samples will be reported on a dry weight basis.

6.5.3 Data Storage

All raw data, notebook references, supporting documentation, and correspondence are assembled, packaged, and stored for a minimum of 5 years for future use by CAL INC. The laboratory will contact CAL INC or the GSA if they are unable to store the documentation for the specified period of time and provide an alternative. All reports are client confidential.

6.5.4 Data Reporting

A comprehensive certificate of analysis will be prepared at the conclusion of the sampling and analytical work. Certificates of analysis containing analytical results and preliminary QC data only will be submitted to the GSA as soon as they are available (approximately 5 working days after sample shipment to the Laboratory for each shipment of samples). Draft certificates of analysis may not have all requirements of this section but will contain basic QC information such

as MS/MSD analyses, LCS analyses, method blank results, chain of custody forms, and cooler receipt forms.

7.0 TREATMENT AND DISPOSAL OF PROJECT WASTES

7.1 Manifests

All project wastes will be manifested, as required by Federal and state regulations. The USTs are anticipated to be the only project wastes that will be considered as hazardous. All other project wastes are anticipated to be non-hazardous and will be manifested as such. It is assumed that GSA personnel will be available to sign all manifests. Copies of all manifests will be provided in the final closure report.

7.2 Tank Transportation and Disposal

The USTs will be individually transported using a 18-wheel truck and associated lowboy trailer. Pilot cars will be employed, as required by the California Department of Transportation (CALTRANS) regulations. The USTs will be transported by Erickson, Inc. to their treatment, storage, and disposal (TSD) facility in Richmond, California. Haul routes, transportation licenses, and permits are presented in Appendix 4.

7.3 Tank Contents

Sampling and analysis of the UST contents will be performed prior to disposal, as described in Section 6, to determine disposal options. Sampling and analysis will conform to the Specification and to the potential disposal facilities waste acceptance criteria. The UST contents are anticipated to be disposed of at the B & J Landfill in Vacaville, California. All rinseate generated during the removal and cleaning of the USTs will be treated on site and disposed of with all groundwater generated. All groundwater will be treated and sent through the sanitary sewer to EBMUD's wastewater treatment plant.

7.4 Contaminated Soil

Contaminated soil will be loaded using a backhoe into storage bins. The storage bins will be temporarily stored on site pending analytical results. If the soil is contaminated, and thus unsuitable for use as backfill, it will be transported by Allied to B & J Landfill in Vacaville, California where it will be properly disposed of.

7.5 Contaminated Groundwater

All groundwater removed from the excavation will be treated on site using the carbon treatment units as detailed in Section 5.4. The treated groundwater will be sent through the sanitary sewer to EBMUD's wastewater treatment plant.

8.0 SITE RESTORATION

This section describes the methods and procedures that will be employed to restore the site. This section addresses backfilling of the UST and pipeline excavations, restoration of all concrete and paving removed during the course of the project, and the replacement of landscaping, fencing, and concrete gutters and curbs, as necessary.

8.1 Excavation Backfilling

The excavation will be backfilled only after applicable analytical testing results are approved by the Contracting Officer. The excavations will be backfilled within 48 hours after receiving notice to proceed by the Contracting Officer. All excavated and filled sections as well as adjacent transition areas will be uniformly smooth-graded. The finished surface will be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish will be that obtainable from blade-grader operations.

8.2 Installation of Aggregate, Asphalt, and Paint

In accordance with Section 2510 of the Specification, an aggregate base course, 1 1/2-inch maximum gradation, will be used to underlie all areas requiring asphalt paving. Aggregate will be compacted to 95 percent of maximum dry density. Asphalt will be installed in all areas which were disturbed during the site work. It is anticipated that approximately 1000 square feet of asphalt will be installed. Lane marking paint, as specified, will be used to remark all parking designations, as required, to restore the site to its original condition.

8.3 Materials Testing

In accordance with Section 02200 of the Specifications, backfill material will be tested pursuant to the applicable ASTM method. Backfill will be compacted to 90 percent of laboratory maximum density shown for the specific ranges of depth below the surface of the pavement. Density tests and QA/QC testing will be conducted on the backfill material in accordance with the Specification.

8.3.1 Soil Testing

Samples of backfill soil will be collected for moisture density (MD) analysis. MD curves will be used to determine the optimum moisture content during backfilling activities. During soil compaction activities, density testing will be conducted using a nuclear gauge to ensure proper compaction and moisture rates are being achieved.

8.3.2 Asphalt Mix Design

Asphalt will be required to replace the asphalt removed during the excavation phase of the project. All asphalt work and associated testing will be conducted in accordance with Section 2510 of the Specification.

The aggregate source will be approved by the Contracting Officer. Bituminous material to be mixed with the aggregates will be paving asphalt and will be in accordance with the Specification. All testing results will be submitted, as required.

9.0 REFERENCES

Alameda County Environmental Health Department. 1995. Underground Storage Tank Removal Process in Alameda County.

Cape Environmental Management, Inc. (Cape). 1995. Preliminary Site Assessment Report, Alameda Federal Center, Alameda, California.

General Services Administration Specification No. GS-09P-96-KZC-0013.

Tri-Regional Board Staff Recommendations For Preliminary Investigation and Evaluation of Underground Storage Tank Sites. 1990.

United States Environmental Protection Agency (USEPA). 1987. Document 540/G-87/003, Data Quality Objectives for Remedial Response Activities.

USEPA. 1986. SW-846 Test Methods for Evaluating Solid Waste, third edition.

Table 1
Summary of Analytical Results
Petroleum and Volatile Compounds (Soil)

Sample ID (Depth in feet)	Date Sampled	O&G (mg/Kg)	TEPH (mg/Kg)	TVH (mg/Kg)	B (µg/Kg)	T (µg/Kg)	E (µg/Kg)	X (µg/Kg)	VH (µg/Kg)
TW/MW4-5'	5/17/95	ND	3.3	ND	ND	ND	ND	ND	ND
TW/MW4-10'	5/17/95	ND	19 (2.0)	ND	ND	ND	ND	ND	ND
TW/MW4-15'	5/17/95	290	3.2	ND	ND	ND	ND	ND	ND
MW6-4'	5/18/95	90	ND	ND	ND	ND	ND	ND	ND
MW6-10'	5/18/95	98	25 (5.0)	ND	ND	ND	ND	ND	ND
MW6-13'	5/18/95	ND	ND	ND	ND	ND	ND	ND	ND
TB1-10'	5/18/95	ND	ND	ND	ND	ND	ND	ND	ND
TB1-15'	5/18/95	ND	ND	ND	ND	ND	ND	ND	ND
TB2-10'	5/18/95	520	3.2	ND	ND	ND	ND	ND	ND
TB2-15'	5/18/95	ND	ND	ND	ND	ND	ND	ND	ND
TB3-5'	5/18/95	140	9.3 (5.0)	ND	ND	ND	ND	ND	ND
TB3-10'	5/18/95	150	42 (5.0)	ND	ND	ND	ND	ND	ND
TB3-15'	5/18/95	120	10	ND	ND	ND	ND	ND	ND

NOTES:

mg/Kg- Milligrams per kilogram
µg/Kg- Micrograms per kilogram
ND- Not detected at or above Method Detection Limit (MDL).
O&G- Hydrocarbon oil and grease using test method SMWW 5520 with MDL of 50 mg/Kg.
TEPH- Total extractable petroleum hydrocarbons as diesel fuel using California Department of Health Services (DOHS) Method with MDL of 1.0 mg/Kg. Number in parenthesis following reported concentration represents raised MDL.
TVH- Total volatile hydrocarbons as gasoline using California DOHS Method with a MDL of 1.0 mg/Kg.
BTEX- Benzene, toluene, ethyl benzene and total xylenes using EPA Test Method 8020 with MDL of 5.0 µg/Kg.
VH- Volatile halocarbons for EPA Test Method 8010 compounds using EPA Test Method 8240 with compound MDLs ranging from 5.0 µg/Kg to 20.0 µg/Kg.

Table 2
Summary of Analytical Results
Polynuclear Aromatic Hydrocarbons (Soil)

Sample ID (Depth in feet)	Date Sampled	PNA (µg/L)
TW/MW4-5'	5/17/95	ND
TW/MW4-10'	5/17/95	450 Phenanthrene 1,400 Fluoranthene 3,400 Pyrene (3,300) 740 Benzo (a) anthracene 1,000 Chrysene 1,000 Benzo (b) fluoranthene 660 Benzo (k) fluoranthene 1,400 Benzo (a) pyrene 770 Indeno (1,2,2-cd) pyrene 980 Benzo (g,h,i) perylene
TW/MW4-15'	5/17/95	ND
MW6-4'	5/18/95	ND
MW6-10'	5/18/95	*240 Phenanthrene 490 Fluoranthene 1,100 Pyrene 450 Benzo (a) anthracene 390 Chrysene 660 Benzo (b)fluoranthene 540 Benzo (k) fluoranthene 830 Benzo (a) pyrene 370 Indeno (1,2,3-cd) pyrene 460 Benzo (g,h,i) perylene
MW6-13	5/18/95	ND
TB1-10'	5/18/95	*230 Pyrene
TB1-15'	5/18/95	ND
TB2-10'	5/18/95	ND
TB2-15'	5/18/95	ND

NOTES: Results indicate concentrations of compounds detected at or above Method Detection Limit (MDL) of 330 µg/L. Number in parenthesis following compound indicate raised MDL. Undetected compounds are not listed.

PNA- Polynuclear aromatic hydrocarbons using EPA Test Method 8270.

µg/L- Micrograms per liter.

ND- Not detected at or above MDL.

* Concentration of compound detected using instrument detection limit (IDL) of 50 µg/L.

Table 2 (cont.)
Summary of Analytical Results
Polynuclear Aromatic Hydrocarbons (Soil)

Sample ID (Depth in feet)	Date Sampled	PNA (µg/L)
TB3-5'	5/18/95	ND
TB3-10'	5/18/95	420 Phenanthrene 1,100 Fluoranthene 2,600 Pyrene 660 Benzo (a) anthracene 780 Chrysene 680 Benzo (b) fluoranthene 710 Benzo (k) fluoranthene 930 Benzo (a) pyrene 340 Indeno (1,2,3-cd) pyrene 410 Benzo (g,h,i) perylene
TB3-15'	5/18/95	*260 Phenanthrene 900 Fluoranthene 1,500 Pyrene 410 Benzo (a) anthracene 500 Chrysene 370 Benzo (b) fluoranthene 370 Benzo (k) fluoranthene 590 Benzo (a) pyrene *270 Indigo (1,2,3-cd) pyrene 330 Benzo (g,h,i) perylene

NOTES: Results indicate concentration of compound detected at or above Method Detection Limit (MDL) of 330 µg/L. Undetected compounds are not listed.

PNA- Polynuclear aromatic hydrocarbons using EPA Test Method 8270.
µg/L- Micrograms per liter.
* Concentration of compound detected using instrument detection limit (IDL) of 50 µg/L.

Table 3
Summary of Analytical Results
Petroleum Compounds (Water)

Sample ID	Date Sampled	O&G (mg/L)	TEPH (µg/L)	TVH (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW-1	5/18/95	ND	5,500	ND	1.1	ND	0.9	1.6
MW2-R	5/18/95	ND	ND	ND	ND	ND	ND	ND
MW-3	5/18/95	ND	92	ND	ND	ND	ND	ND
MW-4	5/17/95	ND	ND	ND	ND	ND	ND	ND
TW/MW-5	5/17/95	ND	680	ND	ND	ND	ND	ND
MW-6	5/18/95	ND	ND	ND	ND	ND	ND	ND

NOTES:

mg/L- Milligrams per liter.
µg/L- Micrograms per liter.
ND- Not detected at or above Method Detection Limit (MDL).
O&G- Hydrocarbon oil and grease using Test Method SMWW 5520 with MDL of 5 to 7 mg/L. Number in parenthesis following reported concentration represents raised MDL.
TEPH- Total extractable petroleum hydrocarbon using California Department of Health Services (DOHS) Method with MDL of 50 µg/L.
TVH- Total volatile hydrocarbons as gasoline using California DOHS Method with MDL of 50 µg/L.
BTEX- Benzene, toluene, ethyl benzene and total xylenes using EPA Test Method 8020 with MDL of 0.5 µg/L.

Table 4
Summary of Analytical Results
Volatile Halocarbons and Polynuclear Aromatic Hydrocarbons (Water)

Sample ID	Date Sampled	VH (µg/L)	PNA (µg/L)
MW-1	5/18/95	3.0 cis-1,2-Dichloroethene (1.0) 3.0 trans-1,2-Dichloroethene (1.0) 7.0 Trichloroethene (1.0) 1.0 Tetrachloroethene (1.0)	ND
MW2-R	5/18/95	ND	ND
MW-3	5/18/95	ND	ND
MW-4	5/18/95	ND	ND
TW/MW-5	5/17/95	1.0 Chloroform (1.0)	*7.5 Napthalene *8.5 Fluoranthene 14 Pyrene *5.5 Chrysene *6.2 Benzo (a) pyrene
MW-6	5/18/95	ND	ND

NOTES: Results indicate concentration of compound detected and corresponding method detection limit (MDL) in parenthesis following respective compound.

µg/L- Micrograms per liter.
ND- Compounds not detected at or above MDL.
VH- Volatile halocarbons for EPA Test Method 8010 compounds using EPA Test Method 8240 with compound MDL's ranging from 1.0 µg/L to 20 µg/L.
PNA- Polynuclear aromatic hydrocarbons using EPA Test Method 8270 with MDL of 10 µg/L.
* Reported compound concentrations below MDL were detected using instrument detection limit (IDL) ranging from 1 to 5 µg/L.

SOIL BORING SAMPLE RESULTS
reprinted from
T & T EARTH SERVICES

Location	Sample Number	TPH-G	B/T/E/X	TPH-D	418.1	8080	8270	6010 Cd/Cr/Ni/Pb/Zn	8010
Tank 3	Top Sludge	ND	ND	69000	600000	ND	ND	ND	NR
Tank 3	Bottom Sediment	ND	ND	4800	12800	ND	ND	ND/22/33/10/47	ND
Tank 4	Sediment	ND	ND/ND/12/64	220		NR	ND	ND/17/21/ND/15	NR

TPH-G	Total Petroleum Hydrocarbons as gasoline
B/T/E/X	Benzene/Toluene/Ethyl Benzene/Xylene
TPH-D	Total Petroleum Hydrocarbons as diesel
418.1	Total Recoverable Hydrocarbons
8080	Pesticides, PCBs
8270	Semi-Volatile Organic Compounds
6010	California Assessment Metals (Cadmium, Chromium, Nickel, Lead, Zinc)
8010	Chlorinated Hydrocarbons
ND	Not detected
NR	Not run (not analyzed)

APPENDIX 2

DRAFT
SITE SAFETY AND HEALTH PLAN
UST REMOVAL PROJECT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE
ALAMEDA, CALIFORNIA

CONTRACT NO. GS-09P-96-KZC-0013
GSA PROJECT NO. RCA21602

PREPARED ON BEHALF OF:

GENERAL SERVICES ADMINISTRATION
450 GOLDEN GATE AVENUE, 3RD FLOOR
SAN FRANCISCO, CALIFORNIA

PREPARED BY:

CAL INC
2040 PEABODY ROAD, SUITE 400
VACAVILLE, CALIFORNIA 95687

SEPTEMBER 1996

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This site safety and health plan (SHP) sets forth the minimum safety and health, and emergency response requirements for activities involving, or potentially involving, employee exposure to safety or health hazards associated with the proposed site operations. Site operations are to consist of: 1) shoring to support excavation near Building 1, 2) the excavation of petroleum hydrocarbon contaminated soil, 3) the transportation and treatment/disposal of the contaminated soil excavation and removal of soils, 4) the removal, transportation, and disposal of two USTs, 5) backfilling and compaction, and 6) shoring removal. This plan applies to all site work performed under this contract, whether in "contaminated" or "support" areas.

2.0 SITE SAFETY REGULATORY REQUIREMENTS

Work performed under this contract will comply with General Services Administration (GSA) EM 385-1-1, applicable Federal, State of California, and local safety and occupational health laws and regulations. Applicable regulations include, but are not limited to, Occupational Safety and Health Administration (OSHA) Standards 29 CFR, Part 1910, especially Section 120 "Hazardous Waste Site Operations and Emergency Response" and CFR, Part 1926, especially Section 65 "Hazardous Waste Site Operations and Emergency Response". Where the requirements of this specification, applicable laws, criteria, ordinances, regulations and referenced documents vary, the most stringent will apply.

3.0 HAZARD/RISK ANALYSIS

3.1 Site Tasks and Operations

A project specific hazard analysis has been developed and is presented in Attachment A. The hazard analyses provides principal steps for each "feature of work" identified for the project. In general, the following features of work have been identified with respect to site tasks and operations:

- Installation of Shoring
- Excavation
- Sampling and Testing;
- Removal and Disposal of Soil.
- Removal and Disposal of Liquids.
- Site Restoration.

The hazard analysis presented in Attachment A provides a step by step procedural design for each feature of work. Potential hazards, mitigating measures, level of PPE, equipment needs, and specialized training requirements are outlined in the Hazard Analysis.

3.2 Potential Hazards

3.2.1 General Safety Hazards

Potential safety hazards will include, but are not limited to general construction-type hazards, such as:

- Fire and explosion
- Oxygen deficiency in confined spaces or during cave-ins
- Snapping cables, slings, ropes
- Overloaded cranes and other hoists and suspended loads
- Speeding and improperly operated vehicles
- Unguarded, improperly operated moving equipment
- Slippery and unstable surfaces, steep grades, uneven terrain
- Hazardous substances not properly identified or contained
- Exposure to chemical contaminants
- Precariously positioned objects that may fall
- Open pits and ditches
- Noise
- Buried utility lines and energized overhead and underground power lines
- Unguarded machinery contact points
- Temperature extremes
- Lifting heavy objects
- Pressurized vessels

3.2.2 Chemical Hazards

During construction operations within areas of contaminated subsurface materials, hazardous materials which present the potential for inhalation, ingestion, or skin absorption of hazardous chemicals may be encountered. The following information is provided for anticipated chemical hazards at the site. The chemicals described below, while toxic in varying degrees, are not considered hazardous under normal use conditions or through casual or incidental contact.

Unusual conditions which increase risk are those which allow chemical vapor buildup in unventilated places, atomizing chemical liquids into heavy mists, dusting of contaminated soils, and prolonged skin contact with the chemicals, themselves, or contaminated dusts or objects.

The symptoms of toxic reactions which are described below are the result of exposures exceeding the respective PELs, STELs, etc.

Dust suppression and use of appropriate respiratory protection and other personal protective equipment and clothing are expected to minimize employee exposures and prevent the symptoms described.

3.2.2.1 Diesel Fuel

Not considered hazardous under normal use conditions or casual or incidental contact. Acute vapor exposure may cause dizziness and temporary irritation to eyes and respiratory system, prolonged exposure to higher vapor concentrations may cause central nervous system effects. Contact with skin may cause dermatitis. Vapors can catch fire and burn when exposed to ignition sources. Exposure routes are ingestion, inhalation, and dermal contact.

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 330 parts per million (ppm).

3.2.2.2 Gasoline

Not considered hazardous under normal use conditions or casual or incidental contact. Gasoline is a mixture of short to intermediate-chain aliphatic and aromatic hydrocarbons. It is highly flammable and volatile. Gasoline irritates the skin and mucous membranes, depresses the central nervous system, and may cause intoxication.

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 330 parts per million (ppm).

3.2.2.3 Benzene

Benzene is an aromatic hydrocarbon commonly found in gasoline and other petroleum product materials. It is not a hazard under normal use conditions. Inhalation of benzene vapors in elevated concentrations can be hazardous, depending on exposure time. It is highly volatile, and inhalation is the primary route of exposure. Acute symptoms at exposure levels approaching 250 ppm include drowsiness, dizziness, headaches, and nausea. Benzene is a known carcinogen and long-term exposure causes bone marrow damage and leukemia.

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 1 ppm.

3.2.2.4 Toluene

Toluene is an aromatic hydrocarbon used as a solvent and fuel component. Toluene is flammable (Flashpoint - 40 degrees F) and is relatively volatile. Symptoms of over-exposure include: dermal and mucous membrane irritation, headache, nausea, loss of appetite and impairment of coordination. Generally these symptoms only occur at high exposure levels (>200 ppm).

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 100 ppm.

3 2.2.5 Xylene

Xylene is an aromatic hydrocarbon used in solvents and for fuel. Xylene is flammable (Flashpoint 63 to 82 degrees F) and highly volatile. Xylene exhibits essentially the same symptoms of exposure as Toluene. The TLV for xylene is 100 ppm TWA and 150 ppm STEL.

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 100 ppm, ACGIH TLV = 100 ppm.

3.2.2.6 Ethyl Benzene

Irritation to eyes, skin, mucous membranes and is narcotic in high concentrations.

Exposure Routes: Inhalation, Ingestion, Dermal contact.
Exposure Limits: OSHA PEL = 100 ppm, ACGIH TLV = 100 ppm.

3.2.2.7 Petroleum Distillates

Not considered hazardous under normal use conditions or by casual or incidental contact. Petroleum distillates exhibit a relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm have been reported to cause eye irritation, nose irritation, throat irritation, drowsiness and cracked skin upon dermal contact. Higher levels of concentration have been reported to cause dizziness and mild anesthesia in less than one hour. Many additives simply enhance the toxicity of the distillates.

Exposure Routes: Inhalation, ingestion, and dermal contact
Exposure Limits: OSHA PEL = 400 mg/m3, ACGIH TLV = 350 mg/m3

3.2.3 Physical Hazards

Physical hazards are inherently present during field operations. Physical hazards present at the project site will include noise exposure associated with the operation of heavy equipment, heat and cold stress, sunburn, and biological hazards. These hazards are described below.

3.2.3.1 Noise

Noise exposures will be controlled to levels below the permissible noise exposure levels which are equivalent to an 8 hour time weighted average (TWA) level of 90 decibels (dBA). Reduction of exposures may be by engineering controls or adequate hearing protection. Engineering controls will include isolation of the noise source by their enclosure and reduction of noise transmission by application of noise absorbing materials. Hearing protection will be worn at all times when noise levels are suspected of being equal to or exceeding 85 decibels or 50% of the OSHA standard. Use of portable "Walkman-type" radios are prohibited at any time. A copy of the OSHA Occupational Noise Standard, 29 CFR 1910.95 will be available and copies will be made available to employees

upon request. Most work site noise will originate from heavy equipment. As a result, equipment operators and observers will be instructed to use hearing protection.

3.2.3.2 Heat Stress

A worker's risk for developing heat stress is greatly increased when wearing impermeable clothing or respirators. This type of clothing interferes with the body's normal cooling mechanisms. For workers who wear permeable clothing, the Contractor will follow the work/rest schedules recommended in the current ACGIH Threshold Limit Values (TLV) for Heat Stress. For workers who wear semipermeable or impermeable clothing, the Contractor will follow the technical guidelines in "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities". Monitoring of personnel wearing impermeable clothing will commence when the ambient temperature is above 70 degrees Fahrenheit. Monitoring frequency will increase as the ambient temperature increases or as slow recovery rates are observed. A shady rest area and an adequate supply of cool drinking water will be provided for the workers.

3.2.3.3 Cold Stress

Exposure to cold air, or to immersion in cold water, at temperatures well above freezing, can lead to hypothermia. To guard against cold injury the Contractor will provide appropriate clothing and warm shelter for rest periods. Procedures to monitor and avoid cold stress will be followed in accordance with the current TLVs for Cold Stress as recommended by the ACGIH.

3.2.3.4 Sunburn

Sunburn is a burn to the skin caused by overexposure to ultraviolet light (sunshine). The symptoms of exposure are not usually apparent until two to four hours after the exposure ceases. Depending upon the severity of the exposure, the symptoms can range from reddening of the skin, accompanied by mild discomfort, to painful deep burns and blisters. Although light-haired, fair-skinned, blue-eyed personnel are at the greatest risk of sunburn, all complexion types can develop sunburn, if the exposure is long and intense enough.

The physical hazard of sunburn will be controlled by: 1) providing a shady rest area; 2) wearing appropriate clothing (long pants and tee shirts, i.e. no tank tops); 3) wearing sunscreen as appropriate; and 4) working in shifts.

3.2.3.5 Biological Hazards

Potential biological hazards that may be encountered during site work are pollen, spiders, snakes, scorpions, and ticks. This is not intended to be a complete list.

3 2.3.6 Heavy Equipment Operation

The safety hazards associated with the operation of heavy equipment can be effectively eliminated if the employee maintains a constant awareness of these hazards. Constant visual or verbal contact with the equipment operator will facilitate such awareness.

3.2.3.7 Slip-Trip-Fall Hazard

While it is difficult to prevent slip-trip-fall hazards, risk of injury will be minimized by implementing proper site control measures such as daily safety meetings, proper footwear and by keeping the work area free of obstructions.

3.2.3.8 Lifting Hazards

Field operations often require that heavy physical labor tasks be performed. All employees will be instructed in proper lifting techniques. Additionally, employees will be instructed to not attempt to lift large or heavy objects without assistance.

3.2.3.9 Tool and Equipment Hazards

Improper tool handling and inadequate tool maintenance will increase risk of injury during their use. Management of these hazards involve rigorous maintenance of tools and equipment and effective training of employees in the proper use of these tools.

3.2.3.10 Open Excavation

Open excavations as deep as 20 feet are anticipated during the construction actions at the project site. Excavations will be maintained in compliance with appropriate OSHA regulations. Nevertheless, constant employee safety awareness while working near excavations will lessen the associated hazards.

3.2.3.11 Shored Excavations

In the event of the excavated areas being unstable and/or greater than five feet in depth where personnel must enter the space to perform construction activities, shoring or sloped excavations in accordance with OSHA. standards will be installed. Employees will be reminded that even though the excavations are shored that it is always extremely beneficial to remain cautious of the situation.

Extreme caution will be used to assure that heavy equipment does not upset the shoring system. In situations where size of the excavation is not restricted, the excavation may be sloped to the angle of repose.

3.2.3.12 Fire Hazard Control

When welding or cutting, be sure that hot sparks or slag do not come in contact with flammables. An approved fire extinguisher will be immediately available when welding or cutting and mounted to all heavy equipment. Only approved containers will be used for storing flammable liquids. Oily rags and waste will be placed in proper containers. Fire protection equipment will be used for fire fighting. The location of fire extinguishers and other fighting equipment will be known by all employees. Gasoline or other flammable liquids will not be used for cleaning. All fire hazards will be reported to the Foreman immediately. Fire and emergency access lanes will be kept clear at all times in order to facilitate equipment entry and exit.

3.3 Action Levels

3.3.1 Real Time Monitoring

Real time worker exposure will be assessed through air monitoring with a photoionization detector (PID), combustible gas indicator (CGI), oxygen meter, colorimetric indicator tubes, and particulate dust meter. The PID and CGI will be calibrated to isobutylene and hexane standards, respectively. The following PEL's have been identified for the project:

Constituent	PEL
Benzene	1.0 ppm
Dust	2.5 mg/m3

Breathing zone monitoring will be conducted primarily with the PID and CGI/O2 meter. If volatiles are detected with the PID in the breathing zone at concentrations of 0.2 ppm or greater for a period of 30 seconds, then colorimetric tubes will also be employed. It is anticipated that benzene tubes will primarily be used. The detection of benzene with the colorimetric tubes in the breathing zone at concentrations greater than 2 of the PEL (0.5 ppm) will trigger the upgrade of PPE from Level D to Level C, which includes the use of respiratory equipment. If volatiles are detected in the breathing zone at concentrations greater than 5 times the PEL (5 ppm), work will be stopped and the Site Safety and Health Manager will be contacted for instructions.

Dust levels will be measured using a particulate dust meter, which has a detection limit of 0.010 mg/m3. The PEL for particulate dust is 2.5 mg/m3. Upgrade to Level C respiratory equipment will be required if dust levels are detected at concentrations greater than 2 the PEL (1.25 mg/m3).

Based upon the results of air monitoring for total hydrocarbons, toxic chemicals, respirable dust and combustible gas/oxygen, action levels will be established based upon the Atmospheric Hazard Action Guide table below. The levels identified are those which are maintained for 30 seconds at the breathing zone.

4.0 ACTIVITY HAZARD ANALYSES

An Activity Hazard Analysis has been developed for each feature of work. This analysis defines the activities to be performed and identifies the elements of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. The Activity Hazard Analyses are included in Attachment A of this report.

5.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

5.1 General

This section of the SSHP outlines the organizational structure and site personnel responsible for the safety and health of personnel during the proposed work. The Contractor has designated an organizational structure as depicted in Attachment B. The replacement of any members of the Safety and Health Staff requires the acceptance of the Contracting Officer. Replacement requests will include the names, qualifications, duties, and responsibilities of each proposed replacement.

5.2 Safety and Health Staff

5.2.1 Site Superintendent

The Site Superintendent for CAL INC is Mr. Robert Barry. Mr. Barry is responsible for all site activities to implement this SSHP, the authority to direct work performed under this contract and verify compliance.

5.2.2 Site Safety and Health Officer (SSHO)

The Site Safety and Health Officer is Mr. Robert Barry. Mr. Barry's qualifications and work experience summary are included in Attachment B of this plan. The SSHO will:

- Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted SSHP,
- Be assigned to the site on a full time basis for the duration of field activities. If operations are performed during more than one work shift per day, a site Safety and Health Officer will be present for each shift.
- Have authority to ensure site compliance with specified safety and health requirements, Federal, State of California, and OSHA regulations and all aspects of the SSHP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment-program, and preparation of records by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.

- Have the authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.

- Consult with and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.

- Serve as a member of the Contractor's quality control staff on matters relating to safety and health.

- Conduct accident investigations and prepare accident reports.

- Review results of daily quality control inspections and document safety and health findings into the Daily Safety Inspection Log.

- In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

5.2.3 Occupational Physician

The occupational physician is Dr. Patricia Wiggins, M.D., a licensed physician. A summary of her qualifications is included in Attachment C. The physician will be familiar with this site's hazards and the scope of this project. Dr. Wiggins has been briefed on the project site conditions and hazards. The physician will be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120 (f) and 29 CFR 29 1926.65 (f) and Section 9.0 Medical Surveillance.

5.2.4 Persons Certified in First Aid and CPR

At least one person who is certified in first aid and CPR by the American Red Cross or other approved agency will be onsite at all times during site operations. They will be trained in universal precautions and the use of personal protective equipment (PPE) as described in the Bloodborne Pathogens Standard of 29 CFR 1910.1030. These persons may perform other duties but will be immediately available to render first aid when needed. The identity of these persons will be made known to all personnel involved in this work. Mr. Robert Barry of CAL INC is currently certified to administer first aid and CPR.

5.3 Quality Control Safety Responsibilities

CAL INC's Quality Control program will include conducting and documenting daily safety inspections. The safety inspections will be logged daily, using the U.S. Army Corps of Engineers Resident Management System software. The QC safety inspection reports will be conducted in addition to the SSHO's daily safety reports.

6.0 SAFETY AND HEALTH TRAINING

6.1 Employee Training Plan

Establishment of a training program will be undertaken by CAL INC for the purpose of educating all workers who will be handling hazardous material. Training will be documented and for personnel in the contamination zone will include initial and refresher training in accordance with 29 CFR 1910.120 regulations. Key employees will be instructed in first-aid and other emergency procedures. All employees will be instructed in the hazards associated with the various chemicals they may be exposed to in their work environment. Fire extinguishers will be installed on each piece of equipment. Employees will be periodically instructed in the use of fire extinguishers and fire protection procedures. In addition, employees will be trained in the safe handling practices of hazardous materials such as hydrocarbons and other chemical compounds anticipated on the site. Regular safety meetings will be held with employee sign-in and documentation to be filed. Employees will not be allowed into the exclusion or contamination zones without the required training.

The training program will include training on site specific operations, hazardous waste operations, PPE use, confined space entry and follow up training. All employees will receive information and training consisting of the following:

- Names of employees and alternates responsible for safety and health.
- Acute and chronic effects of exposure to hazardous substances that may be present.
- Their rights and responsibilities under OSHA.
- Monitoring procedures.
- Contractor safety and health plan.
- Standard operating procedures.
- Engineering controls.
- Personal protective equipment (PPE).
- Decontamination.
- Emergencies.
- Site control measures.
- Heat and/or cold stress prevention, treatment and monitoring.

Supervisory personnel will be required to complete at least eight additional hours of training which will include:

- Contractor's Safety and Health Program and employee training program. Program.
- Spill Containment Program.
- Health Hazard Monitoring Procedures.

In addition to OSHA regulation training requirements, all site personnel performing field activities will be required to complete site specific training taught by the S.S.H.O. The CO will be notified of

the site specific training class at least 5 days in advance. Topics to be covered in site-specific training sessions for on-site personnel include:

- Names of personnel responsible for site safety and health;
- Engineering controls and work practices by which the employee can minimize risks for hazards;
- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- The biological, chemical radiological, and physical hazards at the site and their respective properties;
- The potential routes of exposure to chemicals, the possible toxic effects, the IDLH and PEL values of chemical hazards, and the level of personal exposure which can be anticipated, acute and chronic effects of the toxic chemicals;
- Heat and/or cold stress prevention, treatment and monitoring;
- Personal cleanliness and restrictions on eating, drinking, and smoking on the job;
- The availability of on-site potable water and toilet facilities;
- Applicable provisions of the OSHA standards (29 CFR 1910 and 1926) and the Contractor's Safety and Health Program;
- Confined space entry procedures;
- Spill containment program;
- The functions, capabilities, limitations, use, and maintenance of monitoring equipment, (a hands-on review will be held with persons assigned to use the equipment);
- The Contractor's SSHP will be reviewed and made available to the employees;
- The use, care, and disposition of the specific PPE selected for this work (the PPE will be available for hands-on familiarity and practice donning, as needed);
- Handling of medical emergencies (the locations and telephone numbers for ambulance service and hospitals will be made known);
- The decontamination procedures established for this construction activities;
- The emergency contingency procedures contained in the SSHP;
- The fire and accident response procedures will be discussed prior to the start of work;
- Basic operational safety, emphasizing the hazards expected on the site; and
- Employee rights and responsibilities under OSHA.

6.2 Certification of Training

Employee training information and certifications may be found in Attachment C.

6.3 Weekly Training Meetings

Weekly health and safety training/discussion meetings will be held. The SSHO will be responsible for scheduling and conducting this safety meeting. All on-site personnel will be required to attend. Hands-on refresher training on PPE, decontamination procedures, work practices, changes in work-tasks, schedule changes, results of previous week's air monitoring, review of safety discrepancies noted during previous week, etc., will be discussed. Should an operation change affecting the on-site field work be made, a meeting prior to implementation of the change will be convened to explain the changes to all concerned.

6.4 Visitor Training

Should an occasion arise when an official visitor seeks entry into an exclusion zone or contamination reduction zone, the visitor will present documentation that health and safety training and medical surveillance examination/certification equivalent to that required for on-site work is current. In addition, a short orientation covering relevant information outlined above will be given by the Contractor. The visitor will also provide evidence of respirator fit testing and have an appropriate respirator available in the event one is required.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 General

All personnel working on the project site will wear the appropriate level of protection as described herein. It is anticipated that EPA level D will be required. However, if air monitoring results indicate airborne concentrations that potentially compromise an individual's health, the level of protection will be upgraded. When air monitoring indicates that the action levels have been reached, as averaged over a period of fifteen minutes, as indicated in the project specifications, the level of personal protection will be upgraded to either Modified Level D or Level C. The SHM will be responsible for indicating initial and upgraded levels of protection. The level of protection will vary depending upon which zone the personnel are working.

7.2 Levels of PPE

In general, all on-site work will be conducted in Level D, Modified Level D, or Level C PPE. Upgrades to Level C PPE will be determined based on the results of air monitoring, as discussed in Section 3.3.1. Level A and Level B work are not anticipated for the project. The use of Level A or B PPE will not be implemented without prior authorization from the CO. A summary of the

minimum PPE and specific materials from which the PPE components are constructed for each "feature of work" are presented below.

7.2.1 Level D

- Hearing Protection (if needed)
- Hard hat
- Safety glasses
- Safety shoes or boots
- Coveralls (long pants and short sleeved shirts are acceptable depending on ambient temperatures)
- Work gloves (chemical resistant gloves if handling contaminated soil or material)
- Safety glasses with side shields (if needed)

7.2.2 Level D Modified

- Hearing protection (if needed)
- Work clothing, as dictated by the weather
- Safety shoes or boots
- Hard hat
- Saranex-or Polyethylene-coated Tyvek (or equivalent) coveralls (when handling or contact may occur with contaminated soils or materials)
- Steel-toed boots
- Nitrile, neoprene, natural rubber, or other chemical resistant gloves (when handling or contact may occur with contaminated soils or materials)
- Safety glasses with side shields (if needed)

7.2.3 Level C

- Hearing protection (if needed)
- Hard hat
- Full or half face respirator with dual cartridges
- Saranex-or Polyethylene-coated Tyvek (or equivalent) coveralls with hood
- Nitrile, Neoprene, natural rubber, or other chemical resistant gloves (when handling or contact may occur with contaminated soils or materials) with chemical resistant inner gloves
- Chemical resistant safety boots

7.2.4 Level B

- Hearing protection (if needed)
- Pressure-demand supplied-air-respirator with air egress bottle or self-contained breathing apparatus
- Hard hat
- Saranex-or Polyethylene-coated Tyvek (or equivalent) coveralls with hood
- Nitrile, Neoprene, natural rubber, or other chemical resistant gloves (when handling or contact may occur with contaminated soils or materials) with chemical resistant inner gloves
- Chemical resistant safety boots

7.2.5 Level A

- Hearing protection (if needed)
- Pressure-demand supplied-air-respirator with air egress bottle or self-contained breathing apparatus
- Hard hat (if needed)
- Saranex-or Polyethylene-coated Tyvek (or equivalent) coveralls with hood
- Nitrile, Neoprene, natural rubber, or other chemical resistant gloves (when handling or contact may occur with contaminated soils or materials) with chemical resistant inner gloves
- Chemical resistant safety boots

7.3 Inspection of PPE

Specific procedures recommended by equipment manufacturers should be followed for inspection of clothing. A general inspection checklist for clothing before use include:

- Determining that the clothing material is correct for the specified task at hand.
- Visually inspect for imperfect seams, non-uniform coatings, tears, malfunctioning closures, hold up to light and check for pinholes.
- Flex products to observe for cracks or other signs of shelf deterioration.
- If the product has been used previously, inspect inside and out for signs of chemical degradation (discoloration, swelling, stiffness).

During the work task periodic inspection of equipment should consist of the following:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening.
- Closure failure, tears, punctures, and seam discontinuities.

7.4 Respiratory Protection Program

7.4.1 Overview of CAL INC Respiratory Protection Program

In the course of environmental operations, CAL INC will provide respirators to all employees and will ensure that respirators are used when and where they are required by Federal and State Occupational, Safety and Health Administration Offices. Respirators will be selected based on worker's exposure hazards and the employee's specific requirements. Only respirators jointly approved my MSHA and NIOSH will be used by CAL INC. This program addresses the various necessities and requirements for respirator use at CAL INC.

CAL INC will maintain and record the type of respirator assigned to each employee, the date issued and the fit test results. This program will be used as a Standard Operating Procedure (SOP) and will be modified to suit altered site conditions if necessary. A copy of this program will be kept on site and periodically reviewed as necessary to comply with internal SOP's and regulatory requirements.

CAL INC does not allow employees to engage in work requiring respirator use if s/he does not have the full approval of the physician or if the employee is unable to function properly wearing a respirator, he or she is prohibited to work in areas possessing environmental hazards and requiring respiratory protection.

It is CAL INC's practice to work in teams if possible. This provides a greater degree of safety should an employee be overcome by a toxic or oxygen deficient atmosphere. Communication must be maintained (visual, voice or signals) between all employees in the work area. When self-contained respirators are used in atmospheres immediately dangerous to life or health, stand-by personnel are always present with suitable rescue equipment.

7.4.2 Respirators

Respirators are a last line of defense. Respirators will be selected based on the anticipated exposure for the work being performed. In most instances, site safety and health plans will need to be developed for each specific site, addressing the respiratory and personal protective equipment required for that site. These plans will identify the level of personal protection required and respiratory protection required for the various phases of the specific project (i.e., Level D will be required for site characterization work performed during the first phase of work). For additional information regarding the selection of respiratory protection, please refer to the Site Safety and Health Plan for the specific project in question.

7.4.3 Respirator Fit Testing Program

Respirator fit testing is required of all employees using respirators. Respirators issued to employees will have the least possible face-piece leakage and will be fitted properly. CAL INC uses several different face fit tests for half mask respirators (negative pressure, positive pressure,

qualitative and sometimes quantitative) at the time of initial fitting and every six months thereafter. Records are kept of all phases of respirator testing and use.

Every employee using a respirator receives written fit instructions including demonstrations and practices on how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Employees are warned never to wear respirators when conditions prevent a good face seal.

One of the most important parts of an effective respirator program is fit testing. The fit of respirators must be determined when the respirators are issued and that the employees check the fit each time they put the respirator on. These two points are requirements of CAL INC, since the weakest point of protection for a respirator is leakage around the face-seal.

Prior to any type of fit-testing, the respirator straps must be inspected and adjusted properly to fit as comfortably as possible. Over-tightening the straps will sometimes reduce forceps leakage, but the wearer may be unable to tolerate the respirator during the work period. The face piece should not press into the face and shut off blood circulation or cause major discomfort.

At the same time a respirator is issued, a visual inspection of the fit will always be made by the Site Superintendent on each job site. The Site Superintendent always checks to see that there are no visible openings or leaks and that the respirator fits properly and comfortable.

7.4.3.1 Qualitative Fit Testing

CAL INC will implement a qualitative fit testing program. The qualitative fit testing program will include positive/negative pressure testing, irritant smoke testing, and testing with banana oil. A description of each is presented below.

Positive/Negative Pressure Testing

For the negative pressure test, the user closes off the inlet of the cartridge or filters by covering them with the palms or squeezing the breathing tube so it does not allow air to pass. He then inhales gently so the forceps collapses slightly; and holds his breath for about 10 seconds. If the forceps remains slightly collapsed and no inward leakage is detected, the respirator probably fits tightly enough. The employee must be aware that the hand pressure may modify the face-seal and cause a false result. This test is only used on respirators with tight fitting face-pieces.

The positive pressure test is very similar in principle to the negative pressure test. It is conducted by closing off or covering the exhalation valve and exhaling gently into the forceps. The respirator fit is considered good if slight positive pressure can be built up inside the forceps without any evidence of outward leakage. If your respirator requires removal of the exhalation valve cover, the test should be conducted before the respirator is put on. This helps in not disturbing the respirator fit.

Irritant Smoke Test

The irritant smoke test is performed after the pressure test has been passed. The test substance preferred is stannic oxychloride. This substance comes in a tube with a squeeze bulb on one end. When the tube ends are broken and air is passed through, a dense irritating smoke is emitted. To perform this test the employee must enter a test enclosure (a clear suspended plastic bag) and the smoke is sprayed or squeezed into a test hole. If the wearer detects any irritating smoke inside the respirator, it means a defective fit. This is recorded as a failed test and requires adjustments or replacement of the respirator. This test has an advantage in that the wearer usually reacts involuntarily to a leakage by coughing or sneezing. This makes the likelihood of merely pretending to pass the fit test very low. The results of all fit tests are kept in our office for three years.

Banana Oil Test

When the employee enters the test chamber, he is given a paper towel folded in half and wetted with 3/4 of one cc of pure banana oil. The employee is instructed to hang the wet towel on the hook at the top of the chamber. He must wait two minutes for the IAA test concentration to be reached before starting the fit test exercise. During this time, the individual providing the fit test explains the purpose of the fit test, the importance of cooperation, the purpose of the head exercises, and demonstrates some of the exercises.

The employee is asked to perform each of the test exercises for at least one minute. He is asked to leave the test chamber and test area if he detects a banana like odor. If this happens, we assume the test has failed and the employee must select another respirator. He must wait at least five minutes before re-testing. If the employee can not pass the fit test using a half-mask respirator then he must use a full face respirator.

7.4.4 Respirator Inspection and Maintenance

Respirators will be cleaned after each days use, or more often if necessary. Respirator inspection includes a check for tightness of connections and the condition of the face-pieces, headbands, valves, connection tubes, and canisters. Rubber or elastomer parts are inspected for pliability and signs of deterioration. Records will be kept on respirators of inspection dates and findings and also for respirators maintained for emergency use.

CAL INC will maintain an area for cleaning and storing respirators at each jobsite. Respirators will be routinely inspected. All worn or deteriorated parts will be replaced.

When powered air-purifying respirators are required or requested by employees they will obtain the same care of filtered respirators (must be cleaned, maintained, and carefully stored) plus the air quality must be maintained. Emergency self-contained respirators are thoroughly inspected no less than once a month and after each use. We conduct regular inspections and evaluations to determine the continued effectiveness of our program.

Any employee who uses a filter respirator is allowed to change the filter elements whenever an increase in breathing resistance is detected. Employees are permitted to leave the work area to wash their faces and respirator face-pieces whenever necessary to prevent skin irritation. If requested, powered air-purifying respirators will be provided to employees.

Maintenance and care of respirators will be adjusted to fit the conditions of each project taking in to account the type of plant, working conditions and site hazards. Our maintenance program includes inspection for defects (including a leak check), cleaning and disinfecting, repair, and storage. All equipment will be properly maintained to retain its original effectiveness. All of our respirators that are in daily use will be inspected before and after each use. Respirators that are not individually assigned but kept ready for use will be inspected after each use or at least on a monthly basis. Our self-contained respirators will be kept fully charged according to the manufacturers instructions and warning devices function properly. All respirators used frequently will be cleaned and disinfected. Each employee will be instructed in how to personally clean a respirator.

Replacement or repairs will be completed with parts designed for the respirator. It is against CAL INC's written policy to replace components or to make adjustments or repairs beyond the manufacture's recommendations. Reducing or admission valves or regulators will be returned to the manufacturer or sent to a trained technician for adjustment or repairs.

Respirators will be packed or stored so that the face-pieces and exhalation valve rest in a normal position. Instructions for proper storage, use and care are mounted inside the storage containers.

7.4.5 Medical Surveillance Program

Medical surveillance at CAL INC is monitored by the Site Superintendent or Site Safety and Health Officer. It is CAL INC's policy to make available all medical examinations relative to the employees exposure.. Our medical surveillance program includes pre-placement, annual, and termination examinations.

We are required, by law, to make results of medical surveillance available to our employees. All testing becomes part of an employee's personnel file and a copy is available upon request. All CAL INC employees potentially exposed to human health hazards working in environmental field operations must participate in the medical surveillance program. Also, employees who wear negative pressure respirators as part of their job must have a medical evaluation to evaluate whether their respiratory system is capable of wearing a respirator.

Pre-placement or initial assignment exams must be completed in accordance with applicable regulations. This is a comprehensive medical exam and includes a complete medical and work history, a physical examination of the pulmonary and gastrointestinal system (including x-rays), pulmonary function tests including forced vital capacity, the maximum amount of air that can be expired from the lung after full inhalation, and forced expiratory volume after one second after full inhalation. Blood, urine and other tests deemed necessary by the physician, or OSHA standards will also be performed. We will also request that the physician provide a written statement

indicating whether or not an employee is capable of wearing a negative pressure respirator and outlining any limitations associated with its use.

Our annual examinations are essentially the same as the pre-placement evaluation. It is used primarily as an ongoing surveillance program. The physician will be able to compare the annual examinations with pre-placement evaluations to determine if there are any changes in an employee's health status. If there are noticeable changes, they are immediately discussed with the employee, the owner of the company, the physician and appropriate action is taken.

Record keeping in this area is of the utmost importance. Records of the exams will be kept through the duration of employment plus 30 years. This will provide documentation of the health status of our employees.

No employee is allowed to work in the field where there is a potential for adverse health effects due to the operations conducted by CAL INC, without current medical records.

We provide our physician with copies of applicable OSHA standards pertaining to medical examinations (written description of our employees duties as they related to employees exposure, and a description of personal protective and respiratory equipment used or anticipated). Any information from previous medical examinations of an employee is not available to our physician.

Copies of our physicians written opinions are given to the employee within 30 days of its receipt and discussed at length with them by the Supervisor.

It is also made clear to our physicians that under no circumstances is an employee's confidence to be broken accept where it pertains to his ability to perform his duties by wearing a respirator or where it may pose a danger to the employee.

7.5 PPE for Government Personnel

Three clean sets of personal protective equipment clothing (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by individual visitors), as required for entry into the Exclusion Zone and/or Contamination Reduction Zone, will be available for use by the Contracting Officer or official visitors. The sets will be cleaned and maintained by the Contractor and stored and clearly marked: "FOR USE BY GOVERNMENT ONLY." The Contractor will provide basic training in the use and limitations of the PPE provided, and institute administrative controls to check prerequisites prior to issuance. Prerequisites include meeting minimum training requirements for the work tasks to be performed at medical clearance for site hazards and respirator use.

8.0 MEDICAL SURVEILLANCE

8.1 General Medical Surveillance

The Safety and Health Manager, in conjunction with the Occupational Physician, will detail, in the employer's Safety and Health Program and the SSHP, the medical surveillance program that includes scheduling of examinations, certification of fitness for duty, compliance with OSHA requirements, and information provided to the physician. Examinations will be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and will be provided without cost to the employee, without loss of pay and at a reasonable time and place. Medical surveillance protocols and examination and test results will be reviewed by the Occupational Physician. The medical surveillance program will contain the requirements specified below. Personnel working in contaminated areas of the site will have been examined as prescribed in 29 CFR 1910.120, and 29 CFR 1926.65, and determined medically fit to perform their duties.

8.2 Frequency of Medical Examinations

Employees will have been provided with medical examinations as specified, within the past 12 months and will receive exams annually thereafter (if contract duration exceeds 1 year); on termination of employment; reassignment in accordance with 29 CFR 1910.120(e)(3)(1)(C), and 29 CFR 1926.65 (e)(3)(I)(C); if the employee develops signs or symptoms of illness related to workplace exposures; if the physician determines examinations need to be conducted more often than once a year; and when an employee develops a lost time injury or illness during the period of this contract. The supervisor will be provided with a written statement signed by the physician prior to allowing the employee to return to the work site after injury or accident illness resulting in a lost workday, as defined in CFR 29 Part 1904 Section .12 (f).

8.3 Content of Medical Examinations

The following elements will be included in the medical surveillance program. Additional elements may be included at the discretion of the occupational physician responsible for reviewing the medical surveillance protocols.

- Determine a base-line picture of employee's health against which future changes can be measured.
- General physical examination including evaluation of all major organ systems.
- Identify any underlying illnesses or conditions which might be aggravated by certain exposures or job activities.
- Recognize any abnormalities, toxic reactions, or other changes in health, at the earliest opportunity, so that corrective measures can be taken.
- Annual testing of contractor's employees including physical examinations and regular blood workups.

- Physical examination follow-up including physician recommendations and discussion pre-existing health conditions which may effect the employees work status.
- Pulmonary function testing including FVC and FEV.
- CBC with differential.
- Biological blood profile (SMAC-21 or equivalent).
- Urinalysis with microscopic examination.
- Audiometric testing (as required by hearing conservation program).
- Visual acuity.
- Chest x-ray (as directed by Occupational Physician).
- Electrocardiogram (as directed by Occupational Physician).
- Urine heavy metals
- Serum lead
- Zinc protoporphyrin

8.4 Information Provided to the Occupational Physician

CAL INC has enlisted the services of a board certified occupational health physician with the knowledge and experience in the hazards associated with the project and will provide medical examinations and surveillance. The physician, prior to employee examination, will be provided with the following:

- Information about the site vis a vis contamination characteristics.
- A description of the employee's duties as they relate to the employee's exposure.
- The employee's exposure levels or anticipated exposure levels.
- A description of any personal protective equipment used or to be used.
- Information from previous medical examinations of the employee.
- Information of the OSHA respiratory protection standard 29 CFR 1910.134.
- A copy of 29 CFR 1910.120, or 29 CFR 1926.65.
- Information from previous examinations not readily available to the examining physician.
- A copy of Section 5.0 of NIOSH Pub No. 85-115.1.1

8.5 Physician's Written Opinion

Before work begins a copy of the physician's written opinion for each employee will be obtained and furnished to the Safety and Health Manager and to the employee. The opinion will address the employee's ability to perform hazardous remediation work and will contain the following:

- The physician's recommended limitations upon the employee's assigned work and/or PPE usage below. Personnel working in contaminated areas of the site will have been examined as prescribed in 29 CFR 1910.120, and 29 CFR 1926.65, and determined medically fit to perform their duties.
- The physician's opinion about increased risk to the employee's health resulting from performing work at the site.

- A statement that the employee has been informed and advised about the results of the examination.

8.6 Medical Records

Documentation of medical exams will be provided as part of the Certificate of Worker or Visitor Acknowledgment. Medical records will be maintained in accordance with 29 CFR 1910.120, and 28 CFR 1926.65.

8.7 Certificate of Worker or Visitor Acknowledgment

Medical records will be maintained in accordance with 29 CFR 1910.120, and 28 CFR 1926.65.

9.0 CONFINED SPACE ENTRY

Entry into all confined spaces, such as excavations greater than 5 feet in depth, will be prohibited until 1) primary and secondary entry and egress procedures have been established by the SSHO, 2) a Confined Space Entry Permit has been completed by the SSHO, submitted and approved by the CO, and posted conspicuously on site, 3) a tailgate safety meeting has been held with the SSHO and workers entering the confined space, and 4) the atmosphere in the confined space has been monitored for concentrations of oxygen and contaminants. Air monitoring will be performed continuously by the SSHO during the time the workers are present in the confined space. The SSHO will test all areas (top, middle, bottom) of the confined space to determine if stratification has occurred. Resolution of hazardous atmospheric conditions may require forced ventilation of the confined space. Forced ventilation procedures must be approved by the CO.

10.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

10.1 Exposure Monitoring/Air Sampling General

Where it has been determined that there may be employee exposures to on-site and/or off-site migration potentials of hazardous airborne concentrations of hazardous substances appropriate (personal and environmental) direct-reading (real time) air monitoring and integrated (time-weighed average) air sampling will be conducted in accordance with applicable regulations (OSHA, EPA, State). Monitoring will be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls and work practices. Air monitoring will be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed. Both air monitoring and air sampling must accurately represent concentrations of air contamination encountered on and leaving the site.

- All monitoring/sampling results will be compared to "action levels" to determine acceptability and need for corrective action.
- Meteorological monitoring will be performed on-site as needed and used as an adjunct in determining perimeter and any off-site monitoring/sampling locations. Where perimeter monitoring/sampling is not deemed necessary, provide a suitable justification for its exclusion.
- Personal samples will be analyzed only by laboratories successfully participating in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Testing (PAT) or Laboratory Accreditation programs. All monitoring/sampling results will be compared to action levels to determine acceptability and need for corrective action.

10.2 Real-time Monitoring

The following field screening equipment will be used to identify hazardous atmospheric conditions:

- A combination oxygen/combustible gas meter
- An Organic Vapor Analyzer (OVA), either a photoionization or flame ionization detector
- Direct-reading colorimetric indicator tubes for benzene
- Respirable dust monitor
- Sound level meter
- Heat stress monitor

The Contractor will calibrate field monitoring equipment each day prior to commencement of work and after work is completed. The field screening equipment will be calibrated according to manufacturers instructions. An oxygen meter will be used whenever a combustible gas meter is used.

Additional characterization will be conducted do define the extent of contamination in areas exhibiting organic vapor 5 meter units above background (sustained 15 seconds at breathing zone) when using the OVA. Benzene will be selected as the indicator contaminant for determining the need for a higher level of PPE because the lowest PEL of the known site volatile contaminants. Upgrade to Level C PPE at 0.5 ppm Benzene.

Upgrade to Level C PPE when the PID/FID detects petroleum hydrocarbons at 50 meter units (benzene less than 0.5 ppm). Integrated air sampling using a solid sorbent media or filter will be conducted when total hydrocarbon levels exceed 50 ppm, if benzene exceeds 0.5 ppm, or if respirable dust exceeds 2.5 mg/M3.

Meteorological monitoring will be performed on-site and used as an adjunct in determining any off-site monitoring/sampling locations. Noise monitoring will be conducted as needed, depending on the site hazard assessment.

10.2.1 OVA Monitoring

The OVA will be set to operate in the total organic vapor mode and to operate continuously from the time excavation/sampling begins to the time complete removal clearance at a given location has been completed. The sampling probe will be positioned in the breathing zone of the person working closest to the contaminant.

The photoionization detector is insensitive to methane; for that reason it is preferred over flame ionization detectors for this OVA applications where methane may be also potentially present.

10.2.2 Hazard Scenario I

If exposure exceeds 5.0 ppm for 10 continuous seconds as determined above, excavation personnel will immediately stop work and the SSHO will be notified. Continued excavation in the contaminated areas will be performed only by contractors possessing OSHA 40 hour training. If exposure exceeds 100 ppm work will be suspended until permission is given by the SSHO. A total organic vapor reading of 100 ppm does not indicate that conditions are immediately dangerous; and the recommended respirators will provide sufficient protection to allow personnel to move the worksite and equipment away from the contaminant without harm if the move is performed without delay.

10.2.3 Combustible Gas Meter

The combustible gas meter will be used to determine the presence of combustible concentrations of gases, such as methane, in or around the excavation or sampling areas. Air sampling will be conducted when deemed appropriate by SSHO, Superintendent, QC Manager or other site personnel.

10.2.4 Hazard Scenario II

If potentially dangerous levels (e.g., 50% of LEL) of combustible gases are encountered, work will be stopped and restarted when spark-proof equipment is used for evaluating the potential hazard. Workers monitoring LEL and combustible gas conditions will need to use appropriate PPE.

10.3 Personal Air Monitoring

Personal air monitoring (if indicated by direct reading equipment) will be performed to assess the degree of exposure to confirm the adequacy of the level of personal protective equipment. Integrated air sampling using a solid sorbent media, filter, etc., will be conducted when the concentration of a toxic chemical exceeds any PEL or TLV value. Personal air sampling will be performed at intervals designated in the SSHP. Full-shift or near-full-shift breathing zone samples will be collected. Sampling results will be compared to either the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) or the OSHA Permissible Exposure Limits (PEL), whichever is more restrictive.

10.4 Continuous or Periodic Monitoring

Requirements for continuous or periodic monitoring will be determined based on the initial survey monitoring results and knowledge of the operations. Periodic monitoring will be conducted when the possibility of an immediately dangerous to life or health (IDLH) condition or flammable atmosphere has developed or when there is an indication that exposures may have risen over permissible exposure limits (PELs) since prior monitoring. Monitoring will be conducted when contaminants other than those previously identified are being handled. Whenever air monitoring within the exclusion zone indicates that Level C PPE is required, routine air monitoring at the boundary of the exclusion zone will be required. The exclusion zone will be expanded as necessary to ensure airborne concentrations do not exceed Level D Action Levels. Monitoring will be conducted when contaminants other than those previously identified are being handled.

10.5 Evacuation of Work Area

The Contractor will discontinue work operations and have workers evacuate the work area whenever air monitoring indicates concentrations of combustible gas at 20% of the LEL. Work activities will not resume until conditions have been evaluated and corrected.

10.6 Data Recording

Results of air monitoring will be recorded daily. Data to be logged will include:

- Location monitored
- Activities during monitoring
- Date and time monitoring occurred
- Personnel exposed
- Background concentrations recorded and the location
- Weather conditions
- Identification of equipment used for air monitoring
- Results of air monitoring

11.0 HEAT AND COLD STRESS MONITORING

11.1 General

The Safety and Health Manager will develop a heat stress and cold stress monitoring program for onsite activities. Details of the monitoring program, including schedules for work and rest, and physiological monitoring requirements, will be described in the SSHP. Personnel will be trained recognize the symptoms of heat and cold stress. The SSHO and an alternate person will be designated, in writing, to be responsible for the heat and cold stress monitoring program.

11.2 Heat Stress Monitoring

Heat stress is the adverse stress to body due to exposure to excess heat can greatly diminish the ability of the body to function properly. Therefore, all personnel involved in work activities will wear personal protective equipment and by the rate of work performed. Because the incidence of heat stress depends on a variety of factors, all workers will be monitored. Hazards associated with heat stress include the following:

- Heat Rash--may result from continuous exposure to heat or to humid air.
- Heat Cramps--caused by heavy sweating with inadequate electrolyte replacement. Heat cramps can cause muscle spasms, pain in the hands, feet and abdomen.
- Heat Exhaustion--occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Heat exhaustion can cause pale, cool, moist skin, heavy sweating, dizziness, and nausea and fainting.
- Heat Stroke--the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Heat stroke can cause red, hot unusually dry skin. Symptoms include lack of, or reduced perspiration, nausea, dizziness, confusion, and strong rapid pulse and coma.

During the day-to-day field work, the Safety and Health Officer, Project Superintendent, and workers will be alert for the signs and symptoms of heat stress. A hazard exists when individuals are required to work in warm temperatures while wearing protective equipment. The Safety and Health Officer will monitor the ambient air temperature utilizing local information sources.

The field crew members working in chemical-resistant protective clothing will be observed for the following signs and symptoms of heat stress, dizziness and nausea, profuse sweating, skin color change, vision problems, fainting, weakness, fatigue, cramping, and hot, red, dry skin.

Any team member who exhibits these symptoms will be monitored for heat stress. Heat stress will consist of measuring heart rate and/or body temperature (alternative) to prevent the onset of heat stress illness.

Heart rate (HR) will be measured by the radial pulse of the wrist for thirty seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats per minute. If the HR is in excess of the above guideline, the next work period will be shortened by one-third, while the length of the rest period stays the same. If the pulse rate is in excess of 110 beats per minute at the beginning of the next rest period, the following work cycle will be further shortened by one-third.

Workers experiencing heat stress that is not relived by rest period/work period modifications will be removed immediately from field work and be required, if conscious, to consume two to four pints of electrolyte fluid or cool water every hour while resting in a shaded area. The individual should not return to work until symptoms are no longer recognizable. If the symptoms appear critical, persist or get worse, immediate medical attention will be sought.

11.3 Cold Stress

Cold Stress is the adverse stress to the body due to exposure to excess cold. Cold stress can greatly diminish the ability of the body to function properly. Knowing how to recognize such stress and how to prevent it will greatly enhance the employee's ability to function under these conditions.

- Cold stress is the significant heat loss resulting from hypothermia which typically occurs in cold, wet and windy environments. Workers are more susceptible to hypothermia when they are physically exhausted or in poor condition. Most people think of only sub-zero conditions as dangerous, but hypothermia commonly occurs at temperatures above freezing (32 degrees F). Although the combination of cold, wet and windy conditions is the most dangerous, simply being cold and tired may bring on hypothermia.
- Frostbite is the most common injury resulting from exposure to cold. The extremities of the body are most often affected. The signs of frostbite are: 1) The skin turns white or grayish-yellow; 2) Pain is sometimes felt early but subsides later. Often there is no pain. 3) The affected part feels intensely cold and numb.
- Hypothermia is characterized by shivering, numbness, drowsiness, muscular weakness and low internal body temperature when the body feels warm externally. This can lead to unconsciousness and death. With both frostbite and hypothermia, the affected areas need to be warmed quickly. This is best done by immersing in warm, not hot, water. In all cases seek medical assistance.
- Prevention - Dress for windy and wet weather. Clothing may include wool socks, long underwear, insulated jackets and/or pants; insulated hat and cotton undergloves. Many layers of clothing are better than a single heavy coat. Head coverings should be worn. Maintain a good diet. Because the body will use large amounts of energy staying warm, you will need to replace the lost energy by eating plenty of food and drinking liquids. Stay active. When the body is physically active, heat is generated. When you are inactive, (standing or sitting) the body's metabolism drops, producing less heat. If your job is to observe, move around a little, swing your arms, tighten your muscles or walk a few steps to stay active. Do not sit or lay directly on cold objects or the ground. During the day-to-day field work, the Construction Managers, Project Superintendents, and workers will be alert

for the signs and symptoms of cold stress. A hazard exists when individuals are improperly clothed and are performing relatively stationary tasks such as inspection or observation.

12.0 SAFETY PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

12.1 General Site Rules/Prohibitions

12.1.1 Worker Information

All employees, subcontractors or persons entering the site who will be engaged in hazardous waste operations or have the potential to be exposed to hazardous material will be informed of the nature, level and degree of exposure likely as a result of participation in or around the hazardous waste handling operations. Each person engaged in such operations will be required to indicate they have been informed of the associated hazards and requirements for personnel. A certificate to be used by each worker and visitor will be completed and submitted.

12.1.2 Buddy System

Contractor personnel will not conduct work activities alone at this site. The "Buddy System", as specified in 29 CFR 1910.120 will be implemented. The buddy teams working at the site will maintain visual and audible contact so that they may provide emergency assistance to each other. Both members of the buddy team need not be in the same site zone, but each member must be wearing adequate PPE to assist the other member.

12.1.3 Engineering Controls and Work Practices

Engineering controls will be instituted to reduce employee exposure to or below PELs for substances regulated by 29 CFR Part 1910 to the extent that such controls are feasible. These may include the use of pressurized cabs or control booths or equipment. Work practices may include the wetting down of dusty operations and locating employees upwind of possible hazardous areas.

12.1.4 Employee Rotation

The Contractor will not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

12.1.5 Work Practices and Procedures

The following health precautions will be implemented:

- Avoid skin contact and inhaling vapors
- Keep petroleum liquids away from eyes, skin, and mouth, they can be harmful or fatal if inhaled, absorbed through the skin, or ingested
- Use soap and water or waterless hand cleaner to remove any petroleum product that contacts skin. Do not use gasoline or similar solvents to remove oil and grease from skin
- Promptly wash petroleum-soaked clothes and avoid using soaked leather goods.
- Properly dispose of rags
- Keep work areas clean and well ventilated
- Clean up spills promptly.

12.2 Materials Handling

12.2.1 Spill and Discharge Control

All potential spills or discharges will be addressed in accordance with the Spill and Discharge Plan, presented in Appendix 4.

Should spill or discharge of contaminated soil occur, the following measures will be undertaken:

- Take immediate measures to control and contain the spill within the site boundaries. This will include, at a minimum, keep unnecessary people away, isolate hazardous areas, and deny entry, do not allow anyone to touch spilled material.
- Stay upwind
- Keep out of low areas
- Keep combustibles away from the spilled material
- Use water spray or foam to reduce vapor or dust generation, as needed
- Take samples for analysis to determine that clean-up is adequate
- Remove or retrieve any discharged liquids or sludges, if possible. Absorb discharged materials with sand, clean fill, or other noncombustible absorbent material. Place the absorbent/spill mixture into containers and dispose of as per EPA and DOT requirements.

12.2.1.1 Solid Spills

For solid spills, immediately remove and place contaminated materials into staging piles, and cover, identify the pile as contaminated, test the material for treatability, and dispose of off-site at an approved off-site disposal facility.

12.2.1.2 Liquid Spills

If a discharge of material stored in an impoundment, tank, or container occurs, the following actions will be taken to reduce potential migration to adjacent properties, take immediate measures to control the discharge within the site boundaries or beyond the site boundaries. This will include, at a minimum, the following actions:

- Immediately identify the point of discharge and take measures to eliminate further discharges, contain and eliminate the discharge if possible.
- Remove or retrieve any discharged liquids or sludges.
- Absorb discharged materials with sand, clean fill, or other noncombustible absorbent material
- Place the absorbent/discharge mixture into dry containers
- Keep unnecessary people way
- Isolate the hazardous area
- Deny entry
- Do not allow anyone to touch the discharged materials.

12.2.1.3 Notification of Spills and Discharges

If the spill or discharge is reportable, and/or human health or the environment are threatened, notify the National Response Center, Contra Costa County Department of Environmental Health-Hazardous Materials Division, and the CO. Spills or leaks, regardless of their quantity will be reported to the Contracting Officer immediately following discovery. A follow-up written report will be submitted to the Contracting Officer within seven (7) days after the initial report. The written report will be in narrative form and as a minimum include the following:

- A description of the material spilled including identity and quantity. Photographs will be provided showing the location and extent of the spill.
- Whether the amount spilled is EPA/State reportable and when and to whom it was reported.
- Exact time and location of the spill, including a description of the area involved.
- Containment procedures initiated and a full description of the cleanup measures taken, or to be taken, including disposal location of the spill residue.

12.2.2 Materials Transfer Safety

A vacuum truck will be used for removal of free product from the excavation. The area of operation for the vacuum truck will be vapor free. The truck will be located upwind from the tank and outside the path of probable vapor travel. The vacuum pump exhaust gases will be discharged through a hose of adequate size and length downwind of the truck area. Vacuum truck operating and safety practices will conform to API Publication 2219.

12.2.3 Materials Handling, Storage, and Disposal

Employees will be trained in and will use proper lifting techniques. Material handling devices will be available for the material handling needs of an activity. Whenever heavy or bulky material is to be moved, the material handling needs will be evaluated in terms of weight, size, and distance and path of move. The following hierarchy will be followed in selecting a means for material handling:

- elimination of material handling need by engineering,
- movement by mechanical device (e.g. lift truck, overhead crane, or conveyor),
- movement by manual means with handling aid (e.g. dolly or cart), or
- movement by manual means with protective equipment (e.g. lifting belt or lifting monitor).

Materials will not be moved over or suspended above personnel unless positive precautions have been taken to protect the personnel from falling objects. Where the movement of materials may be hazardous to persons, taglines or other devices will be used to control the loads being handled by hoisting equipment: these devices will be nonconductive when used near energized lines.

All material in bags, containers, bundles, or stored in tiers will be stacked, blocked, interlocked, and limited in height so that it is stable and secured against sliding or collapse. Material will be stacked as low as practical and in no case higher than 20 feet unless otherwise specified in this section. Unauthorized persons will be prohibited from entering storage areas. All persons will be in a safe position while materials are being loaded or unloaded from railroad cars, trucks, or barges.

Non-compatible materials will be segregated in storage. Storage of bagged materials.

- Bagged materials will be stacked by stepping back the layers and crosskeying the bags at least every ten bags high.
- Bags of cement and lime will not be stacked more than ten high without setback, except when restrained by walls of appropriate strength.
- The bags around the outside of the stack will be placed with the mouths of the bags facing the center of the stack.
- During unstacking, the top of the stack will be kept nearly level and the necessary setback maintained.

Structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, will be stacked and blocked so as to prevent spreading or tilting. Pipe, unless racked, will not be stacked higher than 5 feet.

Work areas and means of access will be maintained safe and orderly. Sufficient personnel and equipment will be provided to insure compliance with all housekeeping requirements. Work areas will be inspected daily for adequate housekeeping and findings recorded on daily inspection reports. Work will not be allowed in those areas that do not comply with the requirements of this section.

All stairways, passageways, gangways, and accessways will be kept free of materials, supplies, and obstructions at all times. Tools, materials, and equipment subject to displacement or failing will be adequately secured. Bags containing lime, cement, and other dust-producing material will be removed periodically as specified by the designated authority.

Debris will be cleared from work areas and accessways in and around building storage yards and other structures. A regular procedure will be established for cleanup of the area as specified by the designated authority. Rubbish, brush, long grass, or other combustible material will be kept from areas where flammable and combustible liquids are stored, handled, or processed.

Accumulation of liquids, particularly flammable and combustible liquids, on floors, walls, etc. is prohibited. Spills of flammable and combustible liquids will be cleaned up immediately.

Waste material and rubbish will be placed in containers or, if appropriate, piles. Waste material and rubbish will not be thrown down from a height of more than 6 feet unless the following are complied with. Separate covered, self-closing, non-flammable/-non-reactive containers will be provided for the collection of garbage, oily, flammable, and dangerous wastes. The containers will be labeled with a description of their contents. The contents will be properly disposed of daily.

Hazardous material waste (i.e., vehicle and equipment oils and lubricants, containers and drums for solvents, adhesives, etc.) will be collected, stored, and disposed of in accordance with Federal, state, and local agencies.

12.3 Temporary Facilities

Plans for the layout of temporary construction buildings, facilities, fencing, and access routes, as appropriate, will be submitted to and approved by the appropriate local authorities. Trailers and other temporary structures used as field offices will be anchored with rods and cables or by steel straps to ground anchors. The anchoring system must meet applicable state or local standards and will be designed to withstand winds.

12.4 Hot Work

Hot work will not be permitted on or within the tanks except as outlined herein. Prior to conducting hot work, a hot work permit will be prepared and submitted. An example format for a hot work permit will be included in the SSHP. The permit will describe compliance with the following procedures. An individual at each hot work site will be designated as a fire watch. This person's sole responsibility will be to monitor the hot work and have immediate access to the fire extinguisher located at each hot work site. A new permit will be obtained at the start of each work shift during which hot work will be conducted.

12.5 Ignition Sources

No ignition sources not required for the completion of this project will be permitted in the Exclusion or Contamination Reduction Zones. Before any work is done that might release vapors, Work Zones will be barricaded and posted. All sources of ignition will be eliminated from the area where flammable vapors may be present or may travel.

Signs will be posted warning that vehicles and other sources of ignition will be kept out of the area. No work will be done if the wind direction may carry vapors into areas outside the work zones nor when an electrical storm is threatening the site of work.

Sparks caused by friction or electrostatic effects may also be a source of ignition in flammable atmospheres, especially at low humidity. Proper grounding of metal objects and/or electrical equipment, together with the use of sparkless tools and localized adjustment of humidity, may reduce this hazard.

12.6 Fire Protection and Prevention Plan

12.6.1 Fire Protection and Prevention Plan Elements

The following are the elements of the Fire Protection and Prevention Plan:

- Portable fire extinguishers will be provided where needed and inspected and maintained properly.
- Fire extinguishers will be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
- Fire barrels and buckets will be painted red, marked "For Fire Only". Barrels will be kept filled at all times. Anti-freeze protection will be provided when necessary. Each barrel will be provided with at least two fire buckets.
- Approved fire blankets will be provided and kept in conspicuous and accessible locations as warranted by the operations involved.
- A fire extinguisher, rated not less than 2-A, will be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher will not exceed 100 feet.
- One or more fire extinguishers, rated not less than 2-A, will be provided on each floor. In multi-story buildings, at least one fire extinguisher will be located adjacent to each stairway.
- A fire extinguisher, rated not less than 10B will be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the worksite. This requirement does not apply to the integral fuel tanks of motor vehicles.
- At least one portable fire extinguisher, having a rating of not less than 20-B units, will be located outside of but not more than 10 feet from the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.
- At least one portable fire extinguisher having a rating of not less than 20-B units will be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

- At least one portable fire extinguisher not less than 20-B:C units will be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.
- Each service or fueling area will be provided with at least one fire extinguisher having a rating of not less than 20-B:C located so that an extinguisher will be within 50 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.
- Fire extinguisher equipment will be provided in storage areas according to the hazard present.
- Fire extinguisher or equivalent protection will be provided at the head and tail pulleys of underground belt conveyors and at 300 foot intervals along the belt.
- Fire extinguishers listed or approved by a nationally recognized testing laboratory will be used.
- No fire will be fought where the fire is in imminent danger of contact with explosives. All persons will be removed to a safe area and the fire area guarded against intruders.

- A fire extinguisher rated not less than 2-A will be provided where melting pots, torches, or open flames are in use.
- Sprinklers will be installed in accordance with the Standard for the Installation of Sprinkler Systems, NFPA 13.
- A 1/2-inch diameter garden hose line, not to exceed 100 feet in length and equipped with a nozzle, may be substituted for a 2-A-rated fire extinguisher, provided it is capable of discharging a minimum of 5 gallons per minute with minimum hose stream range of 30 feet horizontally. The garden hose lines will be mounted on conventional racks or reels. The number and location of hose racks or reels will be such that at least one hose stream can be applied to all points in the area.

12.6.2 Water Supply and Distribution

Water supply and distribution facilities for fire fighting will be provided and maintained in accordance with recommendations of National Fire Protection Association or United States Coast Guard regulations. Where a water distribution system is required for the protection of buildings or other structures, water mains and hydrants will be installed prior to or concurrently with the construction of the facilities. Until the permanent system is in operation, an equivalent temporary system will be provided. Vehicles, equipment, materials, and supplies will not be placed so that access to fire hydrants and other fire fighting equipment is obstructed.

12.6.3 Equipment

Fire fighting equipment will be provided and installed in accordance with recommendations of the National Fire Protection Association and United States Coast Guard regulations. No fire protection equipment or device will be made inoperative or used for other purposes, unless specifically approved by the designated authority. Inspections and tests of all mobile fire apparatus will be conducted weekly to assure it is in satisfactory operating condition. If fire hose connections are not compatible with local fire fighting equipment, adapters will be made available.

12.6.4 Fire Alarm Devices

An alarm system will be established by the employer whereby employees on the site and the local fire department can be alerted for an emergency. The alarm code and reporting instructions will be conspicuously posted at phones and at employee entrances. Reporting and evacuating instructions will be conspicuously posted. For work at installations which are equipped with radio wave fire alarm systems, a compatible fire alarm transmitter should be utilized at the construction site.

12.6.5 Fire Fighting Organizations, Training and Drilling

Fire fighting organizations will be provided to assure adequate protection to life and property. National Fire Protection Association recommendations will be used for determining type, size, and training of fire fighting organizations. Fire brigade drills will be held to assure a well-trained and efficient operating force. Records of such drills will be maintained at the installation. Demonstrations and training in first aid fire fighting will be conducted at intervals to insure that project personnel are familiar with and are capable of operating first aid fire fighting equipment.

12.6.6 Miscellaneous

When unusual fire hazards exist or emergencies develop, additional fire protection will be provided as required by the designated authority. When outside help is relied upon for fire protection, a written arrangement will be made if possible. Otherwise a memorandum of record will be provided to the Government person in charge stating agreement and giving details. Standpipe and hydrant connections must be compatible with the equipment of the local fire department. Emergency telephone numbers and reporting instructions will be conspicuously posted.

12.7 Electrical Safety

12.7.1 General

If temporary electrical power is used for this project, it will conform to the National Electrical Code, the National Electrical Safety Code, and EM 385-1-1. Where possible, motorized vehicles will be grounded. Electrical equipment to be used on this project will conform to EM 385-1-1. Air monitoring and sampling equipment will be rated intrinsically safe for Class 1, Division 1, Groups A,B,C, and D areas. All electrical equipment will be protected by Ground Fault Circuit Interrupters (GFCI).

12.7.2 Utilities

Clearances to adjacent overhead transmission and distribution electrical lines will be sufficient for the movement of vehicles and operation of construction equipment. The requirements stated in 29 CFR 1926, EM 385-1-1, and the National Electric Safety Code will be followed by the Contractor.

12.7.3 Lockout/Tagout

Lockout and tagout will be performed only by authorized employees. Employees affected by the lockout or tagout will be notified, prior to and upon completion of, the application and removal of lockout or tagout devices. Systems with energy isolating devices which are capable of being locked out will utilize locking devices to control hazardous energy unless the designated authority (SSHO) has demonstrated and documented all of the following: (1) the use of locking devices would entail burdens that exceed any advantage to the use of lockout over the use of tagout devices, (2) the use of tagout devices will provide full employee protection (as defined in this section), and (3) all affected employees can and will be informed that tagout is being used in lieu of lockout.

If an energy isolating device is not capable of being locked out, the hazardous energy control procedures will utilize tagout providing full employee protection, as follows: (1) all tagout requirements of this regulation and of the hazardous energy control procedures will be complied with (2) the tagout device will be attached to the same location, It possible, that the lockout device would have been attached; ff this is not possible then the tag will be attached as close as safely possible to the device and in a position that will be immediately obvious to anyone attempting to operate the device (3) additional means (e.g., placement of the tag in a manner which inhibits operation of the energy isolating device, removal of an isolating circuit mechanism, blocking of a control switch, opening of an extra disconnecting device, removal of a valve handle to reduce the likelihood of inadvertent energization, etc.) will be employed to provide a level of protection commensurate to that provided by a lockout device.

12.7.4 Hazardous Energy Control Plan

Periodic (at least daily) inspections will be conducted to ensure that all requirements of the hazardous energy control procedures are being followed and will include: a review of each authorized and affected employee of that employee's knowledge of, and responsibilities under, the lockout or tagout procedure, and an evaluation of the implementation and effectiveness of the requirements of the procedures.

Inspections will be documented and specify the system (location) where the energy control procedures were inspected, the date of the inspection, the names of employees performing and included in the inspections, and any deficiencies in compliance with the hazardous energy control procedures.

Lockout and tagout devices will be capable of withstanding the environment to which they are exposed for the maximum period of time the exposure is expected, and indicate the identity of the employee applying the device. These devices will be substantial enough to prevent removal without the use of excessive force or unusual techniques (such as with the use of bolt cutters). These devices will meet all of the following requirements: a. have a standardized (within a project) print and format, b. be constructed and printed so that exposure to weather conditions, wet or damp locations, or corrosive environments will not cause the tag to deteriorate or the message to become illegible; c. be attached by means which are (1) non-reusable, (2) substantial enough to

prevent inadvertent or accidental removal, (3) attachable by hand, self-locking, non-releasable, with a minimum unlocking strength of no less than 50 pounds, and (6) have the basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie; (7) warn against the hazardous condition resulting from system energization and include a legend such as DO NOT START, DO -NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE, etc.

The authorized employee will ensure that all energy isolating devices needed to control energy to, or within, the system are identified and that system is shut down, isolated, blocked, and secured in accordance with the hazardous energy control procedure. Any system operated by a remotely controlled source will be completely isolated such that it cannot be operated by that or any other source. The authorized employee will affix lockout and/or tagout devices to each energy isolating device. Lockout devices will be affixed to each energy isolating device in a manner that will maintain the energy isolating device in the safe position. Tagout devices will be affixed in such a manner as will clearly indicate that the operation of movement of energy isolating devices from the safe position is prohibited.

In areas not under strict control of personnel involved with the hazardous energy control activities, and in areas with public access, padlocks or other positive controls must be installed on the isolation devices along with the appropriate tags. Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy will be relieved, disconnected, restrained, or otherwise rendered safe. Protective grounds will be identified with safe clearance tags. The authorized employee is responsible ensuring the control of residual energy and for placing and tagging and removing or moving protective grounds in accordance with the requirements specified in the hazardous energy control procedures. When there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation will be continued until the energy control procedure is complete. Prior to starting work on systems which have been locked out or tagged out, the authorized employee will verify that isolation and de-energization of the system have successfully been accomplished.

When tagout devices are used, employees will be instructed in the following requirements and limitations of tags. Tags must be legible and understood by all authorized and affected employees and incidental personnel. Tags and their means of attachment must be made of materials which will withstand the environments encountered in the workplace. Tags will be securely attached to energy isolating devices so that they cannot become inadvertently or accidentally detached during use. Tags will not be removed without authorization of the authorized employee and will never be bypassed, ignored, or otherwise defeated. Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical protection that is provided by a lock; tags may evoke a false sense of security.

Before lockout or tagout devices are removed and energy restored to the system, the authorized employee will ensure that following actions have been taken: the work area has been inspected and all non-essential Items (e.g., tools and materials) have been removed from the system, the system components are operationally intact, and all employees have been safely positioned or

removed from the area; and, all affected employees have been notified that the lockout or tagout devices are about to be removed.

With the exception of the following conditions, each lockout and/or tagout device will be removed from each energy isolating device by the authorized employee who applied the device. When this employee is not available, the device(s) may be removed by another individual appointed by, and under the direction of, the designated authority (Corps or contractor, as appropriate) provided that the following procedures are complied with:

- the designated authority ensures that the individual appointed to remove lockout and/or tagout devices is knowledgeable of the scope and procedures of the safe clearance;

- this individual and the requirements for transferring removal authority to him from the authorized individual are listed in the hazardous energy control plan;

- verification by the designated authority that the authorized employee who applied the device is not at the facility;
- the designated authority makes all reasonable efforts to contact the authorized employee to inform him that the lockout and/or tagout devices are to be removed; and
- the authorized employee is informed that the lockout and/or tagout devices have been removed prior to their resuming work at the facility.

12.8 Excavation Safety

Inspections of the excavations will be conducted daily. If there is evidence of a possible cave-in or slide, all work near the excavation will cease until the necessary precautions have been taken to safeguard the employees. If it is necessary to place or operate heavy equipment on a level above and near an excavation, the side of the excavation will be cut back, sheet-piled, shored, or braced as necessary to resist the extra pressure due to such superimposed loads. When mobile equipment is used adjacent to excavations, substantial stop logs or barricades will be installed. If possible, the grade should be away from the excavation. Adequate barriers will be provided at all excavations. All excavating work will be conducted in strict conformance with, at a minimum, EM 385-1-1 and 29 CFR 1926.650 through 29 CFR 1926.653, including requirements for shoring or continuously sloping excavations in which employees are exposed to danger from moving ground. Excavated or stockpiled materials and equipment will not be placed closer to the edge of the excavation than a distance equivalent to one-half the maximum depth of excavation. If the excavation must remain open during periods when the worksite is unoccupied (i.e., overnight, over a weekend, and other similar off periods) lighted barricades will be placed around the excavation in such a manner to alert personnel to the danger and prevent them from falling into the trench. Clearances to adjacent overhead transmission and distribution electrical lines will be sufficient for the movement of vehicles and operation of construction equipment. The requirements stated in EM 385-1-1, 29 CFR 1926, and the National Electric Safety Code will be followed. All utilities must be appropriately identified and marked. All underground utilities including electric, natural gas, cable TV, and telephone lines must be identified through the Underground Service Alert (USA) utility locating

notification service and/or through a private pipeline locating company. Caution will be employed to through hand excavation and pipe locating to determine the actual locations of underground utilities with respect to the pipeline excavation. If required, permits will be obtained for the construction of trenches or excavations which are 5 feet or deeper and into which a person is required to descend.

12.9 Hazard Communication

All personnel must follow established work practices to safely handle hazardous chemicals. A hazardous chemical is broadly defined as a chemical that is either a health hazard, a physical hazard or both. The Contractor will develop a hazard communication program to limit the risks of personnel exposures, damage to equipment, and the unplanned release of hazardous chemicals to the environment due to normal operations. The written program will include protocols for:

- Assessment of the hazards associated with chemicals on site
- Inventory and labeling of chemicals
- Communication of hazards to the employee through Material Safety Data Sheets (MSDSs)
- Hazard communication training
- Acquisition, transportation and handling of chemicals
- Emergency response to releases of chemicals.

The requirements of this program will apply to CAL INC in the event that they need to store hazardous chemicals such as calibration gases for field monitoring equipment, fuel, caustic compounds for sample preservation, or solvents for equipment decontamination on the site. The CAL INC will be responsible for coordinating the inventory of hazardous chemicals used or stored at the site. The inventory will be utilized for reporting and emergency response purposes. Data contained in the inventory will include the name, quantity, and location of the chemical. Material Safety Data Sheets must be readily available.

12.9.1 Check-in and Check-out System

A check-in and check-out system will be used so that there is control and a record of each employee and piece of equipment in each specific work area.

12.9.2 Exposure Symptoms

The Contractor will train employees to recognize symptoms such as dizziness, nausea, skin rash, etc. which may be indicative of exposure to hazards at the site. Workers experiencing any unusual symptoms of fatigue, dizziness, high body temperature, skin or respiratory irritation or suspected overexposure should immediately withdraw from the work area and go through decontamination. The employee should then notify their supervisor.

12.10 Illumination

Work areas will be illuminated to a minimum of 10 foot-candles. If work area illumination levels fall below 10 foot candles supplemental lighting will be provided.

12.11 Sanitation

12.11.1 Potable Water

An adequate supply of drinking water will be supplied from sources approved by Federal, State, or local health authorities. Drinking water will be dispensed by means which prevent contamination between the consumer and source. Outlets dispensing non-potable water will be conspicuously posted: "CAUTION -- WATER UNFIT FOR DRINKING, WASHING OR COOKING". Approved potable water systems only will be used for the distribution of drinking water. A sanitary container for the paper cups and a waste receptacle for the used cups will be provided. Containers for drinking water will be clearly marked as to contents and not used for other purposes. There will not be any cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

12.11.2 Non-Potable Water

Outlets for non-potable water, such as water for fire fighting purposes, will be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes. There will be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

12.11.3 Toilets

One toilet per twenty worksite personnel will be provided at the job site in accordance with EM 385-1-1. Each toilet will be equipped with a metal, plastic, or porcelain urinal trough. Toilets will be so constructed that the occupants will be protected against weather and falling objects. All cracks will be sealed and the door will be tight-fitting, self-closing and latchable. Seat boxes will be vented to the outside (minimum vent size four inches inside diameter) with vent intake located one inch below the seat. Toilets will be constructed so that the interior is lighted. Adequate ventilation will be provided and all windows and vents screened. Provisions for routinely servicing and cleaning all toilets and disposing of the sewage will be established.

12.11.4 Washing Facilities

Washing facilities will be provided as needed to maintain healthful and sanitary conditions. Washing facilities for persons engaged in handling or excavation of hazardous waste, application of paints, coatings, herbicides, insecticides, or in other operations where contaminants may be harmful, will be at or near the work site and will be adequate for removal of the harmful substance. The washing facility will be maintained in a sanitary condition and provided with water, soap,

individual means of drying, and metal-covered receptacles for waste. The washing facility will be equipped with eye wash equipment.

12.11.5 Showers and Changing Room

No shower installations are anticipated for the project. A changing room for workers exposed to contaminated materials is anticipated. Should the decontamination procedure indicate a need for regular showers and change rooms outside of a contaminated area, they will be provided and meet the requirements of 29 CFR 1910.141.

12.12 Signs and Labels

Prior to commencement of site operations, the Contractor will post signs at the perimeter of the exclusion and contamination reduction zones stating:

HAZARDOUS AREA - KEEP OUT
DANGER
NO SMOKING
AUTHORIZED PERSONNEL ONLY

Signs will be visible from all points where entry might occur and at such distances from the restricted area that employees may read the signs and taken necessary protective steps before entering.

12.13 Permits, Licenses, and Notifications

Necessary permits and licenses will be obtained in conjunction with the project hazardous waste site operations, transportation and disposal actions and timely notification furnished of such actions required by Federal, Alameda County, and local authorities and as otherwise specified herein.

12.14 Rental Equipment

If rental equipment is to be used, written notification will be provided to the rental agency, concerning the intended use of the equipment, the possibility of contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification will be obtained from the rental agency.

12.15 Protection of Adjacent Work or Areas to Remain

The work will be performed without damage or contamination of adjacent work or areas. Where such work or area is damaged or contaminated as verified by the Contracting Officer using visual inspection and/or sample analysis, it will be restored to its original condition or decontaminated by the Contractor at no expense to the Government as deemed appropriate by the Contracting Officer. When satisfactory visual inspection and/or sampling analysis results are obtained and have been evaluated by the Contractor and the Contracting Officer, work may proceed.

12.16 Waste Disposal

Final completed copies of the Waste Shipment Record for all shipments of hazardous waste material as specified by EPA and other required state waste manifest shipment records as specified herein. Such completed forms signed and dated by the agent of the disposal/treatment facility will be submitted within 3 days after date of delivery.

12.17 Cranes and Rigging

Cranes used for the installation of soldier piling during shoring operations will have the following documents with them at all times they are to be operated. A copy of the operating manual developed by the manufacturer for the specific make and model of crane; a copy of the operating manual for any crane operator aids with which the crane is equipped. The load rating chart for the crane, which will include: (1) the crane make and model, serial number, and year of manufacturer; (2) load ratings for all crane operating configurations, including optional equipment; (3) wire rope type, size, and reeving; line pull, line speed, and drum capacity; and (4) operating limits in windy or cold weather conditions. The crane's log book which will be used to record operating hours and all crane inspections, tests, maintenance and repair. The log will be updated daily as the crane is used and will be signed by the operator and supervisor: service mechanics will sign the log after conducting maintenance or repairs on the crane. The operator will not engage in any activity which will divert his attention while operating the crane. The operator will respond to signals from the person who is directing the lift or an appointed signal person: when a signal person is not used as part of the crane operation, the operator is responsible for the lifts. Each operator is responsible for those operations under his direct control. Prior to a lift, the rigger (except during a critical lift, when these will be done by the lift supervisor) will ensure that: (1) the crane is level and, where necessary, blocked; (2) the load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches; (3) the lift and swing path is clear of obstructions and adequate

clearance is maintained from electrical sources, and (4) all persons are clear of the swing radius of the counterweight.

When two or more cranes are used to lift one load, one designated person will be responsible for the operation. The designated person will analyze the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made. The designated person will make such determinations as the necessity to reduce crane ratings, load position, boom location, ground support, and speed of movement, which are required to make the lift. The designated person will ensure that all prescribed communication (including signaling) personnel and/or equipment are on hand and property functioning, and that all personnel involved with the crane operation understand the communication systems and their responsibilities associated with communications. Cranes and derricks may only be operated by qualified operators. Cranes and derricks will be operated, inspected, tested and maintained in accordance with the manufacturer's operating manual for the crane.

Rigging equipment for material handling will be inspected as specified by the manufacturer, by a qualified person, prior to use on each shift and as necessary during Its use to ensure that it is safe. Detective rigging will be removed from service. The use and maintenance of rigging equipment will be in accordance with recommendations of the rigging manufacturer and the equipment manufacturer: rigging equipment will not be loaded in excess of the recommended safe working load. Rigging equipment, when not in use, will be removed from the immediate work area and properly stored to maintain it in good condition and to not create any hazards. Hoist rope will not be wrapped around the load. Running lines located within 6 feet - 6 inches of the ground or working level will be guarded or the area restricted.

All eye splices will be made in an approved manner; rope thimbles of proper size will be fitted in the eye, except that in slings the use of thimbles will be optional.

When hoisting loads, a positive latching device will be used to secure the load and rigging.

Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged will be removed from service.

Custom designed grabs, hooks, clamps, or other lifting accessories for such units as modular panels, prefabricated structures, and similar materials will be marked to indicate the safe working loads and will be proof-tested prior to use to 125% of their rated load..

When two wires are broken or rust or corrosion is found adjacent to a socket or end fitting, the wire rope will be removed from service or resocketed. Special attention will be given to the inspection of end fittings on boom support, pendants, and guy ropes. Wire rope removed from service due to defects will be cut up or plainly marked as being unfit for further use as rigging. Wire rope clips attached with U-bolts will have the U-bolts on the dead or short end of the rope: the clip nuts will be retightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope will have a clip attached to it or looped back and secured to itself by a clip: the clip will not be attached directly to the live end.

The safe working load of various classifications and sizes of improved plow steel wire rope and wire rope slings with various terminals will be determined by using the manufacturer's ratings and grades provided that a safety factor of at least 5 is maintained.

Protruding ends of strands in splices on slings and bridles will be covered or blunted. Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or for pulling loads, will consist of one continuous piece without knot or splice. An eye splice made in any wire rope will have not less than five full tucks (this requirement will not preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited). Wire rope will not be secured by knots except on haul back lines on scrapers. Eyes in wire rope bridles, slings, or bull wires will not be formed by wire rope clips or knots. Wire rope clips will not be used to splice rope.

Only alloyed chain will be used in rigging. Chain will be inspected before initial use and weekly thereafter. When used with alloy steel chains, hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments will have a rated capacity at least equal to that of the chain. Job or shop hooks and links, makeshift fasteners formed from bolts and rods, and other similar attachments will not be used.

Fiber rope will not be used if it is frozen or if it has been subjected to acids or excessive heat. Fiber rope will be protected from abrasion by padding where it is fastened or drawn over square corners or sharp or rough surfaces.

Protection will be provided between the sling and sharp unyielding surfaces of the load to be lifted. The use of slings will be such that the entire load is positively secured. Wire rope slings will have a minimum length of clear wire rope equal to ten times the rope diameter between each end fitting or eye splice. Braided slings will have a minimum clear length of braided body equal to forty times the diameter of component ropes between each end fitting or eye splice. Welded alloy steel chain slings will have affixed durable permanent identification stating size, grade, rated capacity, and sling manufacturer.

The subcontractor will have each synthetic web sling marked or coded to show: name or trademark of manufacturer; rated capacities for the type of hitch; and, (3) type of material.

Drums, sheaves, and pulleys will be smooth and free of surface defects which may damage rigging. The ratio between the diameter of the rigging and the drum, block, sheave, or pulley tread diameter will be such that the rigging will adjust itself to the bind without excessive wear, deformation, or damage. In no case will the safe diameters of drums, blocks, sheaves, or pulleys be reduced in replacement of such items unless compensating changes are made in terms of the rigging used and the safeloading limits.

Drums, sheaves, or pulleys having eccentric bores, cracked hubs, spokes, or flanges will be removed from service. Connections, fittings, fastenings, and attachments used with rigging will be of good quality, of proper size and strength, and will be installed in accordance with recommendations of the manufacturer.

The following will be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when allowed by the manufacturer provided that a safety factor of at least five Is maintained. Shackles will not be eccentrically loaded.

The manufacturer's recommendations will be followed in determining the safe working loads of the various sizes and types of specific hooks. All hooks for which no manufacturer's recommendations are available will be tested to twice the intended safe working load before they are put into use- the employer will maintain a record of the dates and results of such tests. Open hooks are prohibited in rigging used to hoist loads. Hoisting hooks rated at 10 tons or larger will be provided with safe handling means.

Drums will have sufficient rope capacity with rope size and reeving to perform all hoisting recommend and lowering functions. At least three full wraps (not layers) of rope will remain on the drum at all times. The drum end of the rope will be anchored by a clamp securely attached to the drum with an arrangement approved by the manufacturer.

Grooved drums will have the correct groove pitch for the diameter of the rope: the depth of the groove will be correct for the diameter of the rope. (1) The flanges on grooved drums will project beyond the last layer of rope a distance of either 2 inches or twice the diameter of the rope, whichever is greater. (2) The flanges on ungrooved drums will project beyond the last layer of rope a distance of either 2-1/2 inches or twice the diameter of the rope, whichever is greater.

Sheaves will be comparable with the size of rope used, as specified by the manufacturer. Sheaves will be inspected to insure they are of correct size, property aligned, lubricated, and in good condition. When rope is subject to riding or lumping off a sheave, the sheave will be equipped with cable-keepers.

Shoulderless eye bolts will not be loaded at an angle. Eye bolts will only be loaded in the plain of the eye and will not be loaded at angles of less than 45 degrees to the horizontal.

12.18 Welding and Cutting

Welders, cutters, and their supervisor will be trained in the safe operation of their equipment, safe welding/cutting practices, and welding/cutting respiratory and fire protection. All welding equipment will be inspected daily. Defective equipment will be removed from service, replaced or repaired, and reinspected before again being placed in service. Welding cylinders and their use will meet the applicable requirements of Section 20, EM 385-1-1. Arc welding and cutting systems and their use will meet the applicable requirements of Section 11, EM 385-1-1. Workers and the public will be shielded from welding rays, flashes, sparks, molten metal, and slag. Cable, hoses, and other equipment will be kept clear of passageways, ladders, and stairways.

Welding and cutting of hazardous materials.

- When welding, cutting, or heating on steel pipelines containing natural gas, 49 CFR Part 192, Welding of Steel in Pipelines, will apply.
- Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test will be made to determine its flammability: preservative coatings will be considered to be highly flammable when scrapings burn with extreme rapidly.
- Preservative coatings will be removed a sufficient distance from the area to be heated to ensure that the temperature of the unstrapped metal will not be appreciably raised: artificial cooling of the metal surrounding the heating area may be used to limit the size of the area to be stripped.
- When welding, cutting, or heating toxic preservative coatings in enclosed spaces, all surfaces covered with toxic preservatives will be stripped of such coverings for a distance of at least 4 inches from the area of heat application or the employees will be protected by air-line respirators.
- When welding, cutting, or heating toxic preservative coatings in the open air, employees will be protected by respirator.

All structural welding accomplished by the contractor or subcontractor on items such as scaffolding, shoring, forms, ladders, piling, etc., will be performed by certified welders using qualified welding procedures. Before heat is applied to a drum, container, or hollow structure, a vent or opening will be provided for the release of any built-up pressure generated during the application of heat.

Employees performing welding, cutting, or heating will be protected by personal protective equipment appropriate for the hazards: respiratory, vision, and skin protection required in the Site Health and Safety Plan. All welding and cutting equipment and operations will be in accordance with standards and recommended practices of American National Standards Institute standard ANSI Z49.1.

All welding, cutting, and heating operations will be ventilated (natural or mechanical) such that personnel exposures to hazardous concentrations of airborne contaminants are within acceptable limits. Welding, cutting, and heating not involving conditions or materials described in this section may normally be done without mechanical ventilation or respiratory protective equipment. General mechanical or local exhaust ventilation will be provided whenever welding, cutting, or heating is performed in a confined space.

Materials of toxic significance. Welding, cutting, or heating operations which involve or generate any of the following materials (Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Ozone, Selenium, Silver, Vanadium) will be performed in accordance with the following:

- Whenever these materials are encountered in confined spaces, local mechanical exhaust ventilation and personal respiratory protection will be used
- Whenever these materials, with the exception of beryllium, are encountered in indoor operations, local mechanical exhaust ventilation will be used: when beryllium is encountered in indoor operations, local mechanical exhaust ventilation and personal respiratory protection will be used.
- Whenever these materials are encountered in outdoor operations, personal respiratory protection will be used.

Welding, cutting, or heating operations which involve or generate fluorine or zinc compounds will be performed in accordance with the following:

- In confined spaces, local mechanical exhaust ventilation or personal respiratory protection will be used.
- In open spaces, sampling will be performed to determine concentrations of fluorides or zinc compounds and the need for local exhaust ventilation or personal respiratory protection.

Oxygen cutting using either a chemical flux or iron powder, gas-shielded arc cutting, or plasma cutting will be done using local mechanical exhaust ventilation or other means adequate to remove the fumes generated. Other persons exposed to the same atmosphere as welders or cutters will be protected in the same manner as welders or cutters.

Compatible fire extinguishing equipment will be provided in the immediate vicinity of welding or cutting operations. Prior to conducting welding or cutting operations, the area will be surveyed to ensure it is free of the following hazards:

- combustible materials
- the presence or possible generation of potentially explosive atmospheres (flammable gases, vapors, liquids, or dusts)
- the presence or nature of an oxygen-enriched atmosphere.

Objects to be welded, cut, or heated will be:

- moved to a location free of dangerous combustibles;
- if the work cannot be moved, all moveable fire hazards in the vicinity will be taken to a safe place (moved at least 35 feet horizontally from the welding or cutting area) or the combustible material and construction will be protected from the heat, sparks, and slag of welding
- when welding or cutting must be done in a location where combustible or flammable materials are located, inspection and written authorization by the designated authority will be required before such operations are begun (the location will be checked for latent fires after the work is completed).

When a welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel will be assigned to guard against fire and instructed in anticipated fire hazards and how fire fighting equipment is to be used.

Where welding or cutting is to be done near walls, partitions, ceiling or roof of combustible construction, fire resistant guards will be provided to prevent ignition. Prior to welding or cutting drums, tanks, or other containers and equipment which have contained hazardous materials the containers will be thoroughly cleaned in accordance with NFPA 327, Cleaning or Safeguarding Small Tanks and Containers, and ANSI/AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers that have Held Hazardous Substances.

Hot tapping or other welding or cutting on a flammable gas or liquid transmission or distribution pipeline will be performed only by personnel qualified to make hot taps and only with the permission of the designated authorities. When welding or cutting in areas protected by fire detection and suppression systems, precautions will be taken to avoid accidental initiation of these systems.

Oxyfuel gas welding and cutting equipment will be listed by a nationally recognized testing laboratory. Oxygen cylinders and apparatus.

- Oxygen cylinders and apparatus will be kept free from oil, grease, and other flammable or explosive substances and will not be handled with oily hands or gloves.

- Oxygen cylinders and apparatus will not be used interchangeably with any other gas.

Fuel gas hose and oxygen hose will be readily distinguishable from each other. Oxygen and fuel gas hoses will not be interchangeable; a single hose having more than one gas passage will not be used. Hose couplings of the type that can be unlocked without a rotary motion are prohibited. Hose which has been subject to flashback or which shows severe wear or damage will be tested to twice the normal pressure to which it is subjected, and in no case less than 300 psi; defective hose, or hose in doubtful condition, will not be used. When parallel runs of oxygen and fuel gas hose are taped together, not more than 4 out of every 12 inches will be covered by tape. Boxes used for the storage of gas hose will be ventilated. Hose connections will be clamped or otherwise securely

fastened in a manner that will withstand, without leakage, twice the pressure to which they are normally subjected in service, but not less than 300 psi.

Torches will be inspected, at the beginning of each working shift, for leaking shutoff valves, hose couplings, and tip connections. Defective torches will not be used. Hoses will be purged individually before lighting the torch for the first time each day. Hoses will not be purged into confined spaces or near ignition sources. Clogged torch tip openings will be cleaned with suitable cleaning wires, drills, or other devices designed for such purposes. Torches will be lighted by friction lighters or other approved devices, not by matches or from hot work. Torch valves will be closed and the gas supply shut off whenever work is suspended. The torch and hose will be removed from confined spaces whenever work is suspended.

Fuel gas piping will be provided with protective equipment, to prevent: (1) the backflow of oxygen into the fuel gas supply system, (2) the passage of a flash back into the fuel gas supply system, and (3) excessive back pressure of oxygen into the fuel gas supply system. The three functions of protective equipment may be combined in one device. Where branch lines are of 2-inch pipe size or larger or of substantial length, protective equipment will be appropriately located. A check valve, pressure regulator, hydraulic sea[, or combination will be provided at each station outlet to prevent backflow. When approved pipeline protective equipment is provided at the station outlets no additional check valve, pressure regulator, or hydraulic seal is required. A shutoff valve will be installed at each station outlet and located on the upstream side of other station outlet equipment. Station outlets will be sealed (capped) except when a hose, a regulator, or piping is attached.

Fuel gas and oxygen cylinder manifolds will bear the name of the substance they contain in letters at least 1 inch high which will be painted on the manifold or on a sign permanently attached to it. Connection of multiple sets of oxyacetylene hoses to a single regulator on a single set of oxyacetylene tanks may only be accomplished by installing a commercially available fitting approved by Compressed Gas Association (CGA) standards and listed by a nationally recognized testing laboratory. The fitting will be installed on the output side of the regulator and will have a built-in shut-off valve and reverse-flow check valve on each branch. Acetylene regulators will not be adjusted to permit a discharge greater than 15 psi.

Electric welding apparatus will be installed, maintained, and operated in accordance with the National Electrical Code. Only manual electrode holders specifically designed for arc welding and cutting of a capacity capable of safely handling the maximum rated current required by the electrodes may be used. All current carrying parts of the holder which are gripped by the welder or cutter, and the outer jaws of the holder, will be fully insulated against the maximum voltage encountered to ground. Cables will be completely insulated, flexible, capable of handling the maximum current requirements of the work in progress, and in good repair. Cables with splices or repaired insulation within 10 feet of the holder will not be used. Where it becomes necessary to connect or splice lengths of cable together, insulated connectors of a capacity at least equivalent to that of the cable will be used. If connections are effected by cable lugs, they will be securely fastened together to give good electrical contact and the exposed wires of the lugs will be completely insulated. The frames of arc welding and cutting machines will be grounded either by a

third wire in the cable connecting the circuit conductor or by a separate wire which is grounded at the source of the current. Neither terminal of the welding generator will be bonded to the frame of the welder. Pipelines containing gases or flammable liquids or conduits carrying electrical conductors will not be used for a ground return circuit. Circuits from welding machines used for other than welding tools will be grounded. Welding supply cables will not be placed near power supply cables or other high-tension wires. Welding leads will not be permitted to contact metal parts supporting suspended scaffolds. Switching equipment for shutting down the welding machine will be provided on or near the welding machine. The equipment will be shut down when the leads are unattended. Arc welding and cutting operations will be shielded by noncombustible or flameproof screens to protect employees and other visitors from the direct rays of the arc. Coiled welding cable will be spread out before use.

Chlorinated solvents will be kept at least 200 feet, unless shielded, from the exposed arc. Persons in the area not protected from the arc by screening will be protected by filter lenses. When two or more welders are exposed to each other's arc, filter lens goggles will be worn under welding helmets: hand shields will be used to protect the welders against flashes and radiant energy when either the helmet is lifted or the shield is removed. Welders and other persons who are exposed to radiation will be protected so that the skin is covered to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields will be free of leaks, openings, and highly reflective surfaces. When gas metal arc welding is performed on stainless steel, persons will be protected against dangerous concentrations of nitrogen dioxide by local exhaust ventilation or air-line respirators.

12.19 Machinery and Mechanized Equipment

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent person and certified to be in safe operating condition. Inspections and tests will be in accordance with manufacturer's recommendations and will be documented. Records of tests and inspections will be maintained at the site by the contractor, and will be made available upon request of the designated authority.

Daily/shift inspections and tests.

- All machinery and equipment will be inspected daily (when in use) to ensure safe operating conditions: the employer will designate competent persons to conduct the inspections
- Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition and that all required safety devices are in place and functional.

Whenever any machinery or equipment is found to be unsafe, or whenever a deficiency which affects the safe operation of equipment is observed, the equipment will be immediate taken out of service and its use prohibited until unsafe conditions have been corrected. A tag indicating that the equipment will not be operated, and that the tag will not be removed, will be placed in a conspicuous location on the equipment. The tag will remain in its attached location until it is

demonstrated to the individual deadlining the equipment that it is safe to operate. When corrections are complete, the machinery or equipment will be retested and reinspected prior to being returned to service.

Machinery and mechanized equipment will be operated only by designated qualified personnel. Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded. Getting off or on any equipment where it is in motion is prohibited. Machinery and equipment will be operated in accordance with the manufacturer's instructions and recommendations. Inspections or determinations of road conditions and structures will be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.

Seats or equal protection must be provided for each person required to ride on equipment. Equipment operated on the highway will be equipped with headlights, taillights, brake lights, and backup light and turn signals visible from the front and rear. All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

Mobile equipment, operating within an off-highway job site not open to public traffic, will have a service brake system and a parking brake system capable of stopping and holding the equipment while fully loaded on the grade of operation. In addition, it is recommended that heavy duty hauling equipment have an emergency brake system which will automatically stop the equipment upon failure of the service brake system; this emergency brake system should be manually operable from the driver's position.

Preventive maintenance procedures recommended by the manufacturer will be followed. All machinery or equipment will be shut down and positive means taken to prevent Its operation while repairs or manual lubrications are being done. Equipment designed to be serviced while running are exempt from this requirement. All repairs on machinery or equipment will be made at a location which will protect repair personnel from traffic. Heavy machinery, equipment, or parts thereof which are suspended or held apart by slings, hoist, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated. All mobile equipment and the areas in which they are operated will be adequately illuminated while work is in progress.

All vehicles which will be parked or moving slower than normal traffic on haul roads will have a yellow flashing light or four-way flashers visible from all directions.

No one will be permitted in the truck cab during loading operations except the driver and then only if the truck has a cab protector. Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

Whenever equipment is parked the parking brake will be set. Equipment parked on an incline will have the wheels chocked or track mechanism blocked and the parking brake. Equipment left unattended at night, adjacent to a highway in normal use or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment. No modifications or additions which affect the capacity or safe operation of machinery or equipment will be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals will be changed accordingly. In no case will the original safety factor of the equipment be reduced.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering handwheel to spin: when permitted, the steering knob will be mounted within the periphery of the wheel.

Safeguards will be provided to prevent machinery and equipment operating on floating plant from going into the water.

All industrial trucks will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in ANSI/ASME B56.1, Safety Standards for Low Lift and High Lift Trucks.

Lift trucks, stackers, and similar equipment will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed. Personnel will not work or pass under or ride in the buckets or booms of loaders in operation.

Each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, and other similar equipment will be equipped with at least one dry chemical or carbon-dioxide fire extinguisher with a minimum rating of 5-B:C.

Fill hatches on water haul vehicles will be secured or the opening reduced to a maximum of 8 inches.

Self-propelled construction equipment, whether moving alone or in combination, will be equipped with a reverse signal alarm. Equipment designed and operated so that the operator is always facing the direction of motion does not require a reverse signal alarm. Reverse signal alarms will be audible and sufficiently distinct to be heard under prevailing conditions. Alarms will operate automatically upon commencement of backward motion. Alarms may be continuous or intermittent (not to exceed 3-second intervals) and will operate during the entire backward movement. Reverse signal alarms will be in addition to requirements for signalpersons. A warning device or signalperson will be provided where there is danger to persons from moving equipment, swinging loads, buckets, booms, etc.

All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment will be guarded when exposed to contact by persons or when they otherwise create a hazard. All hot surfaces of equipment, including exhaust pipes or other lines, will be guarded or insulated to prevent injury and fire. All equipment having a charging skip will be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated. Platforms, footwalks, steps, handholds, guardrails, and toeboards will be designed, constructed, and installed on machinery and equipment to provide safe footing and accessways. Equipment will be provided with suitable working surfaces of platforms, guard rails, and hand grabs when attendants or other employees are required to ride for operating purposes outside the operator's cab or compartment: platforms and steps will be of nonskid material. Substantial overhead protection will be provided for the Operators of fork lifts and similar material handling equipment.

Fuel tanks will be located in a manner which will not allow spills or overflows to run onto engine, exhaust, or electrical equipment. Exhaust or discharges from equipment will be so directed that they do not endanger persons or obstruct view of operator. A safe tire rack, cage, or equivalent protection will be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices. No guard, safety appliance, or device will be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then only after the power has been shut off. All guards and devices will be replaced immediately after completion of repairs and adjustments and before power is turned on. Seatbelts and anchorages meeting the requirements of 49 CFR 571 will be installed and worn in all motor vehicles.

All high rider industrial trucks will be equipped with overhead guards which meet the structural requirements defined in paragraph 4.21 of ANSI/ASME B56.1, Safety Standards for Low Lift and High Lift Trucks. Suitable protection against the elements, falling or flying objects, swinging loads, and similar hazards will be provided. Operators of all machinery or equipment; glass used in windshields or cabs will be safety glass.

All bulldozers, tractors, or similar equipment used in clearing operations will be provided with guards, canopies, or grills to protect the operator from falling and flying objects as appropriate to the nature of the clearing operations.

Seat belts and rollover protective structures (ROPS) will be installed on: (1) crawler and rubber-tire tractors including dozers, push and pull tractors and winch tractors (2) off-the-highway self-propelled pneumatic-tire earth movers such as trucks, pans, scrapers, bottom dumps and end self-propelled construction equipment such as front-end loaders, backhoes, rollers, and compactors.

Rollover protection is required on trucks designed for hauling on public highways, crane-mounted dragline backhoes, sections of rollers and compactors of the tandem steel-wheeled and self-propelled pneumatic tired type that do not have an operator's station, self-propelled rubber-tired lawn and garden tractors and side boom pipe laying tractors operated solely on flat terrain, not exposed to rollover hazards, and (5) cranes, draglines, or equipment on which the operator's cab and boom rotate as a unit.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

12.20 Pressurized Equipment

Pressurized equipment and systems will be inspected and performance tested before being placed in service and after any repair or modification. Unless state or local codes specify more frequent inspection and testing, temporary or portable pressurized equipment and systems will be inspected and performance tested at intervals of not more than six months and permanent installations will be inspected and performance tested at least annually. As a minimum performance test the equipment and system will be subjected to at least the overpressure for actuating a property adjusted safety relieving device; the operability of gauges and relieving and control devices will be demonstrated to the Designated Authority. Inspections and tests will be performed by personnel qualified in accordance with American Society of Mechanical Engineers (ASME) Code or the National Board of Boiler and Pressure Vessel Inspectors. Unless otherwise specified by state or local codes, hydrostatic testing of unfired pressured vessels will be performed: when vessels are installed; when vessels are placed in service after lay-up; after any repairs or modifications; every three years; if the vessel shows any rust or other deterioration; or when conditions found during inspections warrant tests.

12.21 Safe Access and Fall Prevention

Safe access will be provided to all work areas where there is: a horizontal or vertical break of 19 inches or more in a route of access, a stairway, ladder, ramp, or personnel hoist will be provided; means of access constructed of metal will not be used for electrical work or where they might contact electrical conductors; when a structure has only one means of access between levels, that means will be kept clear to permit free passage of employees: if work is performed in an area that restricts free passage, a second means of access will be provided; when a structure has two or more means of access between levels, at least one means of access will always be available for free passage of employees.

Means of access will not be loaded beyond the maximum intended load for which they were designed or beyond their manufactured rated capacity: when loaded, planking and decking will not deflect more than 1/60 the span length. The width of accessways will be determined by the purpose for which they are built and will be sufficient to provide safe passageway for supplying materials and movement of personnel: with the exception of ladders, in no case will the width be less than 18 inches. All load-carrying lumber used for accessways, except planking, will be a minimum of Number 1 Southern Pine Grade, Number 1 Douglas Fir, or the equivalent. Lumber will be reasonably straight-grained and free of shakes, checks, splits, cross grains, unsound knots or knots in groups, decay and growth characteristics, or any other condition which will decrease the strength of the material.

Supporting members and foundations will be of sufficient size and strength to safely distribute loading. Supporting members will be placed on a firm, smooth foundation that will prevent lateral displacement. Unstable objects such as barrels, boxes, loose bricks, or concrete blocks will not be used as supports.

Vertical members (e.g., poles, legs, or uprights) will be plumb and securely braced to prevent swaying or displacement. The design and construction or selection of planking and platform for means of access will be based upon either the number of persons for which they are rated or the uniform load distribution to which they will be subjected.

Solid sawn planks will be of a scaffold plank grade and certified by, of bear the grade stamp of, a grading agency approved by the American Lumber Standards Committee. Planking will be secured to prevent loosening, tipping, or displacement and supported or braced to prevent excessive spring or deflection intermediate beams will be provided to prevent dislodgement of planks due to deflection. The spans listed below are permitted for individual wood planks of scaffold plank grade- light-duty loading does not govern for conditions covered by this table. Planking will be laid with edges close together across the entire access surface: there will be no spaces through which personnel, equipment, or material could fall. When planking is lapped, each plank will lap its supports at least 12 inches. Where the ends of planks abut each other to form a flush floor, the butt joint will be at the centerline of a pole and abutted ends will rest on separate bearers.

Employees will be protected by standard guardrail, catch platforms, temporary floors, safety nets, personal fall protection devices, or the equivalent, in the following situations: (1) on accessways (excluding ladders) or work platforms from which they may fall 6 feet or more, (2) on accessways or work platforms over water, machinery, or dangerous operations, (3) on runways from which they may fall 4 feet or more. Every stairway and ladderway floor opening will be guarded on all exposed sides, except the entrance opening, by securely anchored standard guardrail; entrance openings will be offset or provided with a gate to prevent anyone walking into the opening. Platforms, with the exception of scaffolds, 4 feet to 6 feet in height, having a minimum horizontal dimension in either direction of less than 45 inches will have standard railing installed on all open sides and ends of the platform or the workers will use personal fall protection.

Each employee will be trained in the safe use of accessway and fall protection systems and the recognition of hazards related to their use, including: 1) the nature of access and fall hazards in the work area; (2) the correct procedures for constructing, erecting, maintaining, using, and dismantling accessways and fall protection systems; (3) the maximum intended load-carrying capacities of accessways and fall protection systems; and, (4) all applicable requirements from this section. Retraining will be provided as necessary for employees maintain an understanding of these subjects.

A standard guardrail will consist of toprails, midrails, is and will have a vertical height of a, +/- 3 inches from the upper surface of the toprail to platform, runway, or ramp level. Standard guardrail will be provided with toeboards on all open sides/ends where persons are required or permitted to pass on or under the elevated platform or where needed to prevent and material from failing from the elevated platform. Toprails and midrails. Toprails and midrails will be smooth-surfaced throughout their length. Midrails will be halfway between the toprails and the floor, runway, or ramp. The ends of the toprails and midrails will not overhang posts except where such overhang does not constitute a projection hazard. Synthetic or natural fiber ropes will not be used as toprails siderails: wire rope may be used as toprails or midrails if it is maintained to provide not more than 4 inches in any direction from the center line, under a Pound weight and if support posts are located not more 18 feet apart. For wood railings, toprails will be of at least 2 x 4-inch and midrails will be at least 2 x 6-inch stock; for pipe railings, toprails and midrails will be at least 0.070-inch wall steel tubing or 1.990 inch x 0.058-inch minimum tubing; for structural steel railings, toprails and midrails will be 1 inch x 1-1/4 inch x 1/8-inch angles or other metal shapes lumber spaced not to exceed 8 feet; for pipe railings, posts will be at least 1 inch x 0.070-inch wall steel tubing or 1.990 inch x 0.058-inch wall aluminum tubing spaced not more than 8 feet on center; for structural steel railings, posts will be of 1-1/4 inch x 1-1/4 inch x 1/8-inch angles or other metal shapes of equivalent strength, spaced not more than 8 feet on center.

Toeboards will be 1 inch x 4 inch lumber or the equivalent. Toeboards will be securely fastened in place and have not more than 1/4-inch clearance above floor level. Toeboards will be made of any substantial material, either solid or with openings not over 1 inch in greatest dimension. Where material is piled to such a height that a standard toeboard does not provide protection, paneling or screening from floor to toprail or midrail will be provided. The anchoring of posts and framing of members for all guardrails will be of such construction that the completed structure will withstand a

load of at least 200 pounds applied in any direction at any point on the toprail without failure and with a minimum of deflection.

Guardrails receiving heavy stresses from employees trucking or handling materials will be provided additional strength by the use of heavier stock, closer spacing of posts, bracing, or by other means. A standard handrail will be of construction similar to a standard guardrail except that it is mounted on a wall or partition and does not include a midrail. Handrails will have smooth surfaces along the top and both sides. Handrails will have an adequate handhold for anyone grasping it to avoid failing. Ends of handrails will be constructed so as not to constitute a projection hazard. The height of handrails will be not more than 37 inches nor less than 30 inches from upper surface of handrail to surface of tread, in line with face of riser or to surface of ramp. All handrails and railings will be provided with a clearance of approximately 3 inches between the handrail or railing and any other object.

Personal fall protection devices, independently attached or attended, will be used when performing such work as the following: work in hoppers, bins, silos, tanks, or other confined spaces; work on hazardous slopes, structural steel, poles; erection or dismantling of safety nets; tying reinforcing bars; work from boatswain's chairs, swinging scaffolds, or other unguarded locations at elevations greater than 6 feet; work on skips and platforms used in shafts by crews when the skip or cage does not block the opening to within 1 foot of the sides of the shaft, unless cages are provided. Selection of personal fall protective equipment will be based on the type of work; the work environment; the weight, size, and shape of the user; the type and position of anchorage; and the length of the lanyard.

Personal fall protection equipment will be used only for employee safeguarding: any such equipment actually subjected to impact loading will be immediately removed from service, and will not be used again for employee safeguarding.

No more than one employee may be attached to any one vertical lifeline. Lifelines will be protected against being cut or abraded. The anchor point for a lanyard or deceleration device attached to a lifeline, or a lanyard or a deceleration device attached to a fixed anchorage point, should, ff possible, be located above the wearer's belt or harness attachment. A suitable anchorage point is one which is strong enough to support at least two times the potential impact load of an employee's fall, allows free movement of the attachment, is located as it as possible to prevent contact with an obstruction below should the worker fall, and is as vertical as possible in order to reduce swinging. If a structural member with a sharp edge is used as an anchorage point for a rope, the rope will be effectively sleeved to prevent its being cut or abraded.

Type I body belts for fall arrest should be worn with the lanyard or deceleration device attachment point(s) positioned in the center of the wearers back at hip level. Type I body harnesses used for fall arrest should be worn with the attachment on the back of the wearer near the shoulders.

Personnel in unguarded work places over water, machinery, dangerous operations, or more than 25 feet above the surface will be protected by safety nets: safety nets are not required for short term

repair work where other protection is provided. The use of personal fall protection devices (safety belt/harness, lanyard, and lifeline) is generally not an acceptable substitute for nets. However, for specific operations when approved in writing by the designated authority delineated in the activity hazard analysis(ses), their use maybe substituted. Operations requiring safety net protection will not be undertaken until the net(s) is in place and has been tested. Safety and debris nets will be inspected by a competent person in accordance with the manufacturer's recommendations. Inspections will be conducted after installation, at least weekly thereafter, and following any alteration, repair, or impact loadings: inspections will be documented. If welding or cutting operations occur above the nets, weld protection will be provided. The frequency of inspections will be increased in proportion to the potential for damage to the nets.

All portable ladders will be of sufficient length and will be placed so that workers will not stretch or assume a hazardous position. Portable ladders used as temporary access will extend at least 3 feet past the landing. When a 3 foot extension is not possible, a grasping device (such as a grabrail) will be provided to assist employees in mounting and dismounting the ladder. In no case will the length of the ladder be such that ladder deflection under a load would, by Itself, cause the ladder to slip off Its support. The length of portable step ladders will not exceed 20 feet. When splicing is required to obtain a given length of siderail, the resulting side rail must be at least equivalent in strength to a one-piece side rail made of the same material. Wood ladders will not be coated with any opaque covering, except for identification or warning labels which may be placed on only one face of a side rail. A metal spreader bar or locking device will be provided on each stepladder to hold the front and back sections in an open position.

Ladders will not be placed in passageways, doorways, drives, or any locations where they may be displaced by any other work unless protected by barricades or guards. Portable ladders will be used at such a pitch that the horizontal distance from the top support to the foot of the ladder will not be greater than one-fourth the vertical distance between these points. Wood job-made ladders with spliced rails will be used at an angle such that the horizontal distance is one-eighth the length of the ladder. Ladders will be secured by top, bottom, and intermediate fastenings as required to hold them rigidly in place and to Support the loads which will be imposed upon them. The steps or rungs of all ladders will be set to provide at least 7 inches toe space from the inside edge of the rung to the nearest interference. The top of a non-self supporting ladder will be placed with the two rails supported equally unless it is equipped with a single support attachment. No work requiring lifting of heavy materials or substantial exertion will be done from ladders. When ladders are the only means of access to or from a working area for 25 or more employees, or when a ladder is to serve simultaneous two-way traffic, double-cleated ladders will be used. Portable ladders will have slip-resistant feet. Ladders will not be moved, shifted, or extended while occupied. The top or top step of a step ladder will not be used as a step. Ladders will be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders will be immediately tagged.

13.0 SITE CONTROL MEASURES

All personnel entering the site will be required to sign in on a site control log. In addition, all workers will be required to complete the worker/visitor acknowledgment form. Copies of both the site control log and the worker/visitor acknowledgment form are presented in Attachment F. The purpose of the site control measures is to prevent the spread of contamination and control the flow of personnel, vehicles, and materials into and out of work areas. Procedures for preventing the spread of contamination include establishing work zones, maintaining a site control log, developing an communications program, and implementing site security measures. A discussion of each procedure that will be implemented for preventing the spread of contamination is presented in the following sections.

13.1 Work Zone Designations

Work zone designations for the project have been determined based on physical characteristics of the site (e.g. location of tanks and piping, existing fencing, buildings, roads, etc.) and potential to encounter physical and chemical hazards at the site. In general, the designation of work zone boundaries will be based on contamination characterization data and the Hazard Analysis presented in Attachment A. As work progresses and field conditions are monitored, work zone boundaries may be modified, with the approval of the CO. work zones will be clearly identified and marked in the field using temporary fencing, barricades and tape, and signs. A site map showing the work zone boundaries will be posted in the on-site field office.

13.1.1 Exclusion Zone (EZ)

Includes all areas where contamination is known or anticipated. Entry into the exclusion zone is limited to properly protected and trained personnel. Entry and exit will occur only through the CRZ.

13.1.2 Contamination Reduction Zone (CRZ)

The personnel decontamination facilities, when required, will be located in this zone. When leaving the Exclusion Zone personnel will pass through this area, decontaminate themselves as required before entering the Support Zone. Site personnel will utilize a step-off decontamination sequence unless protection levels are upgraded, in which case, decontamination procedures are to be modified. All materials are to be properly decontaminated before being removed from the site.

13.1.3 Support Zone (SZ)

The Support Zone includes the remaining areas of the job site. Lunch area, restrooms and a command post will be included in this area. All informational/educational material required by OSHA and the NWS Concord should be posted in the Support Zone. No equipment or personnel will be permitted to enter the Support Zone from the Exclusion Zone without passing through the decontamination stations. Eating, drinking and smoking will be allowed only in this zone.

13.2 Site Control Log

CAL INC will keep documentation of training records, PPE use and applicable medical surveillance. In addition, any unsafe conditions present or work practices that have been identified and action taken to correct the identified unsafe conditions and work practices will be identified by the SSHO and documented. Recordkeeping will be performed in accordance with the following.

The Contractor will maintain logs and reports covering the implementation of the SHP. The format will include training logs, weekly reports and a phase-out report. The training log will include the following information for both initial training and refresher training sessions:

- date and place
- area (specific zone) checked
- employees in a particular area
- equipment being utilized by employees named
- protective clothing being worn by employees named
- protective devices being used by employees named and area assignment

The weekly reports will include the following information:

- summary sheet covering the range of work being done
- any incidents of nonuse of protective devices in an area where required, nonuse of protective clothing, disregard of buddy system, violation of eating, smoking, and chewing in prohibited areas, instances of job-related injuries and illness, and monitoring results
- copies of medical certified for employees and the waivers of visitors

13.3 Communication

An employee alarm system that has adequate means of on and off site communication will be provided and installed in accordance with 29 CFR 1910.165. The means of communication will be able to be perceived above ambient noise or light levels by employees in the affected portions of the workplace. The signals will be distinctive and recognizable as messages to evacuate or to perform critical operations.

14.0 PERSONAL HYGIENE AND DECONTAMINATION

The Contractor will provide and maintain decontamination facilities for all personnel at the project site. At the start of the work day, personnel will store personal supply items in the designated area. Additional street clothing (jackets, jeans, shirts, etc.) will be stored in the same area. The workers will pick up a clean Tyvek Suit (if required), respirator, cartridges, filters, and gloves and then proceed to the Decontamination Area. Once inside they will don the equipment for the required level of protection including respirators, disposable Tyvek suits, safety glasses, hard hats, and boots before entering the Exclusion Zone.

Upon returning from the Exclusion Zone, workers will stop at the boot and glove decontamination station. Boots and gloves will be scrubbed with detergent and rinsed with water. The workers will then remove boots, Tyvek suits, hard hats, eye protection, gloves, and respirators. Damaged gloves will be discarded into receptacles provided. Tyvek suits will also be discarded if damaged or saved (if on break, lunch, etc., and the suit is still in good condition). All disposable clothing and respirator cartridges will be discarded into the receptacles provided at the end of each work day. Hard hats, gloves, eye protection Tyvek suits, and respirators will be stored for later use or discarded. Contaminated protective clothing and equipment will not be removed from the decontamination area until it has been properly bagged.

Evaluation of decontamination methods and procedures will be performed as necessary to assure that employees are not exposed to hazards by revising PPE procedures may be modified in number of steps depending on levels of hazards encountered.

Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment will be informed of the potentially harmful effects of exposures to hazardous substances.

A portable emergency shower/eye wash and a 20-lb ABC - type fire extinguisher will be located in the contamination reduction zone. Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they will be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing will be provided and used.

In general, the following personnel decontamination procedures will be employed for workers in contact with potentially contaminated soils and liquids:

- Remove any loose soil from work coveralls or protective suit.
- Decontaminate protective suit, boots, and gloves using a detergent wash and tap water rinse.
- Remove and dispose protective suit.
- Remove gloves, boots, etc.
- Wash hands and exposed body parts with soap and water.

15.0 EQUIPMENT DECONTAMINATION

Vehicles and equipment used in the EZ will be decontaminated in the CRZ prior to leaving the site. The procedures for decontamination of vehicles and equipment will be addressed in the SSHP.

15.1 Decontamination Facilities

An equipment decontamination station will be provided within the CRZ for decontaminating vehicles and equipment leaving the EZ. The decontamination station will include the following: a high pressure hot water system for use after the mud and/or site material has been cleaned from the

equipment. Equipment within the EZ or CRZ will be decontaminated before maintenance is performed.

15.2 Decontamination Procedures

Procedures for equipment decontamination will be developed and utilized to prevent the spread of contamination into the SZ and off-site areas. These procedures will address disposal of contaminated products and spent materials used on the site, including containers, fluids, oils, etc. Any item taken into the EZ will be assumed to be contaminated and will be inspected and/or decontaminated before the item leaves the area. Vehicles, equipment, and materials will be cleaned and decontaminated prior to leaving the site. Construction material will be handled in such a way as to minimize the potential for contaminants being spread and/or carried offsite. Prior to exiting the site, vehicles and equipment will be monitored to ensure the adequacy of decontamination.

Sampling equipment will also be decontaminated in the CRZ. Sampling equipment decontamination will consist of a detergent wash, tap water rinse, spray rinse with reagent grade methanol, rinse with deionized water, and a final rinse with type II reagent grade water. MSDS sheets for the above decontamination solutions are provided in Attachment E.

16.0 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

The SSHP will describe the emergency and first aid equipment to be available onsite. The following items, as a minimum, will be maintained onsite and available for immediate use:

- First aid equipment and supplies approved by the consulting physician.
- Emergency eyewashes and showers which comply with ANSI Z358.1.
- Emergency-use respirators.
- Fire extinguisher with a minimum rating of 20-A:120-B:C will be provided at site facilities and in all vehicles and at any other site locations where flammable or such combustible materials present a fire risk.

17.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

17.1 Pre-Emergency Planning

Alameda emergency response agencies will be contacted, met with, and notified of upcoming site activities and potential emergency situations. The capabilities and commitment of the local agencies will be ascertained and obtained. The contractor will ensure that this Emergency Response Plan is compatible and integrated with disaster, fire, and emergency response plans of the local, state, and federal agencies.

17.2 Lines of Authority

The Contractor's superintendent, and SSHO are responsible for overall site safety. In the case of a site safety concern, emergency or accident, the SSHO should be contacted immediately. Upon notification, the SSHO will make appropriate decision regarding the incident. The SSHO will instruct the Project Superintendent or foreman as to required assistance and or agency or emergency medical personnel warning as required.

17.3 Emergency Recognition and Prevention

The recognition and prevention of hazards and potential emergencies are discussed in detail elsewhere in this plan. In general, emergency situations occur when personnel are seriously injured and require first aid and/or injured, and/or hazardous or potentially hazardous materials are spilled or released to the environment.

17.4 Procedures for Site Evacuation

17.4.1 Emergency PPE and Equipment

The following items, as a minimum (and as appropriate) will be immediately available for on-site use:

- First aid equipment and supplies approved by the consulting physician
- Emergency eyewashes/showers (ANSI Z-358.1)
- Emergency-use respirators
- Spill control materials and equipment
- Fire extinguishers
- Telephone

17.4.2 Evacuation Routes and Places of Refuge

Prior to access into the restricted area and during construction operations, workers will be instructed as to designated evacuation routes and procedures. A route map detailing directions to the emergency medical facility will be posted conspicuously at the jobsite. Additionally, each support

vehicle should be equipped with copies of this map and each driver should be familiar with the route and travel time to that facility. A copy of this figure is included as Attachment F.

A place of refuge will be identified. The purpose of the place of refuge is to provide an off-site meeting place in the event that site evacuation is required. The actual place of refuge will be determined during the weekly on-site toolbox safety meetings.

17.4.3 Site Security and Control

The areas onsite where hazardous substances are known to exist will be secured through fencing and warning signs to prevent access and to warn workers of the associated hazards. Access to the work area will be restricted, and all personnel entering the work area will sign in on the site control log and will be briefed on site specific safety and health issues.

17.5 Procedures for Decontamination and Medical Treatment of Injured Personnel

If during an emergency the use of personal decontamination procedures will prohibit the immediate need to provide life-saving and/or other medical treatment these procedures should be abandoned. Site personnel will accompany the victim to the emergency medical treatment facility (along with a copy of this plan) to advise the medical personnel as to the contamination and chemical specific information required. In cases of chemical overexposure, follow the standard procedures outlined below for poison management, first aid, and, if applicable cardiopulmonary resuscitation.

Ingestion:	Refer to the attached MSDS for information on treatment of specific chemicals and/or call the Emergency Medical Center for instructions.
Inhalation:	Move the person from the contamination zone. Initiate CPR, if needed. Call for medical assistance. Refer to MSDS for specific information. If necessary, arrange for emergency transport of the victim to the emergency medical authority.
Dermal Contact:	Wash with copious quantities of potable water. Remove contaminated clothing and re-wash skin. If necessary, arrange for emergency transport of the victim to the emergency medical authority.
Eyes:	Hold eyelids open and rinse the eyes immediately with copious quantities of potable water. Do not rub the eyes. If necessary, arrange for emergency transport of the victim to the emergency medical authority.

17.6 Nearest Hospital

The nearest hospital is located 3 miles from the site. The address and telephone number are as follows:

Alameda Hospital 2070 Clinton Avenue	(510) 522-3700
Emergency Room	(510) 523-4357

17.8 Emergency Alerting and Response Procedures

17.8.1 Emergency Alerting Procedures

If physical injury or illness due to accidental exposure to hazardous waste occurs, uninjured/unaffected personnel should do the following:

- Evacuate all non-essential personnel.
- Remove injured/exposed person(s) to the Support Zone.
- Remove protective gear from injured/exposed person(s).
- Render first aid if necessary.
- Decontaminate exposed person(s).
- Call paramedics/ambulance.
- Evacuate other on-site personnel to a safe place until the SSHO determines that it is safe to resume work.
- Senior Personnel present will notify the SSHO and Superintendent and Advise them of the incident and the steps taken to prevent recurrence.
- Submit a written report on the incident to the CO Representative within 24 hours. The report will be made part of the final closure file.
- All accident records will be kept at site office and Cal, Inc.'s corporate office as part of their Department of Labor recordkeeping requirements.

Following any emergency response, an evaluation of procedures will be performed. The evaluation should include cause and proposed remedy for subsequent incident prevention. Should an emergency situation develop, an alarm siren, audible throughout the jobsite will be sounded in order to stop work activities if necessary, to lower background noise in order to speed communication, and to begin emergency procedures.

17.8.2 Emergency Telephone Numbers

The City of Alameda has a universal emergency response number, which is 911. When 911 is dialed, a public safety answering service will ascertain the type of assistance needed and quickly summon the appropriate emergency service (Fire Department, Police Department, emergency medical or paramedics, ambulance, etc.) to the site. A complete listing of emergency telephone numbers for project personnel is provided below.

Name	Project Title	Duty Hours	Non-Duty Hours
Robert Barry	Site Superintendent	(707) 446-7996	707-434-2992 (pager)
Joseph Krohn	Alternate QC Manager	(707) 446-7996	707-434-5623 (pager)
James Lew	Contracting Officer	(415)-522-3228	

17.9 Community Alert Program

The City of Alameda has a universal emergency response number, which is 911. When 911 is dialed, a public safety answering service will ascertain the type of assistance needed and quickly summon the appropriate local and/or municipal emergency service (Fire Department, Policy Department, emergency medical or paramedics, ambulance, etc.) to the site. The following are other appropriate personnel or agencies to be contacted in an emergency situation:

Alameda Hospital Emergency Room	(510) 522-4357
Alameda County Environmental Health Department Environmental Health Division:	(510) 567-6700
Federal Environmental Protection Agency (24-Hour National Response Center)	(800) 424-8802

17.10 Procedures for Incident Reporting

In the event that an incident such as an explosion or fire, or a spill or release of toxic material occurs during the course of the project, the appropriate government agencies will immediately notified. In addition, the Contracting Officer will be verbally notified immediately and receive a written notification within 24 hours. The report should include the following items:

- Name, organization, telephone number, and location of the Contractor.
- Name and title of the person(s) reporting.
- Date and time of the incident.
- Location of the incident, i.e., site location, facility name.
- Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.
- Cause of the incident, if known.

- Casualties (fatalities, disabling injuries).
- Details of any existing chemical hazard or contamination.
- Estimated property damage, if applicable.
- Nature of damage, effect on contract schedule.

18.0 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a certificate of worker/visitor acknowledgement will be completed and submitted for each visitor allowed to enter the CRZ or EZ. A blank copy of the certificate is included in Attachment D.

19.0 REPORTING

19.1 Logs, Reports, and Recordkeeping

The following logs, reports, and records will be developed, retained, and submitted to the CO:

- Training logs (site specific and visitor);
- Daily inspection logs;
- Equipment Safety and Maintenance Logs;
- Employee/visitor register (Site Control Log); and
- Environmental and personal exposure monitoring/sampling results.